



CONTRACTOR SAFETY MANUAL

**Your Safety is
on the Line**

Enbridge Pipelines Inc.
Enbridge Pipelines (Athabasca) Inc.
Enbridge Pipelines (Saskatchewan) Inc.
Enbridge Pipelines (NW) Inc.
Enbridge Midstream Inc.

Enbridge Pipelines Inc.

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CODE OF ETHICS AND PROFESSIONAL CONDUCT

The code of ethics and professional standards are to be observed by all Company Site Inspectors and contract/contractor personnel. In their professional activities, the Company Site Inspectors and contract/contractor personnel shall sustain and advance the integrity, honor, and prestige of the profession by adherence to these standards. These standards apply at all times during the course of the Company Project, both on and off property.

STANDARDS

1. Hold paramount the safety and health of people, the protection of the environment and protection of property in the performance of professional duties and exercise their obligation to advise clients, workers and the public of dangers and unacceptable risks to people, the environment, or property.
2. Undertake assignments only when qualified by education and/or experience in the specific technical craft/field involved. Demonstrate responsibility and competence for their craft/field by continued professional development and education.
3. Conduct themselves in a professional manner, recognizing that discrimination or improper conduct on the basis of race, creed, color, language, national origin, political or religious affiliation, sex, sexual orientation, age, marital status, family relationship and disability is strictly prohibited by the Company.
4. Engage only in activities that maintain, enhance and improve their professional skills and avoid circumstances that compromise their conduct.
5. Recognize and respect the work and skills of other Site Inspectors, Contractor/Contract Workers and Workers.
6. Recognize their professional limitations and level of competence.
7. Protect the confidentiality of Company information and disclose such information only when properly authorized or when legally obligated to do so.
8. Conduct their professional relations by the highest standards of integrity and avoid compromise of their professional and ethical judgment by conflicts of interest.
9. Enforcement of Company construction safety rules, policies and procedures as well as any and all Federal, Provincial and Local Safety Rules and Regulations.
10. Properly report all incidents, no matter the size or nature to the proper authority within the Project chain of command.

FOREWORD

The Company is committed to excellence in safety performance. We strive for continuous improvement in safety performance, and require, as a minimum, industry standards and legislative requirements be met. Company workers and the contractor(s) we hire share in the successful implementation of this philosophy.

This Contractor Safety Manual has been developed to present a consolidated set of rules, safe work practices, and procedures related to Pipeline and Facility contractor activities including construction and maintenance activities... These rules and procedures were drawn from Company manuals, Government Regulations and accepted industry standard practices.

It is not possible to address all work activities or potentially hazardous situations in a procedures manual. However, it is the intent to present key procedures and methods which the Company expects to be utilized in accomplishing the work. In addition, the Company expects all contractors and their workers to bring a safe work attitude to the job site.

The Contractor Safety Manual provides approved practices and procedures and when the words "shall," "will" and "must" are used, the wording indicates the procedures are mandatory. When the word "should" is used, the wording indicates that the Company Site Representative/Inspector is allowed to exercise professional judgment.

The Contractor Safety Manual is a minimum standard and - where exceeded by Government Safety Acts, Regulations, and Codes - the more stringent shall apply. Conversely, where the manual is more stringent than regulatory requirements, this manual shall govern.

The Company believes all incidents are preventable and as such, safety objectives are set at ZERO incidents. It is expected all Company and contractor workers take every reasonable precaution to eliminate workplace incidents. No job is so urgent it cannot be done safely. Unsafe conditions and/or unsafe work practices are not acceptable on Company sites and must be corrected before work can continue.

The Company is committed to working together with all contractors to ensure all workers arrive home safely.



Health and Safety Policy

Liquids Pipelines

- The health and safety of employees are paramount in the conduct of our business.
- Risks present in all operations must be managed to prevent occupational injuries and illnesses, through planning, organizing and hazard identification, as well as ongoing monitoring and investigation of close calls and incidents.
- All levels of management are responsible and accountable for providing a healthy and safe working environment and fostering a safety culture for our employees and contractors.
- Management is responsible for establishing rules and procedures, as well as providing proper equipment and appropriate training to ensure employees understand their responsibilities.
- Company rules and procedures for health and safety will comply with government regulations and standards, and will be consistent with industry codes and guidelines.
- Employees must be aware of and comply with all health and safety policies and follow all established rules and procedures.
- Our contractors will follow industry and company health and safety policies to enhance their own safe work practices.
- It is the responsibility of all employees to achieve excellence in health and safety performance by working in a manner that ensures their personal health and safety as well as those of fellow workers and contractors.

A handwritten signature in black ink, appearing to read 'Steve Wuori', written over a horizontal line.

Steve Wuori
Executive Vice President
Liquids Pipelines

Enbridge Pipelines Inc. • Enbridge Pipelines (NW) Inc. • Enbridge Pipelines (Athabasca) Inc. • Enbridge (Saskatchewan) Operating Services Inc. • Enbridge Operational Services Inc. • Enbridge Employee Services, Inc.

2/11/2008



Environmental Policy

Liquids Pipelines

- The protection of the environment is an integral element in the conduct of company business.
- The company will ensure adverse environmental effects are minimized through careful planning, implementation of effective protection measures, and monitoring of company activities.
- The company will comply with government regulations and standards through internal rules and procedures for environmental protection that will be consistent with industry codes and guidelines.
- The company will minimize consequences of emergency events by ensuring prompt and effective response.
- The company will provide appropriate training to ensure employees understand their responsibility to protect the environment.
- Employees and contractors must follow company environmental rules and procedures, and must carry out work in an environmentally responsible manner at all times.
- The company will provide the public and government with relevant information regarding planned activities, and will actively respond to their concerns.
- Environmental damage resulting from company actions or actions of its contractors will be repaired in a timely and efficient manner.
- Environmental research will be encouraged, supported and undertaken when necessary to improve company environmental protection and reclamation procedures.



Steve Wuori
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1.0 DEFINITIONS

Above Ground Facilities – Refers to existing above grade operating facilities, structures and supports. Examples: pumps, motors, valves, pipes, tanks, pipe supports, cable trays, power lines, etc.

Accepted Engineering Practices – Those requirements which are compatible with the standards of practice required by a registered professional engineer.

Aluminum Hydraulic Shoring – A pre-engineering shoring system comprised of aluminum hydraulic cylinders (cross braces) used in conjunction with vertical rails (uprights) or horizontal rails (wales). Such systems are designed specifically to support the sidewalls of an excavation and prevent cave-ins.

Authorities Having Jurisdiction- Any duly constituted Federal, Provincial, Municipal, Board or other Public Authority having jurisdiction over the matter in respect of which such words are used.

Authorized Person or Personnel – Any employee, contractor, or other person that is properly and duly authorized by the Company to be present on Company premises. Persons, including family members of employees, shall not be considered an “authorized person” or “authorized personnel” unless and until authorized by the appropriate Company Supervisor and/or Regional Manager.

Bell-Bottom Pier Hole – A type of shaft or footing excavation, the bottom of which is made larger than the cross section above in order to form a belled shape.

Benching (Benching System) – A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near vertical surfaces between levels.

Bonding – The process of connecting two or more conductive objects together by means of a conductor.

Borehole – A hole in the ground created by drilling, auguring, boring, or other similar operation.

Cave-In – The separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Cold Work – Any work activity or process that is unlikely to ignite flammable vapors (e.g. does not involve spark, open flame or a hot surface).

Company (*Canada only*) – Includes Canadian Companies within the Liquid Pipelines Group of Enbridge Inc.

Company Operations Representative - A Company representative responsible for the location at which the work is being performed by the Contractor.

Company Project Execution Lead or Equivalent – Any Company employee responsible for hiring and overseeing a contract project.

Company Project Safety Inspector – A Company employee or appointed representative of the Company responsible for enforcing the Company Contractor Safety Program, Federal, Provincial, Municipal, Rules, Regulations, Policies and Procedures pertaining to safety and health issues and concerns.

Company Site Inspector – A Company employee or any third party hire overseeing Company projects on behalf of the Company.

Competent Person (*Enbridge*) – A person who, because of training and experience, is capable of identifying hazardous or dangerous conditions and has the authority to take prompt corrective measures to eliminate them.

Confined Space Entry – Entry by a person into a confined space occurs when any part of the body breaks the plane of the confined space and enters the confined space.

Confined Space (*Canada*) - Means an enclosed or partially enclosed space that is not designed or intended for continuous human occupancy with a restricted means of entry or exit and may become hazardous to a worker entering it because of:

- design, construction, location or atmosphere.
- the work activities, materials or substances in it.
- the provision of first aid, evacuation, rescue or other emergency response service is compromised.
- other hazards relating to it.

Consultant – Any third party hire working in an advisory capacity to the Company.

Contract Documents – All documents referred to in the Agreement applicable to the work being performed.

Contract Employee – Any third party hire working under the direct supervision of a Company employee.

Contractor – A company hired to complete specific work and paid directly by the Company.

Contractor Worker – Any third party hire working and their respective employees assigned to complete a specific task.

Contractor Safety Representative – The person or persons designated to act on behalf of the Contractor who is qualified to provide on-site safety services as outlined in this Manual.

Contractor Site Representative - The person or persons designated to act on behalf of the Contractor who is qualified to oversee the work, and enforce the Contractors safe work practices and meet all applicable legislative requirements.

Control Zone – Is an area designated by the site Inspector or crews doing the work that has been isolated through the use of barriers, tape etc. to restrict access in order to manage specific hazards as identified in the Task Specific Hazard Assessment.

Curtain – A hanging piece of fabric extending from the floor to the top of the walls and spanning the entire width of a building, used to adequately isolate work activities. An emergency exit must be available along the length of the curtain (i.e. capability to move a curtain section at one end) and must be clearly marked.

Days Away - Any work-related injury or illness that prevents the worker from reporting to work on the next day.

- *Observation Period* is when a worker is injured on the job and the physician places them in a hospital (or at home) for observation only and the worker is unable to return to work the next day it is then classed as a “Days Away Incident”.

Dead Man Valve- A manually operated fail safe valve designed, so that when not activated by the operator, the system is shut down. Squeeze action or foot pressure by the operator shall be required to activate the water system.

Destructive Below-Grade Activity – Any activity such as mechanical excavation, drilling, boring, piling, deep tilling, and grading.

Direct Supervision (*Canada*) - A competent person who provides periodic or continuous monitoring of the work activity based on risk, is personally and visually supervising the worker who is not competent, and is able to communicate readily and clearly with the worker who is not competent.

Enclosed Space – An enclosed or partly enclosed area that is not designed or intended for frequent and lengthy occupancy, has limited means of entry and exit and may aggravate ordinary job hazards because the space is enclosed.

Excavation – Any man-made cut, cavity, trench or depression in an earth surface, formed by earth removal.

Facility – Any above ground or below ground appurtenances (e.g. Pipelines, piping, valves, communication or electrical equipment, conduits, power lines, guide wires, poles, towers, casings, piles, foundations etc) or the site on which such appurtenances are located (e.g. Pump / compressor stations, valve sites, pipeline right of way), as the context may require.

Fire Watch – An individual whom is trained and competent in the use of a gas monitor and fire extinguisher. The fire watch must be positioned in a suitable location, upwind from the work activity, and can effectively monitor the area. The primary responsibility of the fire watch is to monitor the work area for vapors and flammable conditions as the work takes place and alert workers of any unsafe conditions and provide assistance in case of an emergency. The fire watch must monitor the atmosphere and be present while the work is in progress. If for any reason the fire watch is required to leave the work area, the hot work activity must stop.

Ground Disturbance - Any work, operation or activity that results in the penetration of the ground to any depth greater than 30 cm. If the work, operation or activity is above a facility where the depth of that facility is unknown, then any penetration of the ground to any depth will be considered ground disturbance.

Hazardous Area – Any area in which there is a significant potential for a flammable or toxic atmosphere to develop (see Appendix T).

Hazardous Atmosphere – An atmosphere which exposes an individual to a risk of injury, illness, disablement, or death due to one or more of the following causes:

- A flammable gas vapor concentration in excess of 10% of its lower explosive limit (LEL)
- An atmospheric oxygen concentration below 19.5% or above 23%.
- An atmospheric concentration of any substance above the exposure limits established by the governing regulatory body or as indicated on the Material Safety Data Sheet (MSDS)
- Any atmosphere which is recognized as Immediately Dangerous to Life and Health (IDLH).

High Voltage – Over 750 volts (Canada).

Hot Work - Any work activity or process which may create temperatures likely to ignite flammable vapors/gases and materials, such as spark, an open flame, or a hot surface. It also includes activities, which involve the use of percussion tools and spark producing equipment. This includes all non-intrinsically safe electrical equipment and any combustion engine or source.

Hydrovac – Hydrovacating is the use of pressurized water to loosen and vacuum to extract soil. This includes all activities performed by a vacuum truck including but not limited to “hydrovac,” “shot gunning,” “day lighting,” “potholing,” “water washing.”

Incident – An undesirable event that causes or has the potential to cause injury or property damage.

Low Voltage – 30 to 750 volts.

Medical Aid (MA) – Medical aid (M.A.) is any work-related injury or illness that requires treatment by a physician or by registered professional personnel under the standing orders of a physician. All diagnosed occupational illnesses are considered at least M.A. cases; no illnesses are considered F.A. Loss of consciousness due to an injury or exposure in the work environment is a M.A. and must be recorded as such unless it meets the requirements of Days Away (D.A.).

Modified Work (MW) - Any work related injury or illness that prevents a worker’s ability to perform their regularly assigned duties, but are medically able to perform alternate, modified or restricted work.

Motor Vehicle Incident (MVI) – Any incident involving a licensed motor vehicle in the care of, while performing work for, or for the purpose of Enbridge. Non-MVI classes would be ATV’s, cranes, powered mobile equipment, side booms, loaders, and are included in property damage.

- Use of a vehicle covers driving a company or contractor owned, leased or rented vehicle for business use, or use of a personal vehicle for which the operator is

eligible for reimbursement for the mileage driven. Non-collision incidents of the upset, rollover, jack-knife, or run-off-the-road types which cause fatality, injury or damage are MVI's.

- Any incidents that may be the result of a driver's error, but does not result in a contact with their vehicle causing a fatality, injury or damage are considered an "Other Occurrences".
- Shifting cargo, when abnormal driving causes the shifting of cargo, which results in a fatality, injury or damage is considered a MVI (example, materials coming off trailer while in transit).
- Towing or Pushing; Damage resulting from towing or pushing actions is considered Property Damage. A towed vehicle while in transit causes a fatality, injury or damage is classed as a MVI.
- Contact with an animal is considered a non-recordable MVI if the driver actions are deemed to not be a contributing factor. Contact with animals, birds, while in motion that cause fatality, injury or damage is considered an MVI.
- Cosmetic damage caused by rocks or gravel thrown by vehicles or getting road tar on a vehicle is not an MVI

Open System – Any component of the pipeline system that is open to the atmosphere and has **not** been gas-freed and isolated.

Partition (Welders' Screen) – A portable safety screen complete with stand-alone lightweight frame that is used to enclose hot work activities (available in singular or multi-panel arrangement of various widths and heights).

Positively identify- Means to visually locate (daylight) the existing facility by using either water washing (hydrovac, as an example) or hand digging, in addition to probing.

Permit – A written record by which a Company Authorized Representative in charge of equipment, building, or area authorizes a work crew to do a specific job at the worksite. It identifies hazards and associated controls required to complete the type of work to be performed in the specified job location, during a specified period of time.

Permit Approver – Local approval (i.e. Site Inspector, Operations Manager etc) must approve all work activities.

Permit Issuer – The Company employee or an Authorized Company Representative who has the authority and who understands the hazards involved with the work area and explains these hazards in relation to the work area to the "Permit Receiver".

Permit Receiver – The person who is designated as being in control of the work in a specific area and must ensure that those performing the construction assignments are made aware of the hazards of the area in relation to the construction activity, site evacuation and emergency response plans, and are competent to perform the activity prior to work commencing.

Project – A unique, time-limited undertaking carried out by a project team to achieve a specific set of objectives. The project team however, does not direct the work, but rather ensures the work is carried out according to the contract and scope of work defined in it.

Qualified Electrical Worker – A worker who has the knowledge, training and experience to perform electrical work, including company electricians, contract journeymen electricians, and contractor electricians working under the direct supervision of contract journeymen electricians.

Regulation – A rule, ordinance, law, legal standard or device by which conduct or performance is controlled.

Restricted Area – Any area in which there is limited potential for a flammable or toxic atmosphere to develop (See appendix T).

Safety Watch – A worker who is familiar with the work being performed and has experience fulfilling Safety Watch duties. A Safety Watch must have First Aid/CPR certification and be competent to operate the required emergency equipment, gas detection equipment, and fire extinguishers. This person must have the ability to clearly communicate to the workers under his care and access emergency response and site supervision as required.

Safe Work Practices – The written procedures for performing specific tasks that when followed protects persons from illness, injury, or property damage. These procedures reduce or eliminate known and potential hazards from a specific job task.

Service Contractor – A company providing general services for a location. These services are normally of low risk nature and their employees are not normally exposed to operating facility hazards (e.g. laundry services).

Shoring - Shoring is a system, which “shores” up or supports trench or excavation walls to prevent movement of soil, underground utilities, roadways, and foundations.

Signal Person / Spotter - A competent worker that looks for, locates, guides, signals, and reports hazards - as well as one who will stop unsafe activities - in relation to movement of vehicles and heavy equipment. This person must have the ability to clearly communicate to the workers under their care and site supervision as required.

Site –The entire area required for the performance of the work, including station property, right-of-ways, temporary working space, and all required off right-of-way storage areas.

- **Green Field sites** within the confines of existing facility boundaries shall be clearly identified by fencing or other visible means.
- **Brown Field Sites** – Any construction site or activities inside or adjacent (within 3 meters/10 feet) to existing Enbridge facilities (e.g. construction work inside a facility or beside an exposed operating pipeline that does not have an identified boundary).

Sloping - A method of preventing cave-ins of excavation and trench walls by cutting them back on an incline away from the excavation or trench. The angle of incline shall vary with differences in such factors as the soil type, environmental conditions of exposure, and application of soil overloads.

Spoil Pile - A pile of material that was removed from an excavation, trench, or borehole.

Standard – An approved company practice.

Subcontractor – Any person, firm or corporation contracting with the Contractor to perform part of the work, and shall include partners and associates in a joint venture so contracting with the Contractor.

Supervisor – A person working for a Contractor in a supervisory capacity, at the site.

Temporary Protective Structure – A structure or device designed to provide protection from cave-ins, collapse and sliding or rolling materials within excavations, trenches and boreholes (shoring, bracing, piles, planking, cages, trench boxes and casings).

Trench – An elongated excavated area of ground whose depth exceeds its width at the bottom.

Trench Box – A self contained steel structure placed in an excavation that is designed to withstand soil pressures and protect the workers against cave-ins.

Underground Facilities - Refers to existing below grade operating facilities, structures and supports; example, pipelines, cables, conduits, casings, concrete piles, concrete foundations, etc.

Visitor – Any Company or non-Company individual that is not performing any assigned work activity on a Company worksite (i.e. facility, right-of-way, or construction site). An example of a visitor is any individual or group on a tour of a Company worksite.

Work – The total construction and the performance of related services required by the contract documents or a portion thereof.

Worker – Any person engaged in an occupation at the work site.

2.0 PURPOSE - CONTRACTOR SAFETY MANUAL

The Company's Contractor Safety Manual is part of the Contract Document. Additional copies will be provided to the Contractor prior to the start of construction. The Company recognizes the need to continually evaluate its safety manual and associated programs and will provide updates as required. All Contractors and Subcontractors shall familiarize themselves with the sections that apply to their work.

The manual must be made available to all Contractor and Subcontractor personnel so that they can become familiar with the policies, procedures and requirements contained within. Any questions regarding the meaning or interpretation of these rules, policies or procedures must be directed to the respective Company Regional Safety Coordinator or Construction Safety Coordinator through the Company Site Inspector.

The Company expects compliance with the Contractor Safety Manual and all applicable legislative requirements by all Contractor and Subcontractor personnel. Disregard of these rules, policies and procedures will not be tolerated on any Company site. The Company has the authority to remove and/or ban any person(s) who violates the Health and Safety Policies from any Company project or property.

Any Company worker or designated Company Site Representative is authorized and expected to halt construction activities in circumstances where, in the judgment of that person, the construction activity is not being conducted in accordance with either the Contractor Safety Manual, Contractor's Safety Manual, applicable regulations or is creating a hazard to any person or property.

Safety objectives for vehicle incidents, property damage, days away and medical aid injuries by Contractors on Company projects are set at ZERO. A teamwork approach focusing on a cooperative effort between The Company and the Contractor are essential in order to meet these objectives. Every person on site and the highest level of management must exert every effort to eliminate personnel injury, equipment loss, vehicle incident, and damage to facilities.

The Contractor shall comply with and ensure all Subcontractors comply with all Federal, Provincial, State, and Municipal Acts, Regulations and Codes as well as their own safety program. The most stringent rules, regulations, policies and procedures shall apply.

3.0 VARIANCES

The Contractor Safety Manual is a minimum standard and where exceeded by Governmental Safety Regulations, the Governmental Safety Regulations will govern. This program and/or any part thereof cannot be changed, modified, or deleted, unless as identified as below.

An Engineering Project not impacting Operations would require a risk assessment developed by the Construction Manager and the Construction Safety Coordinator, and signed off by the Project Execution Director and the Manager of Construction Safety.

An Operations Project would require a risk assessment developed by the Project Manager (or equivalent) and the Regional Safety Coordinator, signed off by the Area Supervisor, and approved by the Regional Manager.

An Engineering Project impacting Operations would require a risk assessment developed by the Construction Manager, Construction Safety Coordinator and Regional Safety Coordinator, signed off by the Project Execution Director, General Manager and the Sr. Safety Coordinator.

3.1 Variance to Governmental Safety Regulations

Any and all variances to Federal, Provincial, or Local Regulations pertaining to health and safety SHALL be obtained by the Contractor. The Contractor shall provide the construction / regional safety coordinator with a copy of the variance that shall contain the name and phone number of the office who issued the variance. Upon receipt of the variance and verification of the change, the safety requirement (if) supported by the Company, may be changed.

Any deviation must be carefully considered and approved by the respective Company Management. Prior to the Variances being considered a Variance Form (see Appendix A) must be completed. This document must be kept on file with the project documentation.

4.0 RESPONSIBILITIES

4.1 The Company

The project team will establish responsibilities to monitor the Contractor compliance with all applicable Federal, Provincial and Municipal, Acts, Regulations and Codes as well as all the Company Rules and Procedures. The Company representatives will:

- Review the Contractor's Safety Program, safety record, safety manual, and the safety qualifications of safety personnel.
- Conduct formal and informal site inspections to ensure program requirements are being met by the Contractor and Subcontractors.
- Inform the Contractor of all special conditions associated with the construction and ensure the Contractor develops safe work procedures as required. When necessary, specific hazard assessments are completed prior to work commencing.
- Produce project incident statistics.
- Initiate the necessary steps to correct substandard acts and conditions which could cause injury or property damage.
- Verify the Contractor completes detailed incident investigations that identify both the root cause and the immediate and basic causes.
- Follow up to ensure that the Contractor implements interim controls and any other preventative measures or recommendations as identified in the incident investigation report to the satisfaction of the Company.
- If necessary conduct an independent investigation.

4.2 Company Project Execution Lead or Equivalent

Whenever possible, project worksites shall be physically isolated from operating facilities. If this is not possible, the Project Execution Lead or Equivalent must work with a designated Operations Site Representative and site inspection resources to develop a project and site-specific work execution plan. This plan shall clearly define respective and mutual responsibilities with the work.

Effective planning and communication between the Project and Operations representatives will facilitate a smooth and coordinated execution of all required activities. Where conflicting priorities hinder the progress of planned work activities or normal operations, it is the responsibility of the Project and Operating representatives to escalate the issue through their respective line management.

The Project Execution Lead (or equivalent) shall be responsible to ensure that the Contractor Safety Manual is enforced. The Project Execution Lead (or equivalent) shall ensure that the following aspects are effectively coordinated and communicated:

- Work scope and schedule.
- Roles and responsibilities of Project & Operations resources.
- Communications structure.
- Outage requirements (scheduling and resource availability).
- Work permitting requirements.

- Hazard assessment requirements (i.e., HAZOPS when appropriate).
- Contact the Construction / Regional Safety and Training Coordinator prior to Pre-Bid and Pre-Job meetings.
- Inspection resources and qualification requirements.
- All elements of the site safety program are being carried out.
- Ensure inspections are completed to assess the effectiveness of the Contractor Safety Program.
- Incident reporting and investigation processes.
- Necessary steps to correct safety deficiencies pertaining to the Contractor and Subcontractor.
- Work with the Construction / Regional Safety Coordinator to ensure compliance with safety requirements.
- Hot work tie-ins (scheduling and resources availability).
- Isolation requirements and accountabilities.
- Site security requirements.
- Pipeline Maintenance, Operations and Electrical / Mechanical resource requirements or impacts.
- Records and documentation management requirements.
- Project-related incident response and investigation processes.
- Reporting requirements for stakeholders.
- Hold pre-job meeting(s) to establish ground rules and expectations for contractors as well as reviewing project safety objectives.

4.3 Construction Safety Coordinator

The Construction Safety Coordinator shall ensure that all Company safety rules, policies and procedures as well as federal, state and local rules and regulations are enforced on all Major Projects/Engineering construction projects. On such construction projects, the Construction Safety Coordinator shall:

- Supervises the Company Project Safety Inspector(s).
- Conducts field safety inspections on construction projects and necessary follow-up as required.
- Maintains incident reports and reports statistics to the Contractor Safety Program Analyst or appropriate Operations personnel.
- Maintains incident reports and report stats to the Construction Safety Program Analyst (or equivalent).
- Oversees and/or assists with incident investigations.
- Ensure all personnel incident(s), property damage, vehicle incidents and spills are properly investigated and reported as required (verbal and written reports).

- Maintains open communication with the Regional Safety Coordinators to ensure effective safety and health requirements are enforced.
- Develops and communicate the Project Safety Plan in conjunction with the Project Execution Director.
- Participates in the Pre-Bid and Pre-Job Meetings.
- Reviews the weekly field inspection report conducted by the Project Safety Inspector(s).

4.4 Company Project Safety Inspector

The Company Project Safety Inspector shall be responsible for assisting the Project Execution Lead (or equivalent) and Company Site Inspector(s) in administering and monitoring the Contractor Safety Program. The Project Safety Inspector shall:

- Review the Contractor's Safety Manual, and qualifications of personnel.
- Assist in establishing the Site Safety Program and objectives at the Pre Bid / Pre Job Safety Meeting.
- Conduct daily site safety inspections to ensure compliance with the Contractor Safety Manual.
- Correct unsafe acts or conditions.
- Investigate all incidents.
- Communicate as required with the Company Project Execution Lead (or equivalent), Construction / Regional Safety Coordinator, and Site Inspection Staff.

4.5 Company Site Inspector (Operations and Engineering)

The Company Site Inspector shall be responsible for enforcing the Contractor Safety Manual and all applicable governmental and provincial regulations on site. Project inspection resources are responsible to:

- Coordinate all company project safety orientations as determined by the Project Management Team.
- Monitor all Contractor field activities to ensure compliance with Company and project-specific policies, standards, and requirements.
- Facilitate appropriate planning and communication between the Project Team, Contractor, and Operations.
- Monitor the Contractor to ensure that regulatory, safety, and environmental expectations are achieved.
- Monitor the Contractor to ensure expected level of workmanship and quality as conveyed in the contract and construction specifications are achieved.
- Ensure all required documentation and records are prepared.
- Proactively identify potential safety, cost, quality, environmental, and schedule issues and works with Contractors, Project Execution Lead (or equivalent), and Operations Representative to resolve.

- Assist in project-related incident response and investigation processes.
- Participate in or conduct a minimum of one Company formal safety/field inspection per month.
- Notify the Project Safety Inspector / Construction / Regional Safety Coordinator (s) of all incidents and safety concerns.
- Consult with the Project Safety Inspector / Construction / Regional Safety Coordinator(s) on all issues concerning safety and health.
- Ensure initial locating and identification of all Company facilities has been performed.
- Attend and take an active role in the project safety meetings.

4.6 Operations Project Coordinator

The Operations Project Coordinator shall be responsible to ensure that Contractor Safety Manual is enforced. On Operations Project and Engineering Projects under their direction, the Operations Coordinator shall:

- Conduct all company project safety orientations.
- Perform informal field inspections.
- Perform monthly written field inspections and shall review and follow-up with the Contractor.
- Notify the Regional Safety Coordinator of all incidents.
- Investigate all incidents and injuries.
- Consult with the Construction / Regional Safety Coordinator on all matters concerning health and safety.
- Verify all safety requirements listed on the Work Permit are being followed by the Contractor.
- Ensure initial location and identification of all the Company facilities have been completed.
- Monitor all work activities around Company facilities.
- Continuously monitor all work activities around the Company facilities.
- Ensure a Company Representative takes an active role in the weekly safety/toolbox meeting with the Contractor.
- Obtain a copy of the written documentation of the safety/toolbox meetings for project files.

4.7 Company Operations Representative

The Company Operations Representative is responsible to ensure the following aspects are effectively coordinated:

- Operational participation in work scope definition and design review.
- Liaison and communication with inspection resources regarding project plans and activities.

- Define the expectations and requirements for site security.
- In conjunction with Project Execution Lead (or equivalent), identify specific work scope that will be managed or completed by Operations.
- Approval of Work Permits based upon a well defined scope.
- Participation in all scope definition and hazard assessment activities.
- De-energize, isolate, ground, lockout, and perform initial test on all live operating facilities.
- Coordination of resources required for all hot work.
- Submission of field work requests for required facility outages or tie-ins.
- Support of project-related incident response and investigation processes.
- Communication requirements with Operations Management.
- Operational participation in project pre-bid and pre-job meetings.
- Surface locate below grade facilities prior to Contractor excavation activities.

4.8 Contractor Safety Representative/Supervisor

Each Safety Representative shall be approved by the Company's Construction Safety Coordinator prior to commencement of work activities. At a minimum, all safety representatives, superintendents, foreman and subcontractor foremen who direct contractor or subcontractor personnel must meet minimum Company safety training requirements (refer to Appendix AA). No work shall be performed if the Contractor Safety Representative is not on the project site or actively engaged in his/her duties.

The Contractor Safety Representative shall:

- Be thoroughly familiar with the contents of this Contractor Safety Manual.
- Administer the Contractor's Safety Manual and in addition to ongoing compliance as outlined in the Contractor Safety Manual.
- Conduct daily informal safety inspections.
- Ensure documented daily tailgate safety meetings are taking place.
- Be knowledgeable of and ensure compliance with all Federal, Provincial, Local agencies.
- Provide workers with responses to any regulatory concerns regarding occupational health and safety requirements.
- Inform workers of potential dangers in the workplace and advise them of precautionary measures.
- Ensure the workers have and are wearing the required personal protective equipment (PPE).
- Ensure proper tools, equipment and materials are available and used in a manner for which they are designed.
- Cease affected work activities until an identified health and safety problem has been resolved.
- Ensure injured persons have received appropriate medical attention.

- Report and investigate all incidents with the Project Safety Inspector and ensure that oral and written reports are completed as required.
- Provide Incident reports to the Project Safety Inspector.
- Conduct weekly safety meetings and provide the minutes to the Company Site Safety Inspector.
- Ensure workers on projects with limited or no pipeline work experience are easily recognized on the job site or R.O.W.
- Ensure injured workers are on site working under a modified work program are following the physician's recommendations.
- Conduct documented formal site wide safety meetings on a weekly basis.
- Ensure all regulatory required programs are on site and communicated to all workers.
- Conduct a minimum of one documented formal field inspection per week. All formal field inspections shall be communicated to all project workers and forwarded to Project Safety Inspector.
- Accompany injured worker(s) to medical facilities to ensure correct and proper information is given to the attending medical personnel.
- Ensure the Work Permits are communicated to Contractor personnel prior to the start of any work activities.
- Continually identify hazards, assess the risks, and implement controls.
- Assist site management with the completion of all necessary Hazard Assessments as outlined in this manual.

4.9 Contractor and Subcontractor Personnel

The Contractor Supervisor shall:

- Be thoroughly familiar with the contents of this program.
- Administer the Contractor's Safety Manual and in addition to ongoing compliance as outlined in the Company Contractor Safety Program.
- Conduct daily informal safety inspections.
- Ensure documented daily tailgate safety meetings are taking place.
- Be knowledgeable of and ensure compliance with all Federal, Provincial, and local agencies.
- Inform workers of potential dangers in the workplace and advise them of precautionary measures.
- Ensure the workers have and are wearing the required personal protective equipment (PPE).
- Ensure proper tools, equipment and materials are available and used in a manner for which they are designed.
- Cease affected work activities until an identified health and safety problem has been resolved
- Report and investigate all incidents with the Company Project Safety Inspector and ensure that oral and written reports are completed as required.

- Conduct weekly safety meetings and provide the minutes to the Company Site Safety Inspector.
- Ensure workers on projects with limited or no pipeline work experience are easily recognized on the job site or Right of Way (R.O.W.).
- Conduct documented formal site wide safety meetings on a weekly basis.
- Upon the request of the company, the contractor will provide documentation on training records, inspections, incidents, programs, policies, procedures, etc.

4.10 Contractor and Subcontractor Supervisor

Safety is a TEAM EFFORT and Contractor personnel are responsible for their own safety as well as the safety of others.

Contractor personnel shall:

- Refuse to perform work that would cause imminent danger to one's self or others.
- Understand and comply with all applicable regulations, standards, and requirements.
- Follow safe work practices at all times.
- Use the appropriate tools and equipment for the job as per the manufacture's recommendations.
- Operate machinery and equipment only if qualified and authorized to do so.
- Wear required personal protective equipment (PPE) and clothing.
- Remove from service any defective tools, equipment, structures, and worn or defective protective clothing.
- Report all unsafe conditions or acts immediately to the Contractor's Safety Representative / Supervisor.
- Maintain good housekeeping throughout the worksite.
- Immediately report any incident or Close call to the appropriate site Inspector.
- Report to work fit for duty (i.e. fatigue, illicit drugs, and alcohol).
- Ask questions if you don't know.
- Actively participate in required project meetings.

5.0 PROJECT REQUIREMENTS

5.1 Mandatory Review of Safety Programs

The Contractor shall be registered with “ISNetworld”, and participate with the review and verification process, unless excluded. Contractors shall make available copies of their Health and Safety program / manual to the Company Site Safety Inspector.

Contractors are responsible to have a process for subcontractor selection. Contractors shall be prepared to demonstrate their process and justify selections based on their established criteria. Contractors shall submit their subcontractor’s safety programs upon the Company’s request. Contractors are only allowed to perform work activities that they have submitted within their scope to ISNetworld for approval.

5.1.1 Project Safety Plan

NOTE: This section may not apply to Operations projects and maintenance activities where a hazard assessment will be required in place of a project plan.

The Contractor shall develop and provide a Project Safety plan to the appropriate Safety Coordinator prior to the commencement of the work. This Plan should include, but is not limited to, the following:

- Scope of work for the project which must identify in detail any high risk work.
- Overview of the Contractor's implementation strategy for the Contractor's safety program.
- Project-specific safety goals and evaluation criteria.
- Description of planned incentive programs.
- Schedule outlining planned work hours, schedule rotation, etc.
- Communication plan to be used such as phone, radios, computers, etc.
- Key contacts list including name, position and all applicable contact information.
- Identify all Subcontractors to be used and provide applicable contact information.
- Planned training or other related competency checks to be completed during the project.
- Incident management and investigation methods used by the Contractor.
- Environmental protection plan which includes a detailed Environmental Emergency Response Plan.
- Emergency Response Plans for project activities.
- Listing of required permits, authorizations, etc., required to complete scope of project.

5.2 Contractor Safety Representation

The degree of Contractor safety representation required for each project will be determined in advance of construction prior to award and identified in the bid documents.

Each project is analyzed to determine the appropriate level of safety representation which is required. The following factors shall be considered when making this decision:

- Scope, complexity, and length of the project
- Total number of Contractor workers on site
- The risks associated with the work.

There are two levels of representation required by the Company.

Level 1:

A combined Supervisor or Worker/Safety Representative is required on projects with 15 or less people on site.

Level 2

A minimum of one (1) full time Safety Representative (CSO or other recognized certification) with NO OTHER field construction duties is required for any project with 16 or more people on site. The Safety Representatives shall coordinate the Contractor's Safety Manual, the Company Contractor Safety Manual, and advise the Contractor management/supervision on matters related to Occupational Health and Safety.

Additional Contractor Safety Representatives may be required as agreed on with the Company's management prior to the Pre-Job meeting.

The Company reserves the right to increase the required Safety Representation for the project, based upon a Hazard / Risk Assessment.

The Contractor's Safety Representative's résumé of qualifications and experience shall be submitted with the bid documents for approval by the respective Company Safety Coordinator.

In addition, the Company may approve other comparable qualifications after a review of the person's combination of training and experience. Other approved qualifications may be but are not limited to:

- a. Completion of Occupational Health and Safety certificate from a recognized Post Secondary Education Source; or
- b. Canadian Registered Safety Professional (CRSP), Certified Safety Professional (CSP).

Certificates of approved training must also be available prior to the commencement of work.

5.3 Pre-Job Meeting

Once a contract has been issued, a pre-job meeting shall be held before commencing any work activities.

Contractor Superintendent, Contractor Safety Representative, and Company Site Inspector, Project and/or Construction Manager, Construction Safety Coordinator, Company Contracts Representative must be in attendance. Operations attendance shall be determined in consultation with the Project Execution Lead or Equivalent.

New Contractor and subcontractor personnel who direct the work but did not attend the pre-job meeting must review the pre-job meeting guidelines before starting work and sign off as reviewed on the last page of site inspector's retained copy. The person conducting the review may be the Enbridge safety inspector, the site inspector, or the contractor safety representative.

The "Pre-job Meeting Guidelines" (see Appendix B) must be completed at this time and minutes of the meeting will be documented by a Company Representative and copies will be distributed to the Contractor.

5.3.1 Contractor Safety Manual

The Contractor Safety Manual is part of the contract documents and additional copies shall be provided to Contractors at the pre-job meeting. All Contractors shall familiarize themselves with those sections that apply to their work.

A summary of this manual has been prepared in handbook form entitled "*Safety and Environmental Guidelines for Contractors*". The Contractor SHALL ensure that *EACH* worker receives a copy of the handbook.

5.4 Annual Company Safety Orientation

The Contractor shall ensure that each worker has received the "Annual Company Safety and Environment Orientation" *prior* to commencing work. For Construction projects, the Company's video "*Your Safety is On the Line*" must be viewed. The subjects covered in a safety orientation shall include, but are not limited to, the following:

- The Annual Company Safety orientation is required each calendar year.
- Review of the Company's safety and environmental requirements (for example "Safety and Environmental Guidelines" and "Your Safety is On the Line" videos).
- Safety and Environmental Guidelines for Contractors handbook.
- Safety responsibilities of Contractor personnel.
- Potential hazards and special safety requirements.
- The worker's right to refuse to do unsafe work or work in unsafe conditions.

Upon completion of the annual Company safety orientation, each worker must complete the quiz, sign, and return the last page of the "*Safety and Environmental Guidelines for Contractors*" handbook to the Company Site Inspector. A hardhat decal will be issued by the Company Site Inspector to indicate that the handbook has been issued and accepted by the worker.

5.5 Site / Project Specific Orientation

For Major Projects and Engineering projects the Contractor shall prepare a project orientation, covering specific health, safety, and environmental policies, site specific hazards and project

requirements. This orientation shall be presented to Company for approval, prior to commencement of the project.

- Site specific orientations for operations projects will be provided to the Contractor by the Company

A Site/Project Specific Orientation is required for each Contractor/Subcontractor worker prior to work commencing. The Site/Project Specific Orientation includes a review of the following pertinent information:

- Importance of safety to Company.
- Safety objectives and zero tolerance of rules violations
- Work permit requirements.
- Right and responsibility to refuse dangerous work.
- Parking and backing-in policy.
- Security requirements and restricted access areas.
- Location of designated smoking areas.
- Cellular phones are not allowed in hazardous or restricted areas.
- Location of hazardous areas as specified on the site safety plot plans (i.e., NGL facilities, sump tanks, etc.).
- Location of nuclear devices on site.
- Required personal protective equipment.
- Vehicles and equipment requirements, i.e. backup alarms, positive air shutoffs, and spark arrestors.
- Specific work site hazards.
- Appropriate safe work procedures or practices for project.
- Location of government regulations, safety manuals, and copy of all safe work practices and procedures.
- Stop work if an incident occurs and where to report it.
- Review of following emergency procedures:
 - Review of site safety plot plan.
 - Location of control room to report emergencies.
 - Evacuation procedures.
 - Evacuation alarms, sirens, or horns.
 - Requirement and location of fire fighting equipment.
 - Emergency phone numbers.
 - Location and distance of nearest hospital.
 - Identify first aid attendants and location of first aid station.
 - Location of wind socks.
 - Location of emergency exit gates / gate override locations;
 - Location of assembly areas; and
 - Smoking is not allowed in the assembly areas.
 - Are there any questions?

NOTE: Contractors brought in for emergency work shall be given a safety orientation, going over the specifics of the situation *before* starting work.

Contractor Working In an Office

Safety orientation for contract office workers must include a review of the building's emergency procedures and the Safety and Environmental Guidelines for "Contractors" handbook.

Contractor Safety Orientation Records

Completed Contractor's orientation records shall be filed onsite or forwarded to the Project Execution Lead (or equivalent), and retained as part of the appropriate regional/project files.

Where the orientation includes a review of the topics listed on the Contractors Site/Specific Orientation Record, each contract worker employed onsite shall sign the Contractor's Site/Specific Orientation Record. Completed Contractor's Site/Specific Records shall be retained as part of the appropriate regional/project files.

5.6 Safety Meetings

All Contractor and Subcontractor workers shall attend the required safety meetings. The Contractor shall provide the Company with a 24-hour notice of the time and place of these meetings to allow the Company Site Inspector(s) to attend.

- On a **daily basis** the Contractor will conduct a "tailgate" safety meeting to review the daily work permit and health and safety issues associated with the day's work, or in some cases, prior to a specific high-risk task (refer to Appendix C) for a sample of the form.
- On a **weekly basis**, or one per work rotation, the Contractor will conduct a formal site wide safety meeting to review all health and safety issues and forward the written minutes to the Company Site Inspector for their review (refer to Appendix D) for a sample of the form.
- On a **weekly basis**, all Foremen on the project along with the Contractor's Superintendent and / or Safety Representative will conduct a meeting to review matters pertinent to the project. Copies of the agenda, minutes and attendance records shall be included with the project documentation.

5.7 Personal Conduct

Horseplay, fighting and disregard for the safety requirements will result in removal of those involved from site.

5.8 Smoking

Smoking on Company property in hazardous or restricted areas or right-of-ways will only be permitted in outdoor areas that are posted and approved by Company Operations Management. Designated smoking areas shall be kept clean and equipped with a proper waste container and at a minimum of 1 - 20 lbs ABC fire extinguisher. Ensure that the designated smoking area is not located near any doors or windows.

5.9 Visitors to the Site

The Contractor shall provide the Company notification of their intent to bring visitors on site. Unauthorized persons will not be allowed on Company property.

All visitors shall report to the site or station office or control room prior to visiting any Company station, terminal, or pipeline construction or maintenance site.

All visitors are subject to the same regulations related to conduct and protective equipment as other Contractor workers

With the exception of Company workers or guests, the Contractor shall provide visitors all necessary control and guidance to ensure their protection, and provide appropriate personal protective equipment for their use where necessary. Visitors to any site will be for work-specific purposes only. All workers and visitors shall have a site-specific orientation before entry into the work area and wear visible visitor identification at all times.

5.10 Cameras, Audio-Visual and Communications Equipment

Electronic equipment such as cameras, audio-visual equipment, cellular phones and two-way radios are not permitted within the fenced boundaries of Company facilities without prior approval from the Project Execution Lead (or equivalent), and may require a Work Permit for their use.

Intrinsically safe portable communication devices (e.g. cellular phones, pagers, radios, etc.) are permitted for use at operating company facilities, along the Company R.O.W. and at green-field construction sites (i.e. new sites with no existing operating facilities or hazardous or restricted areas).

At operating Company facilities, the use of non-intrinsic portable communication devices are only permitted within designated areas as per local operations requirements. Such communication devices must be left in these designated areas and not carried on site.

At brown-field construction sites and along existing Company R.O.W.s, the use of non-intrinsically safe portable communication devices is not permitted.

Areas designated as hazardous or restricted (i.e. valve sites, densitometer sites and within a work area that becomes hazardous as a result of the work activity being performed), the use of non-intrinsically safe portable communication devices is not permitted.

A communication device, regardless of its rating, will not be permitted to be used while driving a vehicle, operating mobile heavy equipment (e.g. backhoes, dozers, bobcats, etc.) or while within 15 meters / 50 feet of operating mobile heavy equipment.



WARNING: Due to the potential risks associated with increased use of cellular phones, violations will result in disciplinary action.

5.11 Housekeeping

The Contractor must ensure that good housekeeping practices are maintained in all work areas including, field office and marshalling yard, on or off-site storage areas and the construction right-of-way. The use of industrial style dumpsters is recommended at the marshalling yard and any other areas as may be required. Garbage shall not be allowed to accumulate on the construction right-of-way; all garbage shall be collected and removed daily. Any garbage which has the potential to attract wildlife must be collected and secured daily until disposal.

5.12 Firearms / Weapons

The use or possession of firearms and / or archery equipment is prohibited on Company property or along the right-of-ways unless otherwise approved in writing by the Project Execution Lead (or equivalent) and / or Operations General Manager.

5.13 Pets

Pets are not permitted on Company work-sites, property or in vehicles.

5.14 Fatigue Management

The Contractor shall implement a Fatigue Management Plan when workers are at an increased risk from fatigue-related effects. This increased risk can be due to:

- Extended length of shift worked (beyond 12 hours).
- Extended consecutive days worked (beyond 10 consecutive days).
- Extended travel time to and from the work site (total work day, including travel, exceeds 14 hours).
- Excessive physical effort required as part of normal work activity.
- Environmental extremes (heat, cold, noise, vibration, lighting, etc).
- The fatigue management program should consider the following:
 - Identification of the factors that lead to fatigue.
 - Assessment of the risks associated with the workplace factors that contribute to fatigue.
 - Identification of control measures to manage exposure to fatigue.
 - Implementation of the selected control measures.
 - Rehabilitation / Return to work.
 - Management approval processes.

5.15 Extended Hours

The Contractor shall submit an “After Hours Work Plan” to the Site Inspector or Site Supervisor prior to any extension of regular work hours or the addition of an extra shift. This Plan is intended to be used when Contractors are required to work after regular hours in the absence of a Company Inspector. This Plan does not alleviate the Contractor from having a “Working Alone Policy”. The Site Inspector shall review and authorize the Plan to ensure adequate coordination of the activities and that emergency response and security issues have been addressed. Operations Management must approve extended work hours within an operating facility.

5.16 Work in the Dark

Work after dusk (with the exception of security) generally is not permitted and, if necessary, will only be allowed if the following conditions are met:

- Prior approval from Company.
- There is a minimum of two (2) workers, or communications exist to outside areas to request assistance if required.
- Adequate lighting is provided to illuminate the work area.
- Regular “night shift” work will require prior approval from the Company.
- For night security work, one person shall be allowed to work alone so long as they have adequate communication to outside areas. Communications must be maintained and checked at least every two hours with a control room or other appropriate personnel familiar with the Site and Emergency Response Plan for that Project.

5.17 Working Alone

All Contractors will take specific precautions for those workers working alone, both during normal and unexpected work situations. This would include workers required to travel alone to remote location or where there is no routine interaction with other people.

The Construction / Regional Manager and / or Construction / Regional Safety Coordinator must ensure that the Contractor has completed the required hazard assessments prior to the work taking place.

Where any worker is required to work alone, the Contractor must ensure that all legislated requirements are adhered to. Measures can include, but are not limited to the following:

- The Contractor shall provide effective radio, telephone or other electronic communications.
- Workers shall not work alone in hazardous conditions (e.g. potential for exposure to hazardous gases, severe weather) without first making certain that appropriate safety precautions are taken (e.g. personal gas monitors, frequent communications).
- Workers shall not work alone under conditions which are deemed to be immediately dangerous to life and health (IDLH).
- Safe work procedures shall be in place and workers must be suitably trained.

- Equipment shall be in safe condition and Workers are to have appropriate first aid and emergency supplies.
- Workers working alone shall inform co-workers of their whereabouts and expected movement/travel.

A designated person shall periodically make contact with those who are working alone and should be alert for any unusual delays in re-establishing contact.

5.18 Manual Lifting

Proper methods of manually lifting and handling materials protect workers from injury and also make the job easier. When equipment is available and conditions make it practical, use mechanical devices for lifting and carrying. Cranes, hoists, pickers, lift trucks, and similar units are made for this purpose. The Contractor is to ensure that all workers required to perform manual lifting tasks receive proper instruction on back care and lifting methods.

5.19 Sanitary Facilities

The Contractor shall provide sufficient drinking fluids, toilets and personal washing facilities for all Contractor personnel in accordance with Federal, Provincial, Municipal Act, Regulations and Code.

The Contractor shall be responsible to ensure that these facilities are adequately serviced. Portable toilet facilities must be secured in such a manner as to prevent them from being knocked over by equipment, vehicles, or high winds. All site personnel are required to use portable toilets as provided on the worksite.

5.20 Walking On Pipe

The Contractor must perform all work activities such that no workers are required to walk on top of the pipe at any time. Workers shall use alternate means to obtain their survey shots on the pipe, and the contractor will use alternate methods of completing tie-ins without the foreman or any other person walking on the pipe.

Walking on pipe is strictly prohibited.

5.21 Site Access

Entry to the Company property and construction sites shall be restricted to authorized persons. Contractors shall access through gates or entry points designated by the Company.

Contractor workers must park in designated areas. The Contractor shall be responsible to arrange and provide off-site parking and transportation to and from the work site. Access to roadways and driveways shall be kept open and free of parked vehicles.

Only contractor vehicles required for the completion of work activities shall be allowed in the immediate work site (such as welding, x-ray and equipment trucks). All other vehicles shall be parked at the Contractor parking area or Company approved parking areas. Whenever possible all vehicles shall be backed into their parking space, or positioned to drive forward while on

Company property (i.e. Company facilities, office trailers, etc.). Drivers should perform a walk around prior to moving parked vehicles.

The Contractor shall ensure all project roads, parking lots, lay down areas, entrances to buildings etc remain free and clear of all snow and ice as required. During summer months the Contractor shall provide for dust control measures as needed throughout the project.

5.22 Grounding of Portable Equipment

All portable equipment (i.e. welding units, generators, portable light plants, air compressors, etc.) shall be properly grounded as per manufacture guidelines.

5.23 Matches / Lighters on Site

Safety matches (those ignited on the box or folder) and lighters with enclosed mechanisms (i.e., flip-top type) may be carried by workers at the work site. Strike anywhere matches or single action lighters (i.e., disposable butane lighters) must be left in designated smoking areas, offices, vehicles, etc, matches and lighters are prohibited in all hazardous and restricted areas.

5.24 Exits / Landings / Stairways

All entrances, exits, landings, and stairways must remain clear and free of ice, snow, clutter etc at all times. Every exit landing or stairway, having more than three steps, which provide access and egress to portable work or office trailers, shall conform to all applicable regulations and codes.

5.25 Severe Weather

Contractors should have a process to manage severe weather. A Severe Weather Plan may address issues such as lightning, tornados, wind, earthquakes and extreme heat and cold (see Appendix E for cold weather information). All testing or grounding (for mitigating induced voltage) and/or work in or around structures (i.e., tanks, side-booms, cranes, dozers, etc.) outside of compressor/pump buildings and while working on the right-of-way shall be stopped when an electrical storm is visible from the work site. Work shall not recommence until 30 minutes after the final observation of lightning and thunder.

5.26 Security

Company Construction / Project Execution Lead or Equivalent must communicate Regional Security expectations to all Contractor personnel and compliance will not be compromised.

Vehicles and trailers belonging to the Contractor and their workers are subject to unannounced searches while on Company property (i.e. station, terminal, R.O.W., etc.).

5.27 Company Warehouse and Storage Depot

- The Company warehouse and storage depot is designated a hardhat and safety footwear area.
- All dangerous goods being transported must have all required TDG documents and labelling present.
- All persons (shipper/driver) handling dangerous goods for transportation must carry a valid TDG certificate.

5.28 Contractor Lay-Down and Storage Areas

The Contractor Shall ensure all materials are stored in designated areas, convenient for unloading and loading trucks and sufficient safe clearance for movement of all necessary vehicles shall be provided.

- Benches, boxes, chairs, or bins shall not be used to stand on or climb. Approved stepladders shall be used to reach material on high shelves or bins.
- Metal containers with lids shall be kept at convenient locations for waste disposal.
- Overhead clearance shall be posted wherever necessary and overhead power lines clearly identified.
- Lumber shall be stored free of protruding nails and other associated hazards.
- Except for large tanks, material shall not be stored on the ground. Racks, skids, planks, or other material shall be used.
- Stored material shall be stacked in a manner that makes it secure against sliding or collapse.
- Pipe shall be adequately blocked/chocked when stored.

5.29 Preventative Maintenance Programs

Contractors must have a program in place that is designed to inspect and verify that the tools and equipment used on a Company project is in the safest condition possible.

Contractors must inspect, maintain, and repair equipment and tools in accordance with industry practice, legislated requirements, and manufacturer's specifications.

Contractors will inspect equipment and tools before field assignment to verify that they are free of defects or deficiencies and are properly equipped according to policy, industry practice, jurisdictional legislated requirements, and manufacturer's specifications.

Tools and equipment shall be inspected daily and prior to each use by the user to verify that they are in proper working order. Damaged or defective tools must be tagged "OUT OF SERVICE" and removed from service.

The contractor will ensure that only competent persons will maintain tools, vehicles, and mobile equipment in accordance with the manufacturer's maintenance requirements. Records of maintenance will be kept.

All equipment dispatched to a site shall have operation, testing, maintenance records, and maintenance instructions. These records may be requested by company representatives at any time, including prior to the equipment being used on site.

5.30 Fire Piles

Burning shall not be permitted on Company property or right-of-way without prior authorization from the Operations Regional Manager. Brush and slash shall be disposed of by mulching and spreading on an area designated by the Operations Regional Manager. When authorization to burn has been received, a detailed safety procedure shall be submitted to the Company for approval prior to the commencement of burning.

The Contractor shall obtain a burning permit from the local authority prior to commencement of burning.

A continuous Safety Watch shall be required where burning has been permitted and a minimum of two 30 lbs (or 4 - 20 lbs) ABC dry chemical fire extinguishers in operating condition shall be readily available. The actual on-site requirements for fire protection shall be established within the detailed safety procedure submitted to the Company and shall be in accordance with the applicable government regulations.

5.31 Drug and Alcohol Use

The use, possession or being under the influence of alcoholic beverages or illicit drugs, by any worker (Inspector, Contractor worker or Contract worker) is strictly prohibited. Violators will be removed from the project site immediately.

The Company reserves the right to request the Contractor have an alcohol and drug testing policy based the 2005 Canadian Model for Providing a Safe Workplace - Alcohol and Drug Guidelines and Work Rule. The Company may request that the Contractors Policy include criteria for reasonable cause, post incident and / or site (pre) access alcohol and drug testing.

Workers under the influence of prescription drugs causing impairment may also be removed from the site and may be subject to the disciplinary measures.

5.32 Disciplinary Measures

The Contractor shall ensure compliance by all Contractor and Subcontractor personnel with the Contractor's Safety Manual, as well as the Company's Contractor Safety Manual.

Any Company Representative is authorized to halt a construction activity in circumstances where, in the judgment of that person, the construction activity is not being conducted in accordance with the Contractor Safety Manual, Contractor's Safety Manual, Federal, Provincial or Municipal Act, Regulations, Codes, or is creating a hazard to any person or facility infrastructure at the construction site.

In addition, the Company Site Representatives have the authority to request any worker who blatantly violates the Health and Safety policies to leave the site permanently. Disciplinary measures for non-compliance will be strictly enforced.

There are two levels of action that may be initiated depending on the severity of the infraction.

Level One

Includes offenses which will result in the immediate removal of the worker from the work site:

- Workers under the influence of alcohol or illicit drugs.
- Workers possessing, using or distributing illegal substances or alcohol on the Company site.
- Fighting or uttering threats.
- Any instance of sexual harassment.
- Criminal activity
- Actions of gross negligence which results in injury, fatality or property damage.
- Behavior or attitude which could cause severe injury or damage.
- Blatant disobedience of any of the Company rules, policies and procedures.
- Failure to wear and use the required personal protective equipment (PPE).
- Failure to use the necessary safety equipment when needed, required or prescribed.
- Smoking in an area not designated as a smoking area.
- Possessing a firearm on site (on person or inside a vehicle).

Level Two

Includes offenses which require use of a formal disciplinary system:

- All actions in which the worker willfully disregards the Company's safety policies, the Contractor's safety policies or Federal, Provincial, local Safety Regulations and Recommendations.

Discipline:

- **First Offense** – not limited to a documented verbal or written warning.
- **Second Offense** – REMOVAL FROM THE PROJECT.

Written warnings and removal letters for projects shall be issued by the Company.

6.0 HAZARD ASSESSMENT, ELIMINATION, AND CONTROL

The Contractor shall have a written process in place to identify, assess and rank, the hazards associated with their work.

At a minimum, this program shall contain the following elements:

1. Project Hazard Assessment (commonly referred to as JHA)
2. Task Hazard Assessment (THA)
3. Field Level Hazard Assessment (FLHA)

6.1 Project Hazard Assessment (commonly referred to as a JHA)

The Contractor shall complete a Project Hazard Assessment (see Appendix G) for all work activities. A copy shall be provided to the Company for review prior to site mobilization.

The Project Hazard Assessment shall be dated and specify the methods that will be used to control or eliminate the existing or potential hazards.

Following mobilization, supervisors shall update and add applicable information specific to the work package and agree on the best way to address and manage the hazards. The Contractor shall review the updated assessment with the crew prior to work for additional input. This review with the crew is a critical component of the Hazard Assessment process and shall be completed on an ongoing daily bases.

<p>NOTE: On Operations projects, the project hazard assessment may be performed by the company and reviewed and approved with the Contractor.</p>
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6.2 Task Hazard Assessment (THA)

A Task Hazard Assessment (see Appendix H) shall be prepared prior to the start of non-routine, high risk tasks or in the absence of written work procedures. Hazards and controls shall be identified for each step to complete the task in sufficient detail to ensure that all hazards are identified and controlled.

The Contractor shall involve affected workers in the development of the Task Hazard Assessment.

The Task Hazard Assessment and control measures shall be reviewed with all workers involved in the specific task for which the Task Hazard Assessment was prepared.

The Task Hazard Assessment shall be approved by the Project Safety Inspector and/or the Company Site Inspector in writing prior to the work commencing and shall be completed prior to a Work Permit being issued.

6.3 Field Level Hazard Assessment (FLHA)

Prior to the start of work, or when a significant change of scope occurs, a formal Field Level Hazard Assessment (see Appendix I) shall be completed involving the Contractor Site Representative and workers involved in the work.

The Field Level Hazard Assessment shall be reviewed and signed off with all workers as part of the tailgate/toolbox safety meeting prior to starting any work. The Field Level Hazard Assessment shall be completed in the workplace where the task will be performed. This document shall be handwritten, photocopying is not permitted.

Workers shall complete a Field Level Hazard Assessment document to identify, assess, and control hazards associated with their work. Each worker shall continually assess the work as it relates to them, especially in the event that the scope or conditions of the planned work changes (e.g. weather, other work taking place in the area, etc).

Completed Field Level Hazard Assessments are to remain at the work site and available for review by the Company Representative until the project is completed.

6.4 Hazard Controls

Where identified hazards cannot be eliminated, hazards will be controlled in the following order.

6.4.1 Engineering Controls

Where a hazard cannot be eliminated, the Contractor will first implement engineering controls to prevent a worker from coming in contact with an identified hazard. This includes the use of physical guards, barricades and barriers that prevent or eliminate worker contact with the hazard.

6.4.2 Administrative Controls

Where the hazard cannot be eliminated through engineering controls, the Contractor will implement administrative controls to reduce worker exposure to a hazard. This includes the development of practices and procedures to reduce worker exposure to an identified hazard.

6.4.3 Personal Protective Equipment (PPE)

Where hazards cannot be controlled through engineering or administrative controls, the Contractor will implement personal protective equipment standards to protect the worker from the hazard, but shall not consider PPE as the first method to control a hazard.

A combination of engineering, administrative and personal protective equipment can be used to control identified hazards.

6.5 Hazard Communication

Warning signs identifying known hazards shall be posted to warn workers and others in the area of the specific hazard. All signs shall be constructed in a professional manner and shall meet legislated and Company design and installation standards.

The Contractor shall request approval to use signs, which are different, but serve the same intent from those that may be shown in project documentation drawings.

Samples of these signs include, but are not limited to the following:

Directional Signs

Shall be installed throughout the project area as required.

No Trespassing/Open Ditch Signs

The signs are to be posted at all entries to the right-of-way. Signs shall face the intersecting road/highway, where construction activities are being conducted, and shall display a contact telephone number for unauthorized personnel to contact.

Construction Warning Signs

All crossings of any Interstate, Highway, municipal or private roads shall be posted with construction warning signs, which are designed and located in accordance with the requirements of the applicable legislation. Such signs shall be clearly visible to traffic approaching the crossing location from both directions.

High Pressure Testing Signs

High pressure testing signs shall be posted at all open piping locations, e.g. test section ends and, at all entries to the right-of-way, recreational trail access points, while sections are under test. Signs shall face intersecting roads/highways.

“Smoke” Warning Signs

Warning signs shall be used to warn traffic of poor visibility due to smoke from brush burning operations. All such warning signs shall be in accordance with applicable legislation.

Miscellaneous Warning Signs

The Contractor shall erect other such warning signs as necessary, or as requested by the Company, to warn construction personnel and/or the public of other hazards (e.g. STOP, slow, curve, steep hill, noise hazards, caution, work crews ahead, suggested speed restrictions, trucks turning, work in/over navigable waters etc.).

7.0 EMERGENCY PREPAREDNESS / RESPONSE / REPORTING

7.1 Emergency Plans

The Contractor, unless otherwise specified during the project planning phase, shall prepare an appropriate, detailed written Emergency Response Plan for the work prior to job commencement. The Plan will include, but is not limited to:

- Instructions for dealing with and reporting any incidents and/or injuries.
- Transportation Plan; how to transport injured or ill persons to the nearest hospital or evacuation site for pick up by ambulance or helicopter.
- Air Medivac if required for serious injuries.
- Response in the event of a leak or pipeline rupture, including site evacuation procedures and gathering points.
- Response plans for unique rescue situations for planned work, including but not limited to: suspended worker, working on elevated platforms, confined space and water rescue.
- Response to environmental emergencies, e.g. fuel, oil or chemical spills, silt and erosion control.
- Contact numbers for notifying Authorities Having Jurisdiction (e.g. lands and forests, environment) and the Contractor's and the Company designated personnel (including after hours phone numbers and location).
- Emergency telephone numbers and locations for police, fire, ambulance, and hospitals.
- GPS coordinates Legal Land Descriptions & list of suitable Air Medivac sites along route.

The Plan shall be reviewed with all personnel at the Project Orientation so they are familiar with its contents. Copies of the Plan shall be readily available at the worksite and must be carried in all vehicles.

The Contractor shall have all special materials and equipment required to support the Emergency Plans on site. This equipment must be readily available for use and must be inspected weekly to ensure operational readiness. This equipment shall include items such as air horns, wind socks, gas detectors, respiratory equipment, firefighting equipment, spill response materials and equipment, silt fencing and filter cloth, etc.

As part of the emergency planning process, the Contractor shall inform and liaise with municipal emergency response agencies along the project length, in the event their assistance is required, (e.g. ambulance, fire departments, hospitals, and police).

NOTE: Emergency Contact information shall be posted at the site.

NOTE: Operation Contractors working at operating facilities will be provided with ER information specific to the type of work and location by the Regional Operations Representative.

7.2 Emergency Evacuation

It is the responsibility of all personnel to immediately report all leaks, fires, and other emergency or potential emergency situations.

In the event of an alarm or an emergency, all work shall cease immediately and all personnel are to evacuate on foot to predetermined assembly points.

All personnel are to be familiar with evacuation procedures in the event of an emergency, including designated gathering points and head counts to account for all personnel. Evacuation drills will be conducted as deemed necessary by company site management.

NOTE: All permits shall be suspended during emergencies and must be revalidated.

7.3 Fire Prevention

The Contractor shall prepare a Fire Prevention Plan for the project, where applicable.

Good housekeeping is an important part of fire prevention. Garbage shall be collected and secured daily until it can be properly disposed of.

The Contractor shall take all necessary precautions to prevent fires, including but not limited to the following:

- Fuels, volatile solvents or any other flammable substances must be stored in containers that are clearly labeled, approved for their contents and located in a safe place away from any source of ignition.
- Flammable liquid containers shall be electrically bonded when liquids are being transferred from one to another.
- Flammable substances and quantities of chemical in excess of that needed for one day's work shall be stored in an approved storage facility, isolated from the actual work areas.
- Where flammable substances are stored or used, conspicuous signs must be posted stating "NO SMOKING OR OPEN FLAMES WITHIN 8 METERS (25 FEET) OF THIS AREA".
- Workers shall guard against any part of their clothing becoming contaminated with flammable liquids.
- Clean up spills promptly.
- Rags contaminated with flammable substances shall be stored in an approved metal container with a tight fitting lid
- Smoking is permitted only in designated smoking areas.



- A designated fire watch is required under the following circumstances and as per the completed Hazard Assessment
 - A fire watch is required when engaged in hot work activities such as:
 - Welding, flame cutting, or grinding in hazardous areas;
 - Any hot work on or around open systems;
 - Any hot work where product or vapors are present.
- This statement should be in the electrical section under safety watch.

For each work area the Contractor is required to supply and maintain adequate firefighting equipment sufficient to handle expected fire emergencies that might occur during the work activity. The Contractor shall ensure that workers are competent in the proper use of site firefighting equipment.

Each fire extinguisher shall have a tag or label securely attached that indicates the month and year the inspection was performed. Annual maintenance records must be provided upon request.

All work activities in the general vicinity of the fire shall be stopped and site / operations management shall be notified immediately. Workers may attempt to extinguish a fire only if safe to do so and if they are confident in their abilities to effectively fight the fire. If workers cannot ensure their own safety or if there is a risk of being trapped in the fire, workers must immediately evacuate.

7.4 Medical Providers Responsibilities and Qualifications

The Contractor shall have on-site qualified first-aid personnel as required by Federal, Provincial, Municipal Acts, Regulations and Code. Such personnel shall have current certification in First Aid and CPR. If identified in the Engineering contract documents, projects such as cross-country pipelines, major station or terminal work shall have at least one licensed EMT on site with a fully equipped response vehicle that will respond to and handle all medical incidents. These personnel shall report all medical incidents to the Company Site Inspector or Company Project Safety Inspector immediately upon being informed of said medical incident.

Level of Care and Authority <i>(Highest to Lowest)</i>	Licensed and Regulated or Trained and not regulated
EMT- P (Emergency Medical Technician)	Licensed & Regulated
EMT (Emergency Medical Technician)	Licensed & Regulated
EMR (Emergency Medical Responder)	Licensed & Regulated
IFA-3, EMP, Advanced First Aide	Trained & not regulated
Standard First Aid	Trained & not regulated
Emergency First Aid	Trained & not regulated

7.5 Emergency Medical Response

First Aid requirements shall be in accordance with legislated occupational health and safety regulations. Each emergency medical response unit shall be staffed by an EMT (Emergency Medical Technician) as defined in the Emergency Medical Technician Regulations or in accordance with Provincial Standards. The minimum standard for an EMT accepted by the Company is a provincially registered EMT. The contractor shall submit resumes for all EMT and Paramedic candidates to the Company prior to the assignment to the project. The Company reserves the right to review, reject and remove candidates.

The contractor will be responsible to supply suitable emergency vehicle(s) as outlined within the applicable Provincial Regulations.

Specific to the above wording; contractors providing these services are required to provide the Company with a letter from their Medical Director indicating that his/her services are to provide ongoing medical audit and direction control over the assigned personnel under the scope of practice as an EMT. Further, a copy of the Medical Control Guidelines and current copies of the licence of each Emergency Medical Technician, as issued from applicable Provincial Governing Bodies, is required

The Contractor must also submit an “Emergency Medical Response Plan” prior to commencing the project, in accordance with the following:

- The plan must take into account for, and include confirmation of the availability of appropriate Air Medivac services (helicopter and/or fixed wing), in the event of a serious injury.

Prior to commencement of the work, the Contractor must prepare a Transportation Plan to address how injured or ill persons will be transported from the worksite to the nearest hospital. The Transportation Plan must be in accordance with applicable legislation and should be included as part of the project Emergency Response Plan. Although it may be necessary to occasionally transport injured or ill persons a short distance to meet a responding municipal ambulance service (e.g. from the right-of-way to a serviceable all weather road), the Contractor’s emergency medical response units are primarily intended for on-site first aid services and emergency medical treatment of site personnel.

7.6 Emergency Notifications

The Contractor shall determine and post on-site emergency numbers and directions to the site. Signs shall be posted to indicate first aid stations.

7.7 First Aid Supplies

The Contractor shall ensure that all First Aid supplies as required in the applicable regulation are available and maintained. First aid supplies are required to be easily accessible. First aid kits shall be located on site or in each crew vehicle.

The contents of each first aid kit shall be checked by the Contractor before being sent out on each job site and on a regular basis to ensure they are stocked at all times.

The Contractor must also provide first aid supplies (e.g. first aid kits, blankets, stretcher and splints) to workers and crews in accordance with the requirements of the applicable OH & S first aid regulations. Where Mobile Treatment Centres (MTCs) are required, they shall be equipped

with supplies suitable to the scope of practice of the attendants and the medical control guidelines. Specific equipment shall include A.E.D.s, Anaphylaxis kits etc for EMTs and ALS equipment for Paramedics where specifically identified.

Proper equipment for prompt transportation of the injured person to a physician or hospital or a communication system for contacting necessary ambulance service shall be provided.

Where the eyes or body of any person may be exposed to corrosive or flammable materials, suitable facilities for quick drenching or flushing of the eyes and body shall be within the work area for immediate emergency use.

First aid kits may include snake and bee/wasp sting kits. The Contractor shall consult with their physician for appropriate kits based on geographic locations and work activities. If any persons identify themselves as having severe allergies, e.g. to bees, wasps, etc., they should be encouraged to carry bee sting kits (epinephrine) on their person at all times. In addition, it is advisable that ambulance units carry these kits so that they can be provided to a person (who can self administer the medication) in the event of an unexpected severe allergic reaction (anaphylactic shock).

Employers shall provide personal protective equipment (PPE). Appropriate PPE includes gloves, gowns, face shields, masks and eye protection.

7.8 Incident Reporting

The Company is committed to ensuring a safe and healthy work environment for its workers, contractors and subcontractors. The goal of any investigation is not to establish blame but rather to put the necessary controls in place to remove or reduce the hazards and potential for a recurrence.

In the event of any incident or Close call, a detailed investigation (see Appendix J) identifying both the immediate and all underlying causes will be completed. For a First Aid Incident where the worker does not receive outside medical attention, the First Aid Report form will be utilized (see Appendix K).

Verbal report - Immediately

Any incident resulting in personal injury (*First aid incident - refer below*), close call, or property damage shall be reported verbally to the Company Site Inspector / Project Safety Inspector or Operations Project Coordinator.

Enbridge will be notified of any off-site serious incident, such as a motor vehicle incident or personal injury that is an indirect result of the project. The purpose of the notification is a courtesy, for information only, as it may or may not be recordable to the project. Internal notification may be required depending on incident severity. The decision will be made by the respective Safety Coordinator or designate.

7.9 Written Report – within 48 hours

A written report shall be completed and provided to the Company by the contractor within 48 hours of the incident. This report must include all details of the incident including but not limited to:

- Date/ Time / Location of the incident
- Type of occurrence
- Who was involved
- Injured worker information
- Nature of injury
- Body part and location
- Root Cause or Systems need
- Detailed incident description
- Loss of Company property or other property damage
- Immediate causes
- Substandard practices or conditions
- Basic cause including personal and job factors
- Preventative actions
- Statements, photographs and drawings
- Follow up actions
- Signatures

The Contractor shall report incidents to the applicable Authorities Having Jurisdiction, e.g. OSHA, Workers' Compensation Board, etc., where required by legislation.

The Contractor shall regularly update the Company Authorized Representative on the status of follow-up actions. In addition, the Contractor shall cooperate and provide all required information to assist the Company's internal investigation of any incident.

Contractors are responsible for their subcontractors and shall conduct a detailed incident investigation when necessary. A copy of the report shall be submitted to the Company Site Inspector / Safety Inspector / Regional Safety Coordinator within the required time frame.

- * For First Aid incidents, the Contractor shall maintain a First Aid Log at each site and shall complete an investigation and complete an incident report.

7.10 Post Incident Drug and Alcohol Testing

The Company reserves the right to request any Contractor / Subcontractor worker to be Drug and Alcohol Tested following any incident or Close call. The Drug and Alcohol Test shall be conducted within 4 hours of the incident.

7.11 Contractors' Modified Work Program

Each Contractor and Subcontractor shall have a "Modified Work" element in their safety program. The modified work program shall include but is not limited to:

- This includes a form readily available to be completed when a worker visits a physician.
- Focus on getting injured workers back to meaningful work as soon as possible.
- Indicate if the injury warrants lost time, modified work, or no restrictions.

7.12 Statistical Reporting

Company Site Inspectors shall submit a Monthly Safety Analysis Report (see Appendix L) no later than the 7th of each month. The report shall include the number of First Aid, Medical Aid, Medical aid with modified work and Days Away incidents and total construction hours worked for the monthly reporting period of each Contractor and their Subcontractors. Total hours of the Inspectors shall also be included in the report

Construction hours are defined as; hours worked directly on the project in the field, office personnel assigned project related tasks (engineers, drawing staff, etc). Not included are hours for work that the Company did not have direct influence over (i.e. Fab shops, supply vendors).

Site Inspectors /Financial Analysts shall ensure that the following Company requirements are adhered to:

- Hours and injury incidents are updated monthly and submitted no later than the 7th of each month or as otherwise determined by the Company.
- The information is accurate and current.
- The report must be forwarded to appropriate company contact as identified at the pre-job meeting.
- Hours submitted shall be associated with the total construction and performance of related services required for each project.
- The requirement to submit hours and injury incidents is outlined in the pre-bid and pre-job meeting. The contractor shall submit these statistics to the Company Site Inspector.

7.13 Incident Classification

The Company will perform final classification of all incidents according to the Company's document "Classification Guidelines for Occupational Injuries and Illnesses and Motor Vehicle Incidents" (see Appendix M).

8.0 INSPECTIONS

8.1 Inspections by Contractor or Others

The Contractor shall ensure work areas are free of hazards, which could affect worker health and safety. Site inspections provide a means of identifying and reporting unsafe conditions or practices.

All Company worksites are subject to inspection by the Company.

The Contractor will cooperate fully with the Inspectors of all other Authorities having jurisdiction and provide a copy of their report(s) to the Company Representative.

8.2 Informal Inspections

The Contractor's Supervisor shall conduct informal safety inspections as part of their daily activities. Corrective actions must be documented along with the follow up actions.

Informal inspection results must be made available upon request by the Company.

8.3 Formal Weekly/Shift Inspection

The Contractor's Safety Representative(s) shall perform a formal documented inspection of the site weekly, using the Field Inspection Report (*see Appendix N*) or equivalent. Copies of this inspection shall be forwarded to the Company Project Safety Inspector and/or the Company Site Inspector. Contractors shall review the results of the inspection with affected workers. (See Appendix O "What To Look For" as guidance document.)

Documentation of all formal inspections and corrective actions shall be given to the Company Project Safety Inspector and / or the Company Site Inspector within 5 working days.

9.0 WORK PERMITS

9.1 Introduction

Work Permits shall be completed and authorized prior to the start of all Contractor work activities (See Appendix P1). The Permit serves as an important communication device between those authorized to issue the Permit and the Contractors performing the work. This communication is paramount to ensuring that all required safety measures are implemented before and during the execution of the work.

Work Permits:

- Ensure people authorized to issue and approve permits communicate with those doing the work.
- Aid pre-job planning by designating personnel to complete required safety checks or hazard assessments before the work begins.
- Help protect workers, Contractors, and the public by ensuring required safety measures are implemented.
- Require contractors to provide adequate notice and significant descriptions of the scope of work to the Company Site Inspector when requesting Work Permits. The Company Site Inspector should request the work be deferred if either of these expectations is not met.

9.2 Work Permit Requirements

9.2.1 Operations Contractors (under the supervision of a Company Employee)

Contractors performing work under the supervision of a company employee for Operations project work including maintenance or operations project work require a Safe Work Permit / Hazard Assessment from a Company Operations Representative prior to the commencement of the work. (See Appendix P3). Such Contractors shall follow Permit requirements identified in *Book 2, Operating and Maintenance Procedures*.

9.2.2 Operations Contractors (under the supervision of the Contractor Site Representative)

Operations Contractors that perform work under their own supervision require a Safe Work Permit for any work.

9.2.3 Engineering Contractors: Brownfield Work

Contractors performing work under direction of a Company Site Inspector and under the supervision of a contractor site representative require a Construction Work Permit form to be completed for any work.

The Operations person responsible for the location (or designate) will issue and approve an Operations Safe Work Permit form to the Company Site Inspector (Permit Receiver) who will be inspecting the work of the Contractor.

The Company Site Inspector will then in turn issue a Construction Work Permit to the Contractor.

The Construction Work Permit is to be filled out jointly between the Company Site Inspector and the Contractor Supervisor or representative.

NOTE: When completing the Construction Work Permit, the respective Operation Safe Work Permit reference number must be included in the space provided.

The Contractor's representative shall retain the yellow copy of the Construction Work Permit and ensure that all conditions and requirements on the permit are reviewed with all personnel involved and adhered to during the work.

Upon completion of the work, the Contractor Representative shall return the Permit to the Company Site Inspector. The Permit shall be signed off by the user and receiver and all inspector copies shall be filed.

9.2.4 Engineering Contractors: Greenfield Work

An Operations Safe Work Permit for construction related work activities where the work site is designated as Greenfield is not required providing there is no risk of construction activities impacting operations. Example of such work is:

- The mainline or facility construction on a Greenfield site.
- Within a fenced facility or on the right-of-way where the construction area can be clearly physically delineated (i.e. snow fence) from normal operating activities and the Operations Supervisor or designate has provided clear direction as to where the physical barrier(s) are to be located (i.e., boundaries). The Operations Supervisor or designate must ensure the Construction Site Inspector is advised of any operational work activities that may impact construction activities / employees (i.e., hot work, venting, pigging activities, etc.)
- At remote sites, faxed copies of the Operations Safe Work Permit / Hazard Assessment can be utilized if required.

9.3 Permit Limitations

The function of the Construction Work Permit is used as a communication tool; this Permit shall not be valid for more than a 12-hour period. Under certain circumstances an extension may be applied for through the Company Site Inspector approved by the Operations Site designate.

NOTE: Under no circumstances are Contractors, workers or equipment allowed to stage a work area or begin work before obtaining the appropriate Permits from the Company Site Inspector.

The Construction Work Permit is valid only for the shift and purpose it was issued.

The Construction Work Permit shall only be valid for a maximum time of 12 hours and Operations Safe Work Permit shall be valid for a maximum of 24 hours. All work shall cease by the proposed completion time unless a new Permit is issued or the existing Permit is extended by the issuing authority.

NOTE: All Permits shall be suspended during emergencies and must be revalidated prior to work recommencing.

When a Contractor is performing work in a hazardous or restricted work area, or during critical/high risk tasks, the Company Site inspector shall be present on site to monitor the work. If for any reason, the Company Site inspector is required to leave the site the work activity will stop and will not recommence until the Company Site inspector returns.

The Contractor's representative shall keep a copy of the Construction Work Permit at the work site and ensure that all conditions and requirements on the Permit are reviewed with all personnel involved and adhered to during the work.

NOTE: The Contractor shall provide details of any third party deliveries expected during the day for inclusion on the permit.

9.3.1 Operations Extended Safe Work Permits

There are occasions when the conditions for long-term Contractor personnel permit exemptions cannot be met for work extending beyond 24 hours. In these situations, Safe Work Permits may be extended beyond 24 hours up to a maximum of one (1) week.

9.3.1.1 Weekly permit

- The Construction Site Supervisor and Operations Area Supervisor or designate will meet at a minimum weekly to assess the work area for Operations related hazards that may impact construction activities. These hazards and required controls will be documented on the Operations Safe Work Permit / Hazard Assessment prepared by the Construction Site Supervisor.
- The Area Operations Supervisor or designate will review the Safe Work Permit / Hazard Assessment prepared by the Construction Site Supervisor and add any required additional hazard information and any specific conditions for the work activity to be performed under. The Operations Area Supervisor or designate will sign the Operations Safe Work Permit/ Hazard Assessment when comfortable with the terms and conditions.
- The Construction Site Supervisor will use the information contained on the operations permit as well as the construction scope of work information from the contractor to complete the Construction Safe Work Permit / Hazard Assessment.
- Each day during the course of the work, the Operations Area Supervisor or designate will verbally confirm with the Enbridge Construction Site Inspector that no changes to the planned activities are anticipated.

This will be followed up by a fax from the Site Inspector to document that there have been no changes from the planned work activities for the day. If changes to the scope of the work or new hazards are anticipated, the permit will become void and a new permit will have to be issued.

- Operations Safe Work Permit / Hazard Assessment (will be reissued every 7 days). Each Monday (or on a work day as agreed upon), Steps 1 through 5 are to be completed by the Construction Site Supervisor and Operations Area Supervisor throughout the duration of the project on a weekly basis.
- For remote sites, faxed copies of the Operations Safe Work Permit / Hazard Assessment can be utilized.

9.3.2 Weekend Permit or Holiday Schedule

On Operations final work day of each week, the Operations Area Supervisor (or designate) will discuss all planned work activities for the scheduled days off to determine if the existing Permit can stay in place. Any changes to the scope of the work or area hazards will require a new Permit be issued.

NOTE: A contact number must be provided by the Operations Area Supervisor or designate to the Construction Site Inspector in the event the planned work activities change during the weekend.

9.4 Exemptions

The following is a list of Contractor activities that are exempt from any form of work permit:

- Driving vehicles through restricted areas.
- Delivery/service personnel (e.g. delivery and supply vendors, equipment service personnel, telephone, computer, etc.) performing routine work in unclassified areas where the risk is low and personnel are not exposed to operating facility hazards, working at heights, live lines, or equipment.

NOTE: Exemption must be approved by the person responsible for the location, and work must be monitored by an Operations employee or designate.

Exemptions for Long Term Operations Contractor Personnel

Long term Operations Contractor personnel may be given an exemption for a Safe Work Permit for up to one year if all the following requirements are met:

- approved by the Operations employee responsible for the Contractor and Operations management or the person responsible for the work location(s)
- They have been used on a frequent basis or have worked extended periods of time with the Company.

- clearly demonstrate their knowledge and understanding of safe work practices and technical procedures applicable to their line of work
- given a thorough safety orientation
- they participate in Contractor or Company safety group meetings as determined by the person responsible for the site
- They maintain daily communication with an Operations employee.
- They are monitored by the operations person or designate responsible for the location and work;

Exemptions for long-term Contractor personnel may also include:

- cold work – except confined space entry
- hot work in areas that are not hazardous, restricted, or confined

NOTE: Hot work is not permitted for planned work where vapour concentrations are greater than 10% LEL. When long-term Contractor personnel are doing work in station areas that are not hazardous, restricted or confined, the person supervising the work must notify the employee responsible for the location. That person must then communicate any special precautions relevant to the work.

- work that involves breaking electrical connections in restricted areas; and
- work that involves using low-voltage equipment (e.g., voltmeters, laser alignment and hand-held vibration meters, analyzers or cellular telephones) in hazardous or restricted areas

NOTE: In situations using low voltage equipment, the work area must be continuously monitored for combustible vapours.

NOTE: A Hazard Assessment / Safe Work Permit must be completed for all high-risk activities, as per *BOOK 2, Operations and Maintenance Procedures*.

9.4.1 Documentation of Exemptions for Long Term Contractor Personnel

The Operations employee responsible for a Contractor must document an exemption and provide copies to the Contractor, Operations management, and employee(s) responsible for the location(s).

Documentation must include:

- a brief description of the services being provided (e.g., welding, electrical, mechanical labour, inspection services, cathodic protection system maintenance)
- justification for the exemption

- names of Contractor and Subcontractor personnel
- special requirements;
- locations for which the exemption applies (e.g., station, ROW milepost boundaries);
- period of time for which the exemption applies; and
- names of employees who approved the exemption

9.4.2 Work Permit Requirements - Quick Reference Tables

Contractors working on any project shall obtain a Work Permit prior to the commencement for work or any part thereof. The type of Permit to be issued will depend on the boundaries of direction, Supervision and the location of the work activities. These requirements are listed in **Table 1**. The Construction Work Permit can be found in Appendix P2, and the Operations Safe Work Permit can be found in Appendix P3.

Major Projects, LP Engineering and Operations have unique requirements for the individuals with the responsibility to carry out the Safe Work Permit process. The individual with primary responsibility for ensuring the permit is completed is listed in **Table 2**.

Exceptions to the Operations Safe Work Permit are listed in **Table 3**.

Work Permit Requirements - Table 1		
Contractor Designation: Operations, LP Engineering or Major Projects	Construction Work Permit	Operations Safe Work Permit
Operation Contractor- performing work under the supervision of a company employee for Operations project work including maintenance or operations projects.	N/A	X
Contractors performing work under the direction of a Company Site Inspector and under the supervision of a contractor Site representative. Brown Field sites are any construction site or activities inside or adjacent (within 10 feet) to existing Enbridge facilities. Are any construction site or activities inside or adjacent to existing Enbridge facilities. (e.g. Construction work inside a facility or beside an exposed operating pipeline that does not have an identified boundary	X	X
Contractors performing work under the direction of a Company Site Inspector and under the supervision of a contractor Site representative. Green field sites: Sites within the confines of existing facility boundaries or ROW shall be clearly identified by fencing or other visible means.	X	N/A

WORK PERMIT RESPONSIBILITIES – TABLE 2						
Operations Safe Work Permit	Construction Work Permit			Operations Safe Work Permit		
	Permit Issuer	Permit Authorizer	Permit receiver	Permit Issuer	Permit Authorizer	Permit Receiver
Operations Contractor – performing work under the supervision of a company employee for Operations project work including maintenance or operations project.	N/A	N/A	N/A	Company Operations Representative	Company Operations Representative	Contractor performing work
Contractors performing work under the direction of a Company site Inspector and under the supervision of a contractor Site representative. Brown-field activities: Are any site or activities inside or adjacent (within 10 feet) to existing Enbridge facilities? Are any construction sites or activities inside or adjacent to existing Enbridge facilities? (I.e. construction work inside a facility or beside an exposed operating pipeline that does not have an identified boundary.	Company Site Inspector	Company Site Inspector	Contractor Site Representative	Company Operations Representative	Company Operations Representative	Company Site Inspector
Contractors performing work under the direction of a Company Site Inspector and under the supervision of a contractor Site representative. Green-field sites: Sites within the confines of existing facility boundaries or ROW shall be clearly identified by fencing or other visible means.	Company Site Inspector	Company Site Inspector	Contractor Site Representative	N/A	N/A	N/A

Exemptions to the Operations Safe Work Permit Systems - Table 3

1. Driving vehicles through restricted areas.
2. Delivery/service personnel (e.g. delivery and supply vendors, equipment service personnel, telephone, computer, etc.) performing routine work in unclassified areas where the risk is rated less than 4 and personnel are not exposed to operating facility hazards, working at heights, live lines, or equipment. Note: Exception must be approved by the person responsible for the location and work must be monitored by an operations employee or designate.
3. Long Term Operations Contractor personnel that work as extension of operations' crews and have an approved documented exemption from the standard operations contractor permit requirements. Note: Long Term Contractor personnel that are exempt from operations contractor safe work permit requirements must complete a Safe Work Permit form for all high risk work activities similar to an employee.

9.5 Ground Disturbance Permit

The Contractor performing any work for Main Line construction outside the fenced facilities shall obtain a Ground Disturbance Permit (see Appendix Q1, Q2) from a Company Authorized Representative prior to any ground disturbance activity.

Ground disturbance activities include but are not limited to:

- stumping,
- hydro-vac,
- ripping,
- topsoil stripping
- grading
- excavation
- pile driving
- boring and/or directional drilling
- installation of sign support t-bars or posts.

The Ground Disturbance Permit shall be reviewed with all workers involved in the activity prior to commencement of the work. The Contractor's Site Supervisor shall retain a copy of the Permit at the work site.

Contractors working directly for company Operations and LP Engineering within a fenced facility shall complete an "Excavation Guidelines and Hazard Assessment Checklist" (see Appendix R).

9.6 Confined Space Entry Permit

The Contractor shall obtain a Confined Space Permit (see Appendix S) from a Company Authorized Representative prior to work commencing including initial gas testing.

The Confined Space Permit shall be reviewed with all workers involved in the activity prior to commencement of the work.

The Contractor shall provide a detailed confined space work plan as well as a rescue plan prior to the permit being issued.

9.7 Initial Atmospheric Testing

Prior to work commencing or a permit being issued, a company-approved, competent person shall test the atmosphere within the work area with a calibrated direct reading instrument for the following conditions:

- Oxygen content (% O₂) (where required).
- Flammable gases/vapours (% LEL).
- Toxic air contaminants (H₂S, benzene, mono-styrene, acetone, etc. as required).
- Carbon Monoxide level (%CO).

NOTE: The testing results shall be recorded on the Work Permits.

Upon completion of initial gas testing, the Permit Issuer and Permit Receiver must determine the level of respiratory protective equipment required based on the completed Task Hazard Assessment.

While working within a potential hazardous area, air monitoring shall be done at a frequency, which is sufficient to verify that acceptable atmospheric conditions are being maintained within the work area. The Contractor shall ensure that Confined Spaces are continuously monitored.

This frequency shall be indicated on detailed work procedures or on the Work Permit. As concentrations change, respiratory protection levels shall be reviewed and adjusted accordingly.

The Contractors shall provide appropriate gas detection equipment unless otherwise noted within the bid documents or at the pre-bid or pre-job meeting. When necessary, specific gas measurement devices will also be provided by the Contractor (i.e. mono-styrene, acetone, benzene, etc).

Calibration checks and bump tests shall be performed on each portable gas detector as specified in the manufacturer's instructions. The Contractor must maintain calibration and bump test records showing the date and initials of the person doing the calibration.

When opening petroleum systems where a known potential for exposure exists, all workers in the immediate work area must wear appropriate respiratory protection as per the completed hazard assessment until O₂%, H₂S, LEL and Benzene levels have been verified.

Examples of open systems include, but are not limited to, pumps, meters, strainers, valves, storage tank seals, man ways and mixers, scraper traps, provers, spills or leaks, cutting pipe sections or separating flanges on piping, opening/closing fittings used for venting during isolation and filling of pipe sections and vents associated with trucks, sump tanks and storage tanks.

9.8 Personal Monitor Use

Contractors shall make available to their workers, personal multi-gas monitors when a hand held monitor will not adequately provide accurate readings to ensure no one worker will be overexposed. Hand held monitors are required where workers are involved in any of the activities noted below:

- Removing storage tank seals, tank man ways or tank mixers.
- Entering tanks that have not been cleaned and gas freed.
- Work associated with open systems such as scraper traps and provers.
- Spill or leak containment, clean-up and repairs.

The personal monitor shall be positioned in the workers breathing zone (i.e. chest pocket) and the sensor port must be exposed directly to atmosphere (not covered by clothing etc.) at all times.

If a personal monitor goes into alarm, all workers in the work area must immediately stop work, escape to a safe area, and notify other potentially affected workers.

The hazards must then be re-assessed by a worker wearing appropriate respiratory protective equipment using a portable multi-gas detector capable of measuring LEL, H₂S, CO and O₂, as per the Contractor's respiratory program.

As a minimum, personal gas monitors must provide a visual and audible alarm that is equipped with a low and high alarm points.

10.0 PERSONAL PROTECTIVE EQUIPMENT / APPAREL

The Contractor shall ensure workers are trained in proper fitting, use, limitations, cleaning, maintenance, and storage of personal protective equipment.

The minimum Personal Protective Equipment/appropriate apparel required for all company sites and projects shall be:

- Safety glasses or prescription safety glasses with fitted side shields and protective lenses
- Safety boots
- Full length pants
- Approved Hard Hat
- Additional PPE/Apparel may be required depending on the specific site requirements or activities.

NOTE: Muscle shirts, tank tops, and cut offs are not permitted on any work site. There is a minimum requirement of six-inch sleeves on greenfield sites.

10.1 Eye and Face Protection

Approved eye protection such as safety glasses with side shields or appropriate goggles shall be worn at all times. Additional eye and face protection shall be worn when performing any work or in any area where there is danger of injury or irritation of a worker's eyes or face. This may include safety glasses with side shields, impact goggles, or splash goggles as per the completed Task Hazard Assessment. All protective equipment shall meet CSA/ANSI standards.

All workers shall ensure that the protective eyewear fits properly, is clean and in good condition. Prescription safety glasses shall have fitted CSA/ANSI approved side shields attached while on site.

NOTE: Safety eyewear (glasses) shall be worn in addition to the proper face shield or welder's shield when grinding or welding.

The following is a list of activities where there is exposure to eye and face hazards, and the minimum eye and face protection required:

Table 1 Minimum Requirements for Eye and Face Protection	
Activity	Protection Required
Abrasive blasting	<ul style="list-style-type: none"> • Blasting hood complete with supplied air
Arc Welding and gouging	<ul style="list-style-type: none"> • Welder – welding helmet and safety glasses c/w side shields under the helmet • Helper – as above, or full face shield and safety glasses with side shields (minimum shade 3) or full face shield and welder/cutter goggles (minimum shade 3)
CAD Welding activities	<ul style="list-style-type: none"> • Full face shield and safety glasses with side shields
Chipping, hammering metal, sledge hammering, jack hammering, using compressed air, using electric and/or hand saws, concrete work, material handling of particles, and in windy/dusty conditions	<ul style="list-style-type: none"> • Safety glasses with side shields or • Impact goggles • Requires the use of a face shield when using a chipping hammer
Handling asbestos-containing materials	<ul style="list-style-type: none"> • Full face shield and safety glasses with side shields or • Goggles
Handling hazardous substances (e.g. toluene, NGL)	<ul style="list-style-type: none"> • Chemical splash goggles and • Any additional protective equipment indicated on container labels or MSDS, and face shield when handling large quantities, exposed to liquid spray, or transferring liquids
Handling PCB's	<ul style="list-style-type: none"> • Full face shield and safety glasses with side shields or • Chemical resistant goggles
Operating chainsaws, using weed trimmers	<ul style="list-style-type: none"> • Full face shield and safety glasses with side shields or impact goggles (mesh face shields are recommended when operating chainsaws)
Oxy-acetylene welding, cutting, brazing or soldering	<ul style="list-style-type: none"> • Welder – welder's/cutter's goggles (eye-cup or mono-goggles) or safety glasses with side shields (minimum shade 3) and a face shield • NOTE: A welding helmet with a flip-up lens can substitute a face shield. • Helper – same as welder
Pneumatic or electric grinding and buffering (includes cut-off and concrete saws)	<ul style="list-style-type: none"> • Welding helmet and safety glasses with side shields under helmet or • Full face shield and safety glasses with side shields or • Full face shield and impact goggles
Working in windy conditions	<ul style="list-style-type: none"> • Protection as required

10.2 Foot Protection

Safety footwear must have a minimum CSA Grade 1 (ANSI Class 75) safety toe, a puncture resistant sole, and have a minimum 15 cm height.

All workers performing electrical work or any worker entering within a substation require safety footwear marked with the Omega symbol that incorporates an electric shock resistant sole.

Metatarsal / shin guards shall be used where workers are exposed to impact by portable compactors such as jumping jacks, jackhammers, etc.

10.3 Head Protection

As dictated by the applicable Provincial Regulations, CSA Z94.1-92 (R1998) Class “B” or ANSI Z89.1-1997 Type I, Class “E”, or ANSI Z89.1-2003 Type 1, Class E, approved hard hats will be worn at all times, except when in a vehicle or equipment with enclosed cabs or while in control rooms, offices, lunch rooms, or change rooms, or welders actively engaged in welding.

NOTE: Cowboy style hardhats are prohibited on Company property

10.4 Hearing Protection

When equipment is operating or when operating any tool or piece of equipment where the noise level at the operator’s location exceeds occupational exposure limits (85 dBA), plug and/or muff-type hearing protection must be worn. Hearing protection must be worn in all posted areas. For noise levels over 100 decibels (dBA), approved plug and earmuffs must be worn in combination.

10.5 Limb and Body Protection

Where there is a danger of injury to worker’s hands, arms, legs or the trunk of the body, the Contractor shall ensure workers wear proper hand, arm, leg, or body protection equipment that is appropriate to the work being done and the nature of the hazard involved.

The Contractor shall ensure that all workers that handle rough, sharp-edged abrasive materials or are performing work activities that subject the workers’ hands to lacerations, punctures, burns, vibration/impact, chemical absorption, are wearing appropriate hand protection suitable for the work being performed.

10.6 High-Visibility Apparel

High-visibility apparel must meet or exceed the Class 2 standard as specified in CSA Z96, High-Visibility Safety Apparel. Such high-visibility apparel must be worn when a worker is a designated signaller or spotter, when working on or adjacent to roadways, while working around mobile earth moving/heavy equipment, and as determined on the Hazard Assessment.. As

specified by all applicable regulations, Class 2 apparel must be worn when working near mobile earth moving equipment.

10.7 Fire Retardant Clothing

Unless exempt by the Company the Contractor shall wear approved Fire Retardant (FR) clothing for:

- Electrical work (refer to PPE requirements under Chapter 11.6.3)
- Work within hazardous or restricted areas
- Work inside fenced or operating facilities
- Persons involved in, or any persons within 30 meters of mechanical ground disturbance work (e.g. stumping, stripping, grading, excavating, boring/drilling, backfilling, etc.) within three (3) meters of operating facilities, i.e. gas or oil pipelines, whether above or below-ground.
- Welding/cutting on an existing Company or foreign pipeline and/or, any piping system that has recently been hydro-tested using a water-methanol mix and may still contain a flammable atmosphere.
- Areas with potential for flash fire or explosion or where required by the Project Hazard Assessment and Task Hazard assessment.
- Investigating facilities for known or suspected anomalies
- Repairing facilities with leaks, defects or corrosion pits/clusters where the calculated rupture pressure ratio is less than one
- Welding directly to the parent pipe (i.e., mainline or station piping)
- Welding on a pressurized split tee with longitudinal fillet-weld check-straps
- Welding on a pressurized Morrison sleeve
- Working near open systems (within 100 feet). An open system is any component of the pipeline system which is open to the atmosphere and has not been gas-freed and isolated.

Examples include, but are not limited to:

- Open strainers;
- Open pumps;
- Open scraper traps;
- Open pipes;
- Sumps;
- Storage tanks;
- Open valve bonnets; and
- Open prover pipes.

NOTE: Approved fire retardant shirts and pants meet the minimum requirements for high-risk activities. Coveralls provide a higher degree of protection than lighter-weight shirts and pants; multiple layers of clothing provide an even higher degree of protection.

10.7.1 Fabric Requirements

Approved fire retardant clothing fabrics shall meet the requirements of CAN/CGSB 155.20, Work wear for Protection against Hydrocarbon Flash Fire or NFPA 2112.

Approved fire retardant clothing for electrical workers shall meet the minimum arc thermal protection of 8 cal/cm² (HRC 2) and follow guidelines identified in 11.6.3 (Personal Protective Equipment for Electrical Work).

NOTE: In Canada, the CGSB Standard requires a label, stating the garment meets the requirements of the Canadian General Standards Board, must be affixed to the garment.

Leather shoulder and sleeve covers should be worn during welding and cutting operations. Sleeves and the front of clothing must be fastened during welding activities.

10.7.2 Outerwear

Workers shall wear fire retardant clothing as the outer garment (including hard hat liners and hooded jackets) and must fully cover any non fire retardant clothing being worn, except where permitted otherwise within the requirements of this policy.

Non fire retardant outerwear may be worn over approved fire retardant clothing only when other safety concerns exceed the fire hazard (e.g., protection against asbestos, drowning, visibility or corrosive materials).

Where there is a potential for the fire retardant outerwear to become contaminated with flammable products, impermeable FR rain suits or FR Tyvek coveralls may be worn over the fire retardant outerwear.

10.7.3 Rainwear and Disposable Coveralls

CANADA - Fire retardant rainwear that meets the entire CGSB-155.20-2000 or NFPA 2112 standard may be worn as an approved outer garment without any other approved fire retardant clothing underneath.

NOTE: Rainwear and disposable coveralls that do not meet the entire standard is acceptable providing it is not required as identified within the Hazard Assessment for the work, and is worn over approved FR clothing.

10.7.4 Laundering

Follow the laundering instructions and temperature limits for fire retardant clothing identified on the garment care tag. Clothing must be kept reasonably free from grease and oil.

10.7.5 Audits of Clothing Program

Contractors shall routinely inspect / audit fire retardant clothing to ensure it is kept in good condition for its intended use. All inspections/audits shall be in writing and made available to the Company upon request.

<p>NOTE: Fire retardant clothing that is threadbare or torn does not provide sufficient protection.</p>
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10.8 Respiratory Protection

When performing jobs where breathing hazards may be encountered, the Contractor shall ensure that all personnel are provided with appropriate respiratory protection.

If workers are required to wear respiratory protective equipment, then the Contractor shall establish a written code of practice governing the training, selection, maintenance, use and limitations of this equipment.

Appropriate respiratory protection shall be selected based on the completed Task Hazard Assessment which must consider gas/particle monitoring results, physical conditions or when the potential hazard level is unknown.

The Contractor shall:

- Ensure workers who have passed a medical evaluation.
- Have had a respirator fit-test for each tight fitting respirator that will be used.
- Received training in the use of respiratory protection.
- Review and understand the completed Hazard assessment
- The contractor shall make available upon request fit test documentation and training documentation.

The Contractor shall ensure that all Respiratory Protection training meets or exceeds all applicable legislation.

Workers shall be clean-shaven where the respiratory equipment forms a seal with the face. Only approved respiratory protection (CSA Z-94.4) shall be used and all respiratory equipment must be cleaned and inspected after each use.

Guide to Respiratory Selection
Air Purifying Respirator (APR), Self-Contained Breathing Apparatus (SCBA),
High-Efficiency Particulate Air Filter (HEPA), Supplied-Air Respirator (SAR).

Task/Exposure	Hazards	Respiratory Protection	Comments
Abrasive blasting	Silica dust, non-silica dust (e.g., slag, steel grit), lead (from removal of lead-based paint)	Mandatory minimum for blaster: supplied-air hood or helmet with apron (also called cape or bib) operated in a continuous flow mode	Contact appropriate Safety Coordinator for additional requirements if lead paint is involved. If blasting in a confined space or if positioned in the immediate blast area of blasting operations, the helper's protection must be identical to the blaster's.
		Mandatory minimum for helper if positioned in the immediate blast area of blasting operations: half mask APR with HEPA dust filter (see Comments)	
Confined Space Entry	Hazardous atmospheres due to materials or substances present or the task (e.g., oxygen deficiency, mists, fumes, dusts, toxic vapors or gases)	Mandatory minimum for initial entry: SCBA during initial atmosphere testing from inside the area, and as required during initial air testing from outside the area Mandatory minimum for ongoing work: protection requirements depend on the results of initial atmosphere testing and the type of atmospheric hazard created by the task	See Ventilation, Air Testing and Air Monitoring in Confined Spaces, and Personal Protective Equipment for Confined Spaces, for further requirements. To determine the minimum protection for ongoing work, refer to the appropriate hazard (e.g., petroleum vapors) or task (e.g., abrasive blasting, painting and coating, welding) in this table.
Applying herbicide and pesticides	Toxic organic vapors or mists	Mandatory minimum: half mask APR with organic vapor cartridge and dust/mist pre-filter	Consult product MSDS for additional information.

Task/Exposure	Hazards	Respiratory Protection	Comments
Cutting, grinding, buffing (metals, plastic, wood)	Dusts and fumes	Recommended minimum: disposable dust mask (see Comments)	Respiratory protection is mandatory if conditions are very dusty or irritating.
Entering line heaters	Crystalline silica (refractory materials)	Mandatory Minimum: half mask APR with a HEPA dust filter	It must be assumed that all crude heaters contain crystalline silica.
Gauging	Toxic organic vapors (e.g., benzene, petroleum vapors), hydrogen sulphide	Mandatory minimum if LEL >4% and <10%, and H ₂ S <10 ppm: half mask APR with organic vapor cartridge	
		Mandatory minimum if LEL >10% or H ₂ S >10 ppm: SCBA	
Handling acids/caustics (e.g., hydrochloric acid, sulphuric acid, sodium hydroxide)	Corrosive mist or gas	Recommended minimum: half mask APR with acid gas cartridge (see comments)	Respiratory protection is mandatory if activity generates mist or vapor.
Installing fiberglass tank lining	Organic vapors (e.g., styrene)	Mandatory minimum for spray application: full face piece APR with organic vapor cartridge and dust/mist pre-filter	Respiratory protection is mandatory if non-spray application is done in enclosed areas or confined spaces.
		Recommended minimum for non-spray application: half mask APR with organic vapor cartridge and dust/mist pre-filter (see Comments)	
Lab operations	Toxic organic vapors (e.g., benzene, toluene)	Recommended minimum: half mask APR with organic vapor cartridge if high vapor concentration is present	A respirator is not required if a fume hood is used.

Task/Exposure	Hazards	Respiratory Protection	Comments
Painting and coating (not applicable to water-based coatings)	Toxic organic mists (spraying), toxic organic vapors (spraying and brush/roller application), isocyanates (two-part coatings containing isocyanates)	Mandatory minimum for spraying: half mask APR with organic vapor cartridge and dust/mist pre-filter	A full face piece APR with the same cartridge is recommended where eye irritation occurs. Check MSDS for additional information.
		Recommended minimum for brush/roller application: half mask APR with organic vapor cartridge	Respiratory protection is mandatory in enclosed areas and confined spaces with poor ventilation. Check MSDS for additional information.
		Mandatory minimum for two-part coatings containing isocyanates: SCBA or full face piece SAR if coating is sprayed; half mask APR with organic vapor cartridge if brush or roller application	Check MSDS to determine if catalyst/accelerator contains isocyanates.
Tank cleaning	Toxic organic vapors (e.g., benzene, petroleum vapors, H ₂ S), oxygen deficiency	Mandatory minimum for initial entry: SCBA or SAR	
		Mandatory minimum for ongoing work, LEL <10%, H ₂ S <10 ppm, with oil residue present: half mask APR with organic vapor cartridge	
		Mandatory minimum for ongoing work, LEL >10%, H ₂ S >10 ppm: SCBA or full face piece SAR	No work is permitted if LEL >20%.
Welding	Toxic dusts and fumes	Recommended dust mask	Respiratory protection is mandatory when welding inside tanks or in areas with poor ventilation.

10.9 Personal Fall Arrest and Travel Restraint Systems

10.9.1 Personal Fall Arrest Systems

Where workers are required to install, use or remove a personal fall arresting system, the Contractor shall prepare a written fall protection plan for the safe installation, use, or removal of the system. The plan must also include the method of rescue appropriate to the work. The Contractor must also have appropriately trained employees to conduct rescue operations.

Personnel that are required to use any fall protection equipment must be trained competent in its correct use and application.

NOTE: Ironworkers are NOT exempt from fall protection requirements.

Full Body Harness	In situations where a person could fall a vertical distance greater than 2.4 meters and it is impractical to provide adequate work platforms, scaffolds, staging, and guardrails, a CSA or ANSI approved fall arresting full body harness shall be used in conjunction with a lanyard.
Lanyard	CSA or ANSI approved lanyards shall be arranged in such a way to prevent a person from falling freely for more than 1.2 meters. These lanyards shall be used to secure persons wearing a full body harness to an approved drop line, lifeline, or fixed anchorage point. Shock absorbers are required on a personal fall arrest system unless if by adding the device the worker can hit the ground when he or she falls.
Anchorage Points	Fixed anchorage points must be capable of withstanding a minimum force of 22.2 Kilonewtons (5000 pound force), or as otherwise required by applicable Provincial Regulations.
Horizontal Lifelines	The contractor must ensure that, before using a horizontal lifeline system that they installed, a professional engineer, a competent person authorized by the professional engineer, the manufacturer, or a competent person authorized by the manufacturer, certifies that the system has been properly installed according to the manufacturer's specifications or to specifications certified by a professional engineer.

Safety harnesses and shock absorbing lanyard devices exposed to a fall impact load shall be immediately removed from service and all components destroyed. The user shall visually inspect fall arresting equipment prior to each use.

10.9.2 Travel Restraint Systems

“Travel Restraint System” means a type of fall protection system, including guard rails or similar barriers that prevent a worker from travelling to the edge of a structure or to a work position from which the worker could fall.

Safety Belts	SHALL NOT BE USED UNDER ANY CIRCUMSTANCES
Lifelines	Temporary lifelines used for worker restraint shall be CSA or ANSI approved. Lines must be padded at points of attachment and elsewhere, as necessary, to protect against chafing or abrasion caused by contact with sharp edges.

10.10 Lifejacket / Personal Flotation Devices

The contractor shall ensure all Lifejacket and Personnel Flotation Device meet or exceed all applicable regulations and approvals.

Lifejackets and/or Personal Flotation Devices (PFDs) shall be worn when working over water (ponds, rivers, creeks, etc.) and where there is a danger of drowning.

11.0 SAFE WORK PRACTICES

11.1 Blasting (Explosives)

Prior to blasting, detailed blasting and safety procedures shall be submitted to the Project Execution Director (Construction) and the Operations Regional General Manager for written approval.

These procedures shall be reviewed by the Project Engineer and by a qualified blasting consultant retained by the Company.

Prior to detonation of explosives, the Contractor shall provide a minimum of 48 hours notice to the Company. In addition, the Contractor shall notify local Law Enforcement and nearby residents sufficiently in advance as to allow them to protect persons, property, and livestock. The Contractor shall place proper signage and/or an appropriate number of competent safety watches to warn and safeguard the public. Blasting shall not be performed unless the Company Site Inspector is present.

The Contractor shall employ workers qualified and skilled in blasting operations and shall exercise care to prevent damage to pipe that has been strung, nearby structures, overhead telephone, telegraph, or power lines or underground structures such as cables, conduits, and pipelines, as well as to springs and underground water courses. Explosive agents shall in all instances be acceptable to the Company. All necessary permits for blasting shall be obtained by the Contractor.

Controlled blasting shall be required when blasting is performed in the vicinity of overhead facilities or structures. Blast mats shall be used to prevent damage due to fly-rock, as directed by the Company.

Where the pipeline route parallels or crosses an electrical transmission corridor, a potential hazard exists whereby premature initiation of blasting could be triggered by stray current from the electrical field which may exist at these locations. The Contractor shall assess the hazard and may have to restrict the use of electrical detonation caps to a safe distance from such corridors.

Blasting operations shall be suspended under high wind, dust, snow and dry conditions. Similarly, all moving equipment, including trucks, used in the vicinity of electrical blasting operations shall be grounded.

All blasting operations shall be suspended and all persons and equipment withdrawn immediately at the first indication of an approaching electrical storm.

Mobile radio transmitters, pager and cellular phones shall be kept well away from areas of electrical blasting operations and signs shall be posted to have all transmitters near the site turned off.

Drill holes shall not be left loaded overnight unless approved by the Company. When approved, the following minimum restrictions apply and are subject to review by the Company's blasting consultant.

- No electrical detonation caps, leg-wires, or connecting wires shall be left in place.
- No trunk or surface line primer cord connecting individual pigtails shall be left in place. Tying-in and relaying of the shot shall be delayed until the start of the following day's activities.

All mobile equipment used in clearing fly-rock after a blast shall be equipped with a blast shield in front of the operator's position to protect the operator from fly-rock should an undetonated charge be encountered.

Prior to the blast, a controlled area shall be established in all directions from the blast site. No persons or vehicles, except the blaster, shall be within this controlled area at the time of blast detonation. All access roads to blasting sites shall be blocked off and signed while blasting operations are taking place.

An audible blast warning system shall be employed for all blasting. The siren used for a blast signal shall be a distinct sounding siren from any other siren used on construction. The use of vehicle horns as a blast signal is not permitted.

11.2 Abrasive Blasting

During abrasive blasting (sandblasting) operations, the Contractor shall ensure that all applicable legislated requirements and the following requirements are adhered to:

A respiratory code of practice will available for review by the Company prior to commencement of work.

- Hazardous conditions shall be documented on hazard assessments and reviewed with all workers.
- All workers performing abrasive blasting shall wear NIOSH / CSA approved positive pressure, supplied air blast hoods (Type CE) specifically designed for blasting operations.
- All other workers in the immediate vicinity (15m) who may be exposed to the airborne respiratory hazards associated with blasting operations, shall wear appropriate CSA or NIOSH approved respiratory protection (approved dust mask or half mask air purifying respirators with proper dust filters). All other workers in the immediate vicinity (15m) who may be exposed to the airborne respiratory hazards associated with blasting operations shall wear appropriate CSA or NIOSH-approved respiratory protection (approved dust mask or half mask air purifying respirators with proper dust filters).
- All workers shall be trained in the proper care and use of the respiratory equipment and the contractor shall maintain records of this training.
- Contractors shall provide written justification for the selection of blast media to be used which shall include provision for reducing and controlling dust hazards, monitoring of exposure to affected workers, storage, use of and handling, site containment and disposal of products used.
- A waste management plan shall be provided prior the acceptance and approval of all abrasive products being used.
- Contractor should use recycled glass-based abrasive blasting media as the preferred product.
- Crystalline Silica media shall not be used.
- Coal slag shall only be considered if:
 - a self contained recovery unit is used
 - Within a tank shell if the visibility hazard exceeds the health hazard and the tank is adequately ventilated with a rate of air exchange adequate to reduce the exposures.

- The supplied air equipment and quality of breathing air shall comply with all applicable regulations.

Prior to the use of any supplied breathing air equipment on the worksite, the Contractor shall comply with the following:

- Inspect all supplied air equipment to verify it meets the requirements of the ANSI or CSA standard and retain documentation of the inspections;
- Submit air samples (from all *breathing air* compressor systems to be used) for purity analysis to a qualified laboratory;
- Provide copies when requested of the air quality analysis results to the Company Authorized Representative;
- Conduct additional air sampling and analysis as requested by the Company.
- The Contractor shall provide regular testing of supplied breathing air, to ensure carbon monoxide is within acceptable limits as set out in the applicable regulations.
- Air compressors designed to supply breathing air shall be equipped with an alarm system to indicate overheating and compressor failure. Oil lubricated compressors shall have a carbon monoxide (CO) alarm and the air shall be sampled frequently as per manufactures specifications.
- When abrasive blasting for extended periods, a worker rotation plan should be implemented to reduce exposure time.

The Contractor shall ensure all personal protective equipment is provided, such as blasting hood, leather gloves, long sleeved jacket or shirt, and heavy pants.

- The operator shall have the nozzle under control before the air is turned on.
- Prior to refilling or removing the cover from the tank the air pressure shall be bled off.
- An approved air-supplied hood shall be worn during sandblasting. Only approved breathing air in accordance with legislated requirements shall be used.

11.2.1 Respiratory Protection

Workers performing abrasive blasting and those in the immediate vicinity of abrasive blasting operations shall control breathing hazards associated with the use of those blast materials and the material being blasted. (e.g. lead based paint, etc.)

In confined or enclosed spaces (buildings, tanks, etc.), Workers required in the vicinity of abrasive blast operations shall wear the same respiratory equipment as the person performing the abrasive blasting, while blasting is in progress.

As a minimum, workers working who are unable to avoid incidental dust exposure shall wear approved respiratory protective equipment.

11.2.2 Additional Requirements and Controls

Contractors shall ensure:

- That a separate area is provided for removal of PPE that is separate from the lunch / office space.

- Where the abrasive blasting will affect other workers barricades, warning signs, warning ribbon or other systems shall be installed to warn workers and prevent access to the work area.
- Personal hygiene standards are established and practiced (e.g. wash before you eat).
- Intrinsically-safe switches are to be used when applicable, or as determined by the hazard assessment.
- Fail-safe dead-man valves are to be used to prevent accidental release of abrasive material.
- Workers not directly involved in the blasting operation stay up wind if possible.

11.3 Compressed Air

- Excess flow valves or chokes installed on all airlines at the compressor or header to prevent high volume air release.
- Use air supply hoses that are appropriately rated for the maximum pressure produce in the system.
- When applicable, all temporary connections on pneumatic hoses shall be secured using safety pins and whip checks. Safety clips or retainers shall be used at the attachment point on pneumatic tools.
- Ensure air compressors powered by an internal combustion engine are run in well ventilated area. Never operate an air compressor powered by an internal combustion engine in a hazardous or explosive environment.
- Ensure that workers read, understand and follow the manufacturer's recommendations and instructions for use for the compressed equipment which they are using.
- Inspect the air compressor, hoses, connections, regulators and all associated equipment prior to use. If any defect or malfunction is found, do not use the equipment. Immediately tag and remove the equipment from service. Ensure proper lockout procedures are followed where required.
- Compressed air shall not be used for cleaning workers or their clothing. Air hoses are to be properly secured to prevent accidental disconnection. Proper safety nozzles and personal protection equipment shall be used and the area isolated for the blowing off of equipment or floors. Workers shall be made aware of the hazards associated with compressed air.
- Quick connectors on air hoses may come apart if the hoses are dragged over rough terrain. A suitable restraining device (e.g. whip checks) shall be installed as required for quick connectors and for all hose ends to prevent uncontrolled whipping.
- Only low pressure air (not exceeding 30 psi) is to be used for cleaning parts of equipment.
- Pressure relief and regulating valves on air compressors shall not be adjusted to allow the compressor to operate above the manufacturer's recommended rating.

11.4 Confined Space Entry – Hazard Assessment

This applies for entry or work within confined spaces (e.g., tanks, pipes, tunnels, manholes, electrical vaults, boreholes, pits, sump tanks, and vertical and horizontal culverts).

11.4.1 Training and Qualification

Before entry or work within confined spaces, contractors are responsible for ensuring affected workers are trained and qualified in:

- Hazard identification and assessment
- Selection and use of personal protective equipment (PPE)
- Confined space entry

In addition, Contractors are responsible for ensuring affected workers have the knowledge, training, and experience necessary to safely perform the following duties:

- Air testing and monitoring
- Safety watch
- Emergency rescue

11.4.2 Confined Space Classification



WARNING: ALL confined spaces are to be considered **High Hazard** until verified by initial air testing and assessment.

LOW HAZARD

Low Hazard confined spaces are those where airborne concentrations within the following limits are verified by initial testing and are unlikely to develop.

- Oxygen: 19.5 to 23.0%
- Lower explosive limit (LEL): less than 4%
- Hydrogen Sulphide (H₂S): less than or equal to 10 ppm
- Other toxic contaminants: less than or equal to permissible exposure limits (PEL)

MODERATE HAZARD

Moderate Hazard confined spaces are those where airborne concentrations within the following limits are verified by initial testing, or have the potential to develop due to atmospheric change, temperature change, type of work.

- Oxygen: 19.5 to 23.0%
- Lower explosive limit (LEL): 4 to 10%
- Hydrogen Sulphide (H₂S): less than or equal to 10 ppm
- Other toxic contaminants: greater than permissible exposure limits (PEL)

HIGH HAZARD

High Hazard confined spaces are those where airborne concentrations within the following limits are verified by initial testing, are likely to develop, or when atmospheric concentrations cannot be verified.

- Oxygen: less than 19.5 or greater than 23.0% 23.5%

- Lower explosive limit (LEL): 10 to 20%
- Hydrogen Sulphide (H₂S): greater than 10 ppm
- Other toxic contaminants: greater than permissible exposure limits requiring supplied air or self-contained breathing apparatus.

11.4.3 Hazard Assessment

Before entry to work within confined spaces, Contactors are responsible for:

- Assessing and identifying existing and potential hazards specific to the work activity and related job tasks
- Where reasonably practicable, involving all workers associated with the work in the hazard assessment
- Communicating the results of the hazard assessment to all affected workers
- Eliminating or controlling existing or potential hazards specific to the work activity and related job tasks.
- Documenting the hazard assessment on the Confined Space Permit as verification.

NOTE: For an example of a Confined Space Hazard Assessment, See TABLE 1.
For examples of minimum Hazard Controls for the classes of Confined Spaces, See TABLE 2.

11.4.4 Signage

Confined spaces that are permanent or that are frequently accessed shall be identified by signs indicating "CONFINED SPACE".

11.4.5 Air Testing and Monitoring

Air testing for atmospheric hazards shall be conducted in the following order:

- Oxygen deficiency (% O₂)
- Flammable gases/vapors (% LEL)
- Toxic air contaminants (e.g. H₂S)
- Other toxic contaminants associated with the work activity and related job tasks (e.g. CO, Benzene)

NOTE: Remote gas detector accessories (e.g., sample draw pumps) may be needed for air testing at various locations or elevations.

INITIAL AIR TESTING:

- Before entry into a confined space, conduct initial air testing through openings from outside the confined space where possible, using a calibrated direct-reading and/or grab sample instrument.
- If testing from outside the confined space is not possible, conduct initial air testing from inside the confined space using the appropriate PPE in accordance with the completed Hazard Assessment.
- Repeat initial air testing before workers re-enter a confined space.

INTERMITTENT AIR TESTING

- Conduct intermittent air testing as often as necessary to ensure the health and safety of workers in the confined space. *For examples, see Table 2.*

NOTE: Intermittent air testing should be conducted during new tank construction to ensure a hazardous atmosphere is not developing.

CONTINUOUS AIR MONITORING

- The Contractor shall ensure that if there is potential for the atmosphere to change unpredictably after a worker enters the confined space, the atmosphere is continuously monitored.

11.4.6 Safety Watch

Safety watches shall be provided with:

- An emergency warning device (e.g. air horn) and radio communications where applicable.
- For hot work, a fire extinguisher.
- PPE as identified in the completed Task Hazard Assessment.

Safety watches are responsible for:

- Ensuring initial and ongoing air testing and recording test results.
- Ensuring requirements on the permit are followed.
- Controlling access to the confined space.
- Recording workers entering and exiting the confined space.
- Maintaining communication with workers in the confined space.
- Assessing hazards and implementing appropriate controls.
- Contacting emergency rescue services as required.

Safety watches may perform additional duties provided they don't distract from effectively performing safety watch duties.

11.4.7 Pre-Job Meeting

Before starting work, a pre-job meeting must be held. Topics for review include (but are not limited to) the following:

- the Confined Space Entry Permit
- air testing
- entering and exiting the confined space
- communication system
- isolation of energy sources and control of materials movement
- securing the confined space from unauthorized entry
- written rescue procedure and equipment

11.4.8 Communication System

Before entry into a confined space, a method of communication shall be established (e.g. voice, visual, signal line) between the workers and the safety watch, as well as the safety watch and any backup workers or rescue workers.

The communication system shall be maintained as long as workers are in the confined space.

11.4.9 On-Site Rescue

The contractor shall provide either an in-house Rescue Team (on site) or a Third Party Rescue Team (on site). The rescue team shall be equipped with all the necessary and appropriate rescue equipment, including PPE, and all personnel assigned to the rescue team shall be properly trained and certified.

Before entry into a confined space, written rescue procedures shall be readily available and shall include:

- Names of safety watch(es)
- Names and number of rescue workers
- Communication system
- Evacuation method
- Rescue equipment
- Rescue method.
- Retain rescue procedures with the Confined Space Entry Permit.

11.4.10 Permit Approvals and Signing Authorities

A Confined Space Entry Permit (see Appendix S) shall be (a) approved by the Construction Manager for new construction work, or Operations Regional Managers for work within existing high hazard confined spaces, or (b) the site supervisor, for all other work, and (c) signed by both the permit issuer and the permit receiver.

NOTE: Initial air testing for a confined space should be conducted through openings from outside the confined space using a calibrated direct reading gas testing instrument.

If testing cannot be completed from outside the confined space then the appropriate PPE and Safety Watch requirements from the Confined Space Hazard Assessment are required.



WARNING: The Confined Space Entry Permit is verification that a hazard assessment has been completed. Do not approve or issue any Confined Space Entry Permit until the scope of the work has been:

- a) defined in sufficient detail to ensure all hazards are *identified and controlled*, and
 - b) reviewed with the Permit issuer for accuracy.
- All potential hazards and controls have been identified.
 - If the Permit receiver or permit issuer changes while the work is in progress, the new Permit receiver or permit issuer shall read and sign the Confined Space Entry Permit to acknowledge the conditions under which the Permit was issued.

11.4.10.1 Permit Issuer

The Permit Issuer is responsible for:

- Reviewing hazards and controls with the permit receiver
- Verifying compliance with the requirements on the permit
- Verifying that appropriate controls are in place
- Ensuring atmospheric testing is complete
- Determining the need for a safety watch(es)

11.4.10.2 Permit Approver

The Permit Approver is responsible for:

- Acknowledging the work
- Reviewing the hazards and controls with the permit issuer
- Ensuring the permit issuer is aware of site specific information

NOTE: If a Regional Manager approval is required, Site Supervisor approval must be obtained first.

11.4.10.3 Permit Receiver

The Permit Receiver is responsible for:

- Providing the permit issuer with adequate notice and a sufficient description of the scope of work
- Reviewing the completed Task Hazard Assessment and the Permit with affected workers
- Ensuring requirements on the permit are followed.

11.4.10.4 Permit Limitations

A Confined Space Entry Permit is valid for a maximum of 12 hours and only for the conditions under which it was issued.

A new Confined Space Entry Permit shall be issued:

- for each 12-hr period that the work continues, and
- if the scope of work or conditions changes from the original permit.

All work shall cease by the proposed completion time:

- a new permit is issued; or
- the permit issuer extends the existing permit.

11.4.11 Responsibilities

Confined space entry supervisors are responsible for:

- Ensuring written entry procedures and rescue plans are readily available.
- Ensuring only trained workers enter a confined space.
- Verifying lockout/tag-out of equipment.
- Supporting the safety watch in controlling access to the confined space.
- Reviewing hazards and controls with affected workers.
- Ensuring emergency rescue services are readily available.

Workers entering a confined space are responsible for:

- Conducting work in accordance with the requirements on the permit.
- Maintaining communication with the safety watch.
- Exiting the confined space when alerted by the safety watch.
- Wearing appropriate PPE.

11.4.12 Confined Space Entry Permit/Records

For all entry or work within confined spaces, a Task Hazard Assessment and a Confined Space Entry Permit are required.

Retain the Confined Space Entry Permit as follows:

- White copy to the Permit Receiver.
- Pink copy retained by the Issuer.
- Yellow copy at the discretion of Regional Office.
- Retain all gas detection monitoring and supporting documentation.

When work is complete each day:

- The Contractor returns the white copy to the Permit issuer.
- The Permit issuer keeps the pink copy onsite.
- Retain white copies of Confined Space Entry Permits (including the respective Hazard Assessment) on site or in the project file for at least 10 years.
- Retain Hazard assessment with Permit as a permanent record.
- A copy of the Contractor's Confined Space Entry Permit must be attached.

Table 1
Examples of Confined Space Hazard Assessment

HIGH HAZARD		
Type of Confined Space	Potential Hazards	Potential Controls
Geodesic Dome Tank – Floating Roof	<ul style="list-style-type: none"> • Restricted access and egress • Tank height and size may make rescue difficult • Flammable atmosphere • Roof instability • Breathing hazard 	<ul style="list-style-type: none"> • For respiratory protection, Respiratory Protection, and Breathing Hazards • Written job procedure • Safety watch(es) • Continuous gas monitoring • Continuous mechanical ventilation • Communication system
Open Tank – Floating Roof Initial tank entry	<ul style="list-style-type: none"> • Tank height and size may make rescue difficult • Flammable atmosphere • Roof instability • Breathing hazard 	
Cone Tank Roof Holding Tank Initial entry	<ul style="list-style-type: none"> • Explosive/flammable atmosphere • Toxic atmosphere • Oxygen deficiency • Breathing hazard 	
Mainline Sump	<ul style="list-style-type: none"> • Explosive/flammable atmosphere • Substance/residue adhering to walls • Falling when entering and exiting • Restricted movement • Breathing hazard 	
MODERATE HAZARD		
Type of Confined Space	Potential Hazards	Potential Controls
Open Tank – Floating Roof Initial tank roof access	<ul style="list-style-type: none"> • Difficult rescue due to tank height and size • Flammable atmosphere 	<ul style="list-style-type: none"> • Escape pack if remote accessories not used • Continuous gas monitoring • Communications system • Written job procedure
Pipe, Horizontal Culvert, Vertical Culvert (greater than 4 ft), electrical Vault	<ul style="list-style-type: none"> • Product release • Oxygen deficiency 	
Type of confined Space	<ul style="list-style-type: none"> • Potential Hazards 	

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LOW HAZARD		
Type of Confined Space	Potential Hazards	Potential Controls
Below Floor Grating – Pump Room	<ul style="list-style-type: none"> • Restricted egress • Hazardous atmosphere • Oxygen deficiency • Noise 	<ul style="list-style-type: none"> • Supporting structures • Lighting • Housekeeping • Fall Protection • Continuous gas monitoring • Maintain three-point contact • Written job procedure
Open Tank – Floating Roof Roof inspection	<ul style="list-style-type: none"> • Potential hazards can be controlled • Slips, trips, falls 	

Table 2
Examples of Hazard Controls for Confined Space Classes

Requirement	High Hazard	Moderate Hazard	Low Hazard
Confined Space Permit	Required	Required	Required
Pre Job Meeting	Required	Required	Required
Initial Air Testing	Required	Required	Required
Intermittent Air Testing	Required if space is vacated for longer than 20 minutes	Required if space is vacated for longer than 20 minutes	Required if space is vacated for longer than 20 minutes
Continuous Air Monitoring	Required when space is occupied	Required when space is occupied	Required when space is occupied
Written Entry Procedure	Required	Required	Not Required
Written Rescue Procedure	Required	Required	Required
Ventilation	Required	Determined by Air Monitoring	Determined by Air Monitoring
Safety Watch	Required at entrance	Required at entrance	Required at entrance
Rescue Equipment	Required at entrance	Required within reasonable distance of worksite	Required within reasonable distance of worksite
Rescue Workers	Required on-site	2 rescuers required for floating tank roof	Determined by Hazard Assessment
Lockout and Isolation	Determined by Hazard Assessment	Determined by Hazard Assessment	Determined by Hazard Assessment
Fall Arrest	Determined by Hazard Assessment	Determined by Hazard Assessment	Determined by Hazard Assessment

NOTE: The above Tables should not be considered all-inclusive.

11.5 Working in Hazardous and Restricted Areas

This procedure outlines the criteria for working in Hazardous and Restricted areas where combustible vapors / gases and materials may be present. This includes, but is not limited to pump shelters and densitometers; instrument and sample buildings (see Appendix T).

The Contractor shall complete a Task Hazard Assessment for work in these areas to ensure the appropriate hazards are understood and the necessary precautions are taken. All work in these areas must be done under the appropriate work permit.

11.5.1 Fire Watch

The Work Permit shall identify whether a Fire Watch is required. For all tasks, an additional Fire Watch may be required if one person cannot safely monitor the work activities as outlined in the Hazard Assessment, regardless of size.

If the Fire Watch leaves the IMMEDIATE work area for any reason, the work activity shall stop until they return.

For Additional Fire watch requirements and guidelines refer to Section 7.3.

11.6 Electrical Safety

11.6.1 Introduction

Only qualified and competent electrical workers may perform electrical construction, testing, repair and maintenance.

All applicable precautions as outlined in legislated safety codes shall be followed when performing electrical construction, testing, repair and maintenance.

All circuits shall be placed in an energy-free safe work condition (lock-out/tag-out procedures shall be used) before performing construction, testing, repair, or maintenance unless it is not practical to do so.

Qualified electrical workers shall avoid working on live circuits whenever possible. When a circuit is required to be deactivated to perform construction, testing, repair, or maintenance, appropriate lockout and tag out procedures shall be used.

When non-qualified workers are assigned to work with qualified electrical workers (i.e. Journeymen) they shall be instructed in safety precautions, work procedures, and electrical hazards in the area.

11.6.2 General Rules

The Contractor shall ensure:

- All work is completed in accordance with all applicable Federal, Provincial, and Municipal Regulations.
- All applicable trade practices common to the industry are followed and those proper journeymen to apprentice ratios are adhered to.

- That all necessary equipment, safety devices and personal protective equipment are supplied, properly used, and maintained.
- The safe limit of approach distances for workers and equipment shall be maintained at all times.
- Tag lines shall be used to ensure materials do not encroach upon the safe limits of approach minimum distances. If the possibility of encroachment exists, an outage shall be required.
- Contractors who employ non-electrical workers, who work within the substation, shall protect the workers from the hazard within the substation by erecting adequate self-standing non-conductive barricades.
- Ribbon shall be used for increased visibility only and not as a barricade support.
- No person may go beyond the barricaded area without the Company Site Inspector's approval.
- If the substation fence is removed, a temporary fence of equal height shall be installed at the end of each day.
- To maintain a safe clearance from the substation grounding system, all construction equipment such as work trailers and supplies shall be stored a minimum of 3 meters (10 ft.) from outside of the substation fence.
- When a new portion of ground grid, ground cable, or fence is attached to the existing grid or building grid, the bonding cable connection shall be made by a competent, qualified worker wearing high voltage rated gloves, or preferably by a person using a hot stick. Once established, the permanent connections can be made without gloves. The bonding cable shall have proper grounding clamps and be a minimum of #2 AWG.



CAUTION: Never perform regular or emergency work on overhead lines or equipment connected to overhead line when there is a threat of electrical storms.

11.6.2.1 Exposed Electrical Equipment/Conductors

- Non-electrical workers shall not work on electrical conductors.
- Qualified electrical workers shall avoid working on energized circuits whenever possible. All work on energized circuits will be identified on the work permit and addressed through the Hazard Assessment process.



WARNING: Never assume an electrical conductor is de-energized. Don't make body contact or reach blindly into un-insulated equipment or conductors until:

- visibly located from, the power supply, and locked out
- voltage tested and confirmed to be absent of potential (de-energized)
- potential energy sources are safely grounded for high-voltage equipment/conductors

11.6.2.2 Voltage Testing

- Before working on energized conductors, use a voltage detector or tester designed to meet or exceed the system voltage to be tested to verify the absence of potential.
- Visually inspect and confirm proper operation of the voltage detector before and after testing.

NOTE: Proximity-type voltage detectors are not to be used on shielded cable.

Electrical work, other than hot stick work, shall not be done on energized high-voltage conductors.

NOTE: For the purposes of performing hipot and insulation resistance tests, safe work ground conductors may be removed when safe to do so. Prior to testing, the area to which the cable is exposed shall be flagged off, with access restricted to authorized workers only. Safe work ground conductors shall be replaced at completion of testing.

11.6.2.3 Requirements for Two Workers

At least two qualified electrical workers are required for:

- Insulation resistance tests and hi-pot tests on circuits over 480 volts;
- Work requiring the removal of covers or the opening of doors exposing energized high voltage equipment; and
- Any commissioning work over 480 volts.

11.6.2.4 Working on or about electrical equipment:

A Company Operations representative, Site Inspector and Contractor Representative shall:

- Identify potential sources of electrical energy prior to commencing work by jointly reviewing applicable electrical drawings and single-line diagrams.
- Consider all Electrical conductors within high voltage systems to be energized unless the conductor is visibly isolated from the power supply, grounded and locked out.
- Visually inspect the electrical components being worked on,
- Review the detailed scope of work to be performed.
- Review the completed Task Hazard Assessment and required Permits.
- Open doors and remove covers to access equipment compartments in order to physically verify that there is no potential energy sources concealed within the compartments.
- Ensure Workers are instructed to test all conductors to confirm they have been de-energized.
- Ensure testing has been completed prior to working within the established safe limit of approach as outlined in the completed Task Hazard Assessment.

NOTE: The Contractor shall provide appropriate high voltage test equipment (e.g. high voltage probes and high voltage gloves, personal protective equipment).

11.6.3 Personal Protective Equipment for Electrical Work

11.6.3.1 Protective Clothing

- Workers working on or near electrical equipment lines and components are subject to arc flash and shock hazards and shall wear appropriate fire retardant clothing as well as eye, face and head protection (as per NFPA 70E 130.7, Personal Protective Equipment).
- Arc flash and shock hazard warning and danger signs are attached to existing fixed electrical equipment found on Company property and identify the Hazard Risk Category (HRC) inherent to the equipment.
- Appropriate personal protective equipment required is identified for working within the flash hazard boundary per table 130.7 (c) (10) of NFPA 70E.
- Appropriate personal protective equipment required is identified for working within the flash hazard boundary while performing tasks as specified within NFPA 70E, Standard for Electrical Safety in the Workplace.

In the absence of signage, the Contractor shall determine:

- The Hazard Risk Category based on the specific task to be performed as defined by NFPA 70E, Table 130.7 (C) (9) (a).
- The appropriate PPE as defined by NFPA 70E, Table 130.7 (C) (10).
- The required minimum arc rating of PPE as defined by Table 130.7 (C) (11).
- Fire retardant coveralls with minimum 25 cal/cm² rating can be worn over non FR work wear up to HRC 3. Multilayer flash suit pant and jacket and double layer arc hood with minimum rating of 40 cal/cm² shall be worn for HRC4.
- While performing electrical work, keep sleeves down and do not wear metal articles (e.g., rings, watches, key chains) unless rendered non-conductive by taping.
- Do not wear loose clothing.

11.6.3.2 Hand Protection

- Qualified electrical workers working on high-voltage equipment and energized equipment shall wear the required hand protection such as ANSI/ASTM approved rubber gloves and protective leather gauntlet gloves.
- Rubber gloves shall:
 - ♦ Be tested for air leaks and examined for signs of cracks before each use.
 - ♦ Be performance safety tested by an authorized testing company at least twice a year (time between tests not to exceed six months).
 - ♦ Have the date of the test and the test voltage clearly marked on the gloves.

- Workers removing conductive or semi-conductive sheathing shall wear adequate hand protection (i.e. Kevlar gloves)

11.6.3.3 Foot Protection

- Safety footwear marked with the Omega symbol that incorporates an electric shock resistant sole is required for all workers performing electrical work or any worker entering a substation.

11.6.3.4 Eye, Face and Hearing Protection

The Contractor shall ensure the appropriate eye, face, and head protection is worn according to the HRC rating as identified by the equipment signage and/or NFPA 70 E table 130.7(C) (10)

Example:

- HRC 0 and 1 - Safety glasses with side shields or safety goggles and hard hat.
- HRC 2 – All the requirements of HRC 0 and 1, plus a face shield with a minimum 8 cal/cm² rating, with wrap-around guarding to protect not only the face, but also the forehead, ears, and neck (or, alternatively, a flash suit hood), ear canal insert hearing protection and leather gloves (if voltage-rated gloves are required, the leather protectors worn external to the rubber gloves satisfy this requirement).
- HRC 3 and 4 – All the requirements of HRC 0, 1 and 2, plus a double layer flash suit hood with minimum rating of 40 cal/cm²

11.6.3.5 Head Protection:

- The Contractor shall ensure that hardhats are rated for arc hazard protection and meet ANSI Z89.1-1997 Type 1, Class “E” or CSA Z94.1-92 (R1998) Class “B” requirements. See 10.3 Head Protection

11.6.3.6 Fall Protection:

The Contractor shall ensure that Workers working in elevated positions use appropriate fall protection as described in the completed Task Hazard Assessment.

11.6.4 Electrical Tools and Equipment

The Contractor shall ensure:

- Electrical cords and plugs with mechanical damage (e.g., exposed wiring, cords with frayed or deteriorated insulation, bent or broken prong of a plug) shall be immediately tagged as defective and repaired or replaced.
- Portable electric equipment is grounded or double insulated.
- Extension cords are approved three-wire type having appropriate conductor insulation and an overall jacket not susceptible to damage at low temperatures.
- That cords are not permanently secured to any structure.
- Power cords are elevated where possible to prevent damage from vehicles/equipment and tripping hazards.

- All tools and equipment are “off” prior to plugging them in.
- Use ground fault circuit interrupter (GFCI) protection when using portable tools outdoors.
- Unattended temporary electrical equipment such as lights, heaters, etc. that will be left on in hazardous or restricted areas shall be approved and installed for Class 1, Div. 2 area classifications.
- Metal measuring tapes, aluminum ladders, or ropes having metal threads woven into the fabric shall not be used near exposed live electrical parts.
- Portable generators used on the worksite shall be grounded in accordance with manufacturer’s instructions.
- All voltage and current testers are rated for the circuits and equipment to which they are connected.
- That safety ground cables for use in electrical cubicles and substations are stored in a central location. Safety ground cables shall be:
 - An appropriate size for the location.
 - Fitted with 400-amp clamps on each end, suitable for connecting to switchgear or substation equipment and to ground.
 - Fitted with approved crimped ferrules (installed on wire ends to attach to clamps).
 - Kept as short as possible.
 - Attached in a phase to phase to ground concept where possible.
- Only qualified electrical workers can:
 - Inspect or repair defective portable electrical equipment
 - Arrange any temporary wiring for a power supply needed for portable electrical tools, equipment, and lighting units.

11.6.5 Adapter Cords (Pig Tails)

- Whenever practical, use pneumatic or explosion–proof hand tools instead of non-explosion-proof adapter cords.
- All non-explosion-proof adapter cords and explosion-proof extension cords shall be fabricated by a qualified Company electrician and issued by a designated Operations representative.
- All non-explosion-proof adapter cords shall be tagged with a station identifier.
- Operations workers will record the use of non-explosion-proof adapter cords on a log sheet that includes:
 - Date(s) signed in and out.
 - Name of worker using the cord.
 - Location of work.
- Non-explosion-proof adapter cords up to 2 feet in length may be used as a temporary device for hot work in hazardous areas if:
 - The designated work area is continuously monitored for combustible vapors.
 - The connection to the electrical outlet is within the designated work area. Where the connection to the electrical outlet is outside the designated work area, explosion-proof extension cords shall be used.



WARNING: Do not leave non-explosion-proof adapter cords unattended in hazardous areas that are not continuously monitored for combustible vapours.

11.6.6 Fiber Optic Safety

General safety rules and practices to be followed when installing fiber optic cable:

- Keep all food and beverages out of the work area.
- Do not smoke while working with fiber optic systems.
- Always wear safety glasses with side shields. Treat fiber optic splinters the same as you would glass splinters.
- Never look directly into the end of fiber optic cables until you are positive that there is no light source at the other end. Use a fiber optic power meter to make certain the fiber is de-energized (dark). When using an optical tracer or continuity checker, look at the fiber from an angle at least 15 cm away from your eye to determine if the visible light is present.
- Only work in well ventilated areas.
- Contact lens wearers shall not handle their lenses until they have thoroughly washed their hands.
- Do not touch your eyes while working with fiber optic systems until your hands have been thoroughly cleaned.
- Keep all combustible materials safely away from the curing ovens.
- Wear disposable aprons if possible to minimize fiber particles on your clothing. Fiber particles on your clothing can later get into food, drinks, and/or be ingested by other means.
- Dispose of fiber scraps carefully by placing them in a disposable container that has a sealed lid.
- Thoroughly clean your work area when you are done.

11.6.7 Safe Distances

- Where qualified electrical workers cannot maintain minimum safe limits of approach distances and cannot de-energize lines and conductors, use insulated tools rated for the voltage.
- When special insulating tools cannot be used, insulating gloves, shields, mats, covers, and sleeves may serve as the sole portable insulating device between the person and the live part.
- When necessary to perform work in proximity to exposed live equipment, extreme care shall be taken to monitor body, tool, and material movement.
- In these cases a Safety Watch shall be assigned with no other duties but to watch for the safety of workers.

11.6.8 Safe Limits of Approach

Qualified electrical workers and non-electrical workers working near energized overhead power lines or exposed energized conductors shall ensure they and any equipment or tools maintain the safe limits of approach distances as specified below.

Safe Limits of Approach Distances:

Voltage of Power line or Conductor		Minimum Safe Limit of Approach Distances	
Phase to Ground	Phase to Phase	Non-electrical Workers	Qualified Electrical Workers
over 425–12,000 V	over 735–20,780 V	3.0 meters (10 ft)	0.9 meters (3 ft)
over 12,000–22,000 V	over 20,780–38,105 V	3.0 meters (10 ft)	1.2 meters (4 ft)
over 22,000–50,000 V	over 38,105–86,600 V	3.0 meters (10 ft)	1.5 meters (5 ft)
over 50,000–90,000 V	over 86,600–155,880 V	4.5 meters (15 ft)	1.8 meters (6 ft)
Over 90,000–120,000 V	over 155,880–207,845 V	4.5 meters (15 ft)	2.1 meter (7 ft)
over 120,000–150,000 V	over 207,845–259,805 V	6.0 meters (20 ft)	2.7 meters (9 ft)
over 150,000–250,000 V	over 259,805–433,010 V	6.0 meters (20 ft)	3.3 meters (11 ft)
over 250,000–300,000 V	over 433,010–519,615 V	7.5 meters (25 ft)	3.9 meters (13 ft)
over 300,000–350,000 V	over 519,615–606,215 V	7.5 meters (25 ft)	4.5 meters (15 ft)
over 350,000–400,000 V	over 606,215–692,820 V	9.0 meters (30 ft)	5.4 meters (18 ft)

NOTE: Use phase to ground voltages unless phase-to-phase voltages are specified or known for the overhead power line or conductor being approached. Provincial regulations or local utilities may have alternate requirements for safe limits of approach. Refer to relevant regulations.

The Contractor shall:

- Contact a competent Company electrical worker or utility company representative to determine the operating voltage of the overhead power line or exposed electrical conductor.
- Examine the work area to determine if safe limits of approach distances can be maintained.
- Erect barricades to restrict unauthorized access.
- Erect temporary warning signs, which read “DANGER - OVERHEAD POWER LINES” at approximately 7 meters on either side of the line.

- If the work is being carried out near the safe limit of approach distance, the Contractor shall assign a Safety Watch to ensure minimum distances are maintained.
- To help maintain the safe limit of approach the Contractor shall install:
 - two temporary poles may be erected on each side of the pathway; and
 - a ribbon strung across at a height reflecting the minimum safe limit of approach.

Exceptions:

Non-Electrical Workers

- Where non-electrical workers cannot maintain minimum safe limits of approach distances, de-energize and safety ground power lines and conductors, unless a competent electrical worker or utility company representative can assist with applicable safety rules.

NOTE: Under direction of a competent electrical worker or utility company representative, and in accordance with local utility regulations, the minimum distance may be reduced in order to safely route workers, equipment or objects under power lines or energized conductors. However, the clearances for workers, equipment or objects shall remain constant. If possible, qualified electrical workers or utility company representatives may also install insulating devices to protect non-electrical workers.

Qualified Electrical Workers

- Where qualified electrical workers cannot maintain minimum safe limits of approach distances and cannot de-energize lines and conductors, use special insulating tools in accordance with applicable safety rules.
- When special insulating tools cannot be used, use insulating gloves, shields, mats, covers and sleeves rated for the voltage as protection from energized lines and conductors.

11.6.9 High Voltage Work

This applies for (a) work on electrical equipment and circuits with voltages greater than 750 V (Canada) or 600 V (US), and for (b) work upstream (line side) of the 480 V main breaker.

The Contractor shall:

- Complete a Task Hazard Assessment
- Notify appropriate utility companies as necessary before starting any work.
- conduct a pre-job meeting to review but not limited to:
 - Potential hazards associated with the work
 - Work procedures
 - Personal protective equipment (PPE)
 - Safe clearance distances

11.6.9.1 Safety Grounds

- Safety grounds on distribution and equipment may be temporarily removed during voltage tests. Use personal protective equipment (PPE) and keep isolated from hazards.
- Use an approved hot stick for installing or removing safety ground cables to high voltage equipment and conductors.

11.6.9.2 Electrical Isolation/Clearance:

- The Contractor and the Company Site Inspector shall review the work and determining the need for any energy sources to be isolated.
- The Company Site Inspector is responsible for requesting operations to perform the initial isolation and clearance required for the contractor's scope of work.
- The operations representative is responsible for reviewing the contractor's scope of work and conducting the initial de-energization, isolation, grounding, and lockout of the equipment required for the work to be completed safely. Furthermore, for work performed on circuits 480 volts, and over, the operations representative (signing off on "Clearance issued by") is responsible to issue an Electrical Equipment Isolation/Clearance to the contractor once it has been isolated. (Refer to Appendix U)
- Upon receipt of the clearance, the contractor signs off on "Clearance issued to" of the Electrical Equipment Isolation/Clearance Form acknowledging the isolation is complete. The contractor will then apply their own lock to all locked out equipment, test the equipment for voltage and adhere to all the safety requirements associated with their work on the equipment.
- Isolation and clearance procedure steps shall be used to assist in complex electrical isolation.
- Company Site Inspector signs off as "Person in charge" in the role of overseeing the job activities.
- Once the contractor has completed his assigned task, he will sign as "Work Clearance Surrendered by" validating his work is complete.
- The Company site inspector will sign "Work Clearance Surrendered to" and inform the operations representative all work that required de-energizing is complete and the re-energizing process can begin.
- Operations representative will sign as "Work Clearance Surrendered to" and may begin the re-energizing process.
- These steps are used to certify that specified lines or equipment are de-energized, isolated, tested and grounded before conducting work. It is also used to certify that the grounds have been removed, workers warned and the specified lines or equipment are ready to be re-energized.
- Safe limits of approach will be identified prior to the high voltage work beginning and recorded on the above mentioned form. If the work being carried out is near the safe limit of approach distance, the person in charge of the work shall assign a safety watch to monitor body, tool, and equipment movement to ensure minimum distances are maintained.
- Workers shall be instructed not to reach blindly into areas or equipment that may contain energized parts.

11.6.9.3 Substations

Before work starts, the Contractor shall ensure a Safe work plan is developed and shall included the following but is not limited to:

- Safety Watch qualifications
- description and plan of work
- responsibilities of entrants
- special tools or equipment
- personal protective equipment
- fire protection
- barricades and guarding
- safe clearance distances and control methods
- no metal tapes/ladders
- no tools or equipment above shoulder
- maintain minimum of one qualified journeyman to one apprentice
- potential hazards

The Contractor shall provide a copy of all Journeymen and Apprentice Electrician Certificates to the Company Site Inspector before the work begins.

Prior to commencing work, the Company Site Inspector shall advise the applicable power utility company of the nature and schedule of all work and allow them the opportunity to advise the Company of any requirements they may have.

<p>NOTE: At no time will any worker or work alone within an energized substation.</p>
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11.6.9.4 Entering Energized Substations:

a) Planning

- Contractor workers (supervisors, foremen, consultants) that are required to enter an energized substation for preliminary planning, etc., shall be accompanied by a qualified Company Site Inspector or Operations electrician, and where required, a power utility representative.

b) Work

- A Contractor will not enter or perform any work within an energized substation unless either an Operations electrician, a qualified Company Site Inspector, power utility representative, or a qualified Contractor Safety Watch is present at all times to oversee the work.

At all times, the Safety Watch shall have a direct line of sight to all workers within the work area. If the line of sight cannot be maintained at all times, additional Safety Watch workers will be required. The Safety Watch shall be present in the immediate work area at all times. If the Safety Watch leaves the work area, the work must stop. The Company Site Inspector will determine the minimum number of Safety Watch persons required.

c) Commissioning

- A Safety Watch is required if a commissioning person is working alone within a substation.
- A Safety Watch is not required if there is more than one person, providing they will be working together and they are both competent in high voltage work.
- The Company Site Inspector or the Operations electrician will be responsible to be on site to intermittently monitor the work and to ensure that safety requirements are complied with.

If the Company Site Inspector or approved designate is not available to be present at all times, work activity shall stop until such time as the Site Inspector or approved designate returns.

11.6.9.5 Safety Watch Responsibilities:

The Safety Watch shall be:

- A qualified Company Site Inspector, or
- A Contractor journeyman Electrician with high voltage experience.

The Permit Receiver shall ensure that the Safety Watch is:

- Informed of their duties as a Safety Watch and of the hazards involved in the work.
- Instructed in the procedures to follow in the event of an emergency.
- Knowledgeable in the content of the safe work plan and permits.
- Instructed to pay particular attention when there is any possibility of a worker inadvertently encroaching within the safe limits of approach.
- Authorized to stop any part of the work immediately that they consider dangerous.
- Free of any other duties that might interfere with their duties as a Safety Watch

<p>NOTE: Work shall not be performed nor shall any contractor workers be allowed in the substation, if the Safety Watch is not present. A minimum ratio of one journeyman electrician to one electrical apprentice is required for all electrical work being performed within substations.</p>

11.6.9.6 Outages

Work on high voltage equipment shall be done when facilities and equipment are de-energized.

Outages shall be required for the following activities:

- Any work where clearances are less than the safe limit of approach.
- Any work on energized equipment.
- Hydrovac work (See Hydrovac in Energized Substations).

Certain tests require:

- A lock-out of supply lines by the power utility company. The Contractor shall identify this in advance to the power utility company via the Company Site Inspector.

- A written isolation procedure shall be developed stating the instructions to be followed and to which device it applies.
- All workers associated with the work shall review the isolation procedure at a safety meeting to be held in advance of the outage.
- Prior to the outage, a meeting shall be held by the Company Site Inspector, the Contractor, and the power utility representative (where required to provide isolation) to determine isolation points and safety ground locations.

11.6.9.7 Hydrovac in an Energized Substation

Prior to any mechanical excavation, drilling, or pile driving, the first 1.2 meters below grade shall be excavated by hand digging or hydrovacating. Every effort to obtain an outage should be made. If it is highly impractical to complete an outage, all of the following conditions shall be in place before the hydrovac can be performed:

- A Hazard Assessment must be completed.
- The process must be approved by the Project Manager and the Regional General Manager.
- A temporary fence (snow fence) or barricade shall be erected to restrict access to all other areas of the substation.
- A covered structure (wood or plastic) is built over the excavation location to ensure that the water is not permitted to make contact with energized facilities.
- The hydrovac unit is positioned outside the substation with all the required suction and wash hoses running into the excavation area.
- The hydrovac unit is grounded at a location outside the perimeter of the substation (use existing ground rods if possible).
- All workers are wearing the appropriate PPE including CSA approved non-conductive footwear.
- Wands and suction hoses are fitted with protective rubber shields to ensure there is no direct metal to metal contact with underground facilities.

11.6.10 Controlling Induced Voltage

If the pipeline parallels a power company right-of-way, it may be within the electric field that surrounds the overhead cables and, as a result, an induced AC voltage may be generated on the pipeline. The magnitude of this voltage depends on the amount of current carried by the transmission lines, the geometric configuration of the pipeline with respect to the transmission cables, and the length of pipeline paralleling the transmission line. Pipelines, even after leaving the power lines, carry a pipe-to-ground potential.

Generally the voltage on the above ground appurtenances such as valves and scraper traps is limited to 15 volts, which is accepted in industry to be a safe level. The voltage on the buried portions of the pipeline however, may exceed this level and grounding of the pipeline shall be performed to protect against electric shock when working on the pipeline. These requirements are limited not only to pipelines paralleling high voltage transmission lines, but to pipelines extending beyond transmission lines which may remain under their influence for up to 15 km (10 miles) from the point of departure.

The Contractor shall submit a Safe Work Plan for controlling induced Voltage to the Operations Project Execution Lead (or equivalent) for approval. This Plan shall include the following but is not limited to:

- Specialize PPE.
- Measuring / testing.
- Grounding requirements for planned work.
- Work stoppage for adverse weather conditions.

11.7 Lockout Procedures

Only authorized Company workers shall perform initial de-energizing, isolation and lockouts. All Lockout Procedures shall be documented and a copy kept as part of the project documentation.

11.7.1 General

Lockouts are required to prevent injury from the unexpected energization, start-up, or release of stored energy. Examples of stored energy where lockout/tag-out applies are:

- electrical
- mechanical
- hydraulic
- radio active
- thermal
- gravity
- pneumatic

11.7.2 Lockout/Tag-out Procedures

A lockout/tag-out is required before performing any of the following activities:

- When a worker may be exposed to a release of hazardous energy or to the unexpected energization/start-up of machines or equipment while constructing, installing, adjusting, modifying, inspecting, testing, maintaining, and/or servicing the machines or equipment.
- When a worker is required to remove or bypass any guard or other safety device.
- When a worker is required to place any part of their body into a “point of operation”, “Line of Fire” or other danger zones that exist during a machines operation cycle.

General Procedures:

Preparation:

The Contractor and Company Site Inspector shall locate all energy sources that need to be isolated. This is accomplished by reviewing the scope of work, applicable drawings and to visually inspect the equipment components being worked on to verify drawings.

NOTE: It may be necessary to access equipment compartments to verify energy sources.

Worker Notification

- The Contractor and Company Site Inspector shall notify all affected persons that a lockout or tag-out system is in effect and explain the reason for lockout.

Equipment Shutdown

- If the equipment is operating, Operations workers shall shut it down utilizing defined procedures.

Equipment Isolation

- Operations workers shall operate the switch, valve, or other energy isolating device(s) so that equipment is isolated from its energy source(s). All potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, or otherwise made safe:
 - ♦ For electrical energy, open correct electrical disconnect switch or other similar devices.
 - ♦ For energy such as that in rotating flywheels or elevated machine members, all energy shall be dissipated or restrained by methods such as repositioning or blocking.
 - ♦ For thermal, chemical, flammable, pneumatic radioactive, or hydraulic energy where such energy is contained in lines or pipes, valves shall be closed, lines disconnected, flushed or purged, and/or vented and isolating “blanks” installed. Blind flanges used for this purpose are to be of sufficient rating to withstand the highest possible pressure that may result.
- Application of Company Lockout/Tag - When working on equipment, authorized Operations workers shall place a lock clevis and tag on the locking device. The use of tags without locks is only permitted when the equipment is physically incapable of being locked out.
- Verification of Lockout - The Contractor and Company Site Inspectors shall ensure that no workers are exposed and check to see if all sources have been isolated and locked out. This is done by operating the push button or other normal operating controls to make certain the equipment shall not operate.
- Application of Contractor Lockout/Tag-out Device - each trade or occupation working on equipment that is affected by a lockout shall install their own lock and tag on the clevis prior to starting work. One lock/one key shall be used for each trade or occupation and one person in each trade shall be responsible for the lock, tag and key.
- Removal of Contractor Lockout/Tag-out Device - each trade or occupation shall remove their locking devices only after all guards are replaced, all tools and repair equipment are clear, and the work has been completed. Once locks have been removed, the Contractor shall notify the Company Site Inspector that the equipment is safe to energize and that all affected trades or occupations have been advised to consider it energized. Only the person affixing a lock and tag shall be permitted to remove it.
- The Contractor shall provide a written procedure for removing locks where worker is confirmed safe and unavailable to remove their lock.

11.7.3 Specific Lockout Procedures

The Contractor representative in conjunction with the Site inspector and Company Operations representative shall develop and document specific lockout procedures for complicated multiple lockouts and / or complex electrical lockouts before work commences (i.e., major lockout for a meter manifold system or high voltage lockout in a substation).

11.7.4 Approved Lockout/Tag-out Devices

Contractors shall supply or make available the following approved devices where required:

- Lockout locks having only one key per lock.
- Multiple lock adapters (hasp/clevis), Group Lock boxes.
- Chain lengths or equivalent for the purpose of isolating valve handles and similar equipment.
- “DO NOT OPERATE” tags, including the date and time that work was started, name and contact information for the worker that installed the lock, and the purpose of the lockout.

11.8 Equipment

11.8.1 Spark Arrestor and Positive Air Shutoff

- Diesel driven equipment, which is used to perform work within hazardous or restricted areas or in the area of planned pipeline repairs and pipeline leaks, shall have the exhaust system fitted with a spark arrestor, excluding turbo charged equipment.
- Spark arrestors shall be fully functional before working in hazardous or restricted areas. To remain effective, spark arrestors shall be periodically blown clean with compressed air through the cleanout plug.
- Diesel-driven equipment used to perform work within hazardous or restricted areas shall have the air intake system fitted with a positive air shut-off. If not equipped, constant air monitoring is required when diesel-driven equipment is used in hazardous or restricted areas. Vehicles left unattended in a restricted or hazardous area must be shut off and not restarted until air monitoring confirms the absence of hazardous vapors.
- A de-compression switch is not an approved alternative to a positive air shut off.
- The manually operated switch for the positive air shut off shall be clearly identified and all workers familiar with its use. Manual switches may be approved only where continuous air monitoring is in place. Approval shall be in writing from the Construction Manager and/or Regional Manager
- Operation of the positive air shut off shall be checked monthly.
- Service or deliver type vehicles are exempted from these requirements, but shall be escorted by the Company Site Inspector or designate and the area shall be continuously monitored for ignitable vapors.

11.8.2 Refueling Equipment

- Refueling of equipment shall be in a designated safe area where smoking is prohibited. Two 20 lb ABC dry chemical extinguishers shall be located not less than 8 meters or more than 24 meters from any flammable liquid storage/refueling area.
- Engines of small equipment shall be shutdown and shall be cool prior to the refueling operation.

- Diesel-powered equipment may only be refueled with the engine running if this is in accordance with the manufacturer's specification.
- Use only approved fuelling equipment in the form of a pump and hose or gravity feed from an elevated storage tank, which is properly grounded. Bonding is required between the fuel source and the vehicle or equipment being refueled.
- Never fill a gas can in the bed of a truck that has a bed liner in it. The liner may build up static electricity causing an ignition of the gas can.
- Vehicles/equipment will not be refueled directly beneath or in close proximity to high voltage overhead power lines.
- Fuel storage tanks and portable containers shall be clearly labeled indicating their contents as per WHMIS/TDG requirements.
- All on-site, non-mobile fuel storage tanks require secondary containment. The tank shall be double walled or alternatively shall be enclosed in an impermeable berm with a holding capacity equal to 125% of its contents.
- Approved safety containers and proper grounding/bonding techniques shall be used when refueling.
- Never leave equipment unattended while refueling. The dispensing nozzles shall be of the approved type (self-closing). These nozzles shall not be equipped with latches that hold the trigger and/or be blocked open. Portable tanks shall not be closer than 8 meters (25 feet) from any building.

11.8.3 Vehicles and Powered Mobile Equipment

- Vehicles and powered mobile equipment shall be inspected daily by the operator. Any defects shall be reported immediately to the Supervisor and required repairs made immediately.
- No vehicle shall be operated on Company property when loaded in excess of maximum capacity.
- While mounting or dismounting vehicles and equipment, persons shall maintain a "three point contact". The primary rule when mounting or dismounting vehicles or work equipment is the same as climbing up or down a ladder.
- Ensure ground conditions are level when loading or offloading equipment from trailers.
- No one shall be allowed on the bed of a truck during winching operations.
- All loads shall be properly secured during transportation.
- Vehicles transporting materials shall be equipped with Bulkheads or other effective means of protecting the driver.
- Powered mobile equipment shall be equipped with roll over protective structures in accordance with the applicable governmental regulations.
- Each driver shall obey posted speed limits, slowing as road conditions or as worker presence dictate.
- When approaching areas where there is equipment working, do not stop, park, or pass through the area without the equipment operator acknowledging your presence.

- All vehicles including powered mobile equipment shall have seat belts which shall be worn when the vehicle is in motion.
- Each driver shall hold a valid operator's license for the governing jurisdiction and for the type/class of vehicle/equipment operated.
- All vehicle parking at Company Facilities shall be backed in or pulled through when parking, such as at site office trailers and designated parking areas. Keys shall be left inside the vehicles so that they may be moved in the event of an emergency or if the area becomes congested.
- Operators shall walk around their vehicle or equipment before entering to check for potential obstructions or hazards.
- A signal person / spotter shall be used when reversing in congested work areas
- A signal person / spotter shall be used whenever rear vision is obstructed.
- The signal person/spotter shall stop vehicles from backing when hazards are observed including informing operators and personnel of people entering the immediate work area.
- The operator of the vehicle and the signal person/spotter shall have a clear line of site at all times. If the line of site cannot be maintained, the operation will stop the motion of the vehicle until a clear line of site is reestablished.
- Vehicle recovery straps (tow ropes) including the attachment hardware shall be labeled showing ratings to ensure adequate pulling strength to safely pull the weight of the vehicle.
- No side loading of equipment on trailers and/or transporting of equipment sideways shall occur.
- All vehicles including powered mobile equipment with ROPS (rollover protective structure) shall have seat belts which shall be worn when the vehicle is in motion.
- Keys shall be removed and equipment locked when daily work activities are completed for the day.

Contractors working under the direct supervision of a company employee may operate company-owned, leased, or rental vehicles, provided the Site Supervisor ensures the Contractor has:

- Valid driver's license
- At the discretion of the general manager, completed a defensive driving course
- a drivers evaluation
- A driver's abstract indicating no major traffic violations (e.g. excessive speeding tickets), or if not immediately available, the driver's signature confirming the abstract has no major traffic violations.

11.8.3.1 Backup Alarm

The Contractor shall ensure backup alarms are installed in:

- All heavy equipment;
- All trucks over $\frac{3}{4}$ ton.

- Any motor vehicle having an obstructed view to the rear of the vehicle must use a spotter to safely direct the vehicle.
- Any Contractor owned, leased or rented vehicle where rear vision is partially or totally obstructed; and

The backup alarm shall operate automatically when the vehicle, truck or equipment controls are positioned to move in reverse, and shall be clearly audible above background noise in the surrounding work area.

11.8.4 Mobile Hoisting Equipment

This section focuses on the following types of mobile hoisting equipment; cranes with a lifting capacity of 15 tons or greater, boom trucks with a lifting capacity of 5 tons or greater, and all side boom tractor pipe layers.

The Contractor shall ensure all lifting practices meet or exceed all applicable legislative requirements.

11.8.4.1 General

- The Contractor shall ensure that only competent and qualified workers operate Mobile Hoisting Equipment.
- The Contractor shall assign a competent worker to be the rigger. The employee must be properly trained in rigging and copies of the training and certification shall be given to the Company Site Inspector prior to the lift. The level of training and experience shall be consistent with the requirements of the lift to be made.
- The Contractor shall assign a designated competent worker to act as the rigger. The degree of competency shall meet and be consistent with the requirements of the lift to be performed.
- Only authorized competent and qualified workers assigned by the site supervisor shall operate mobile hosting equipment.
- Prior to performing any lift, the operator shall determine the weight of the lift (including the load and rigging) and ensure that the lifting device and all components are of sufficient size and strength to support the weight of the load. The operator shall ensure that the planned lift does not exceed the manufactures recommendations based on the current operating conditions. Under no circumstances shall the manufacturers' ratings be exceeded.
- The Contractor shall ensure that operation of a crane is suspended when the wind velocity at the elevation of the crane exceeds the limit recommended by the manufacturer or when the ambient temperature is below that recommended by the manufacturer. Contractors shall have a policy of de-rating capacities of the crane below certain temperatures.
- All lifting devices shall be properly assembled using the appropriate rigging components as required for the intended lift, (i.e. four-part vs. a two-part line).
- Each piece of lifting equipment shall be equipped with a load and radius chart that can be easily read by the operator from his operating position. This chart shall be permanently attached to the equipment.

- A preventative maintenance program shall be in place for all lifting or hoisting devices to ensure that components are in safe operating condition (i.e. brakes, cables, connections, sheaves, etc.). All load bearing components shall be non-destructive tested under the direction and control of a Professional Engineer in accordance with the manufacturers' specifications.
- Written records including certifications, maintenance records, and inspection results for each crane, hoist, side-boom, etc. intended for lifting materials shall be available upon request.
- Operators shall perform daily equipment checks to verify that the lifting device and all components are in safe condition, and shall maintain a written record (logbook) of these inspections.
- All hoisting hooks shall be free of bends, cracks, corrosion, and enlarged throat openings. Hook swivel action shall be free and the hook shall be equipped with an operational safety latch.
- Winch lines shall be free of knots.
- When lifting a load, the operator of the lifting equipment shall ensure the hoisting line is in a vertical position and is over the centre of the load in such a manner as to reduce the danger to workers from a swing or uncontrolled movement of the load.
- Loads shall never be moved, carried, or swung over workers.
- Loads shall never be picked up or lowered while any worker is between the machine and the load.
- No person shall be allowed to ride on any part of the equipment except in the seats provided.
- No worker is to be in the ditch, on the pipe, or between the pipe and the ditch when lowering the pipe (or anything else) into the ditch.
- Booms shall be kept clear of overhead power lines and maintain the safe limits of approach to any utility at all times.
- The operator of any lifting device shall remain at the controls while equipment is holding a suspended load. If it is necessary for the operator to leave the controls, the suspended load shall be secured (e.g. skidded or blocked up). All locking and safety devices shall be set as necessary to safely secure the machine.
- Where rotation or uncontrolled motion of a load being hoisted is anticipated, one or more tag lines shall be used. Tag lines shall be knot free and shall never be wrapped or secured in any form to a worker's hands.

NOTE: At no time shall the worker physically contact a suspended load unless the load is in place and must be guided by hand. At no time shall the worker physically contact a suspended load unless tag line use creates an unsafe condition as determined by the hazard assessment.

Signalers/spotters shall be used when:

- ◆ The operator cannot clearly see the work.
- ◆ Equipment is backing up or moving, and the operator cannot see all parts of the machine and its path of travel; and/or

- ◆ The fully extended boom may come within the safe limit of approach distance to an overhead power line.
- ◆ When the view of the operator is obscured, the signaler will alert workers to any hazards that arise while material is being moved.
- ◆ The signaler shall be able to communicate with the operator, either verbally or through standard hand or horn signals.
- ◆ The operator shall take direction from only one signaler. The signal person shall be clearly identified and distinguishable from other workers (i.e. high-visibility vest of a different color and/or reflective arm bands) and shall be competent in crane and hoisting hand signals.
- ◆ The operator shall be protected from the danger of flying cables by a suitable cable guard when working on tractors and other equipment with a winch.
- ◆ All hydraulic hoses, fittings, and tubing, shall be inspected prior to use each day. Equipment showing Leakage at the surface of flexible hoses, blistering of hoses, evidence of abrasion, or scrubbing on outer surfaces of hoses, tubing, and fittings shall be immediately replaced or repaired.

NOTE: .Any worker can give the STOP signal and the operator must comply.

11.8.4.2 Cranes and Boom Trucks

- The operator shall be competent in the equipment in which they are operating.
- The operator shall possess and keep available for inspection, an operator's license or certificate.
- All machine ratings are based on the machine being level in both directions and outriggers extended. If this is not possible, the operator shall take this into account when loading and handling.
- Avoid two-blocking, which may cause the load line to fail.
- Cranes will be equipped with an anti-two-block warning device.
- Whenever possible, cranes traveling with suspended loads shall be avoided. If travel is necessary, the load shall be carried as close to the ground as possible, and the boom carried in line with the direction of travel. In addition, tag lines shall be used to control any load swing.
- Loads carried on boom trucks shall be adequately secured. Boom lines are not to be used for securing the loads.
- Whenever cranes and boom-trucks are traveling around the site, booms, knuckles, etc., shall be in its proper resting position to avoid damage to overhead power lines, cable trays, etc.

11.8.4.3 Pipe layers/Side Boom Tractors

The Contractor shall ensure that only competent / qualified workers operate the particular type of side boom hoisting equipment to which they have been assigned. In the cases where

competency cannot be verified by proof of training, the Contractor shall provide the Company with documentation that each operator has been evaluated and determined competent.

The Contractor shall provide the following documentation for each model of side-boom equipment:

- Operation & Maintenance Manual.
- Load and Radius Chart.
- Annual Inspection Certification for both the tractor and its boom attachment.
- Adjustment of brake tensions shall be performed only by a licensed heavy duty mechanic per manufacturer's procedures.
- On a daily basis, operators of pipe layers / side booms shall check the functioning of the boom cut-out valve.
- The boom of the tractor and the load line shall be lowered by winch and not by brake.
- Workers shall stand clear of the boom when loads are being lowered, lifted, or transported. The operator shall not lift, lower or move a load until all persons are clear.
- When in motion, an unloaded boom shall have the empty hook lashed or otherwise restrained so that it cannot swing freely, and the boom attachment shall not be positioned at more than 30 degrees from the vertical position.
- Prior to the operator dismounting the equipment, the unit shall be made inoperative by either disengaging the master clutch and setting the brakes., or in the case of a hydraulic unit, engage and secure the lock-out lever.
- Under no circumstances shall the side boom be held down by placing the bucket of a track hoe on the counter weights.

11.8.4.4 Classification and Control of Lifts

Many types of lifts are possible, however to ensure common terminology and consistency, all lifts will be defined using the following three classifications:

- Critical
- Serious and
- Standard

Critical Lift Criteria

- Any lift that meets any of the conditions listed below will be classified as a Critical Lift. The workers involved in the lift will then apply the appropriate controls to ensure the safe and effective execution of the lift.
- During any single crane lift, when the load is greater than 90% of the manufacturer's rating chart.
- During any tandem lift (multi-crane lift) involving two or more cranes lifting the same load simultaneously, where the load may exceed more than 75% of the lifting capacity of any one crane as measured on the manufacturer's rating chart.

Critical Lift Control

- The minimum control for all critical lifts is that the Contractor completes an Engineering Lift Plan that includes all details of the lift, including scale drawings showing configurations and clearances. This plan shall be signed and approved by a qualified lift engineer or rigging specialist. A rigging specialist is a person deemed by the Contractor to be appropriately trained in the preparation and development of lifting studies.
- The Engineering Lift Plan will be reviewed and agreed to by all workers involved in the lift (operators, riggers, supervisors, etc.) at a pre-lift meeting.

Serious Lift Criteria

- Any lift that meets any of the conditions listed below will be classified as a Serious Lift. The workers involved in the lift will then apply the appropriate controls to ensure the safe and effective execution of the lift.
- Any lift between 80% and 90% of the crane lifting capacity, as measured on the manufacturer's rating chart.
- Any crane lift where workers are being hoisted in a man-basket.
- Any crane lift where the load or any part of the crane could come over top of power lines or transformers.
- Any crane lift where the actual weight of the load is unknown.
- Any lift in a confined space or restricted area where the load or any part of the crane structure could come over top of any in-service piping, or within the safe limits of approach for high voltage equipment or power lines.
- Any lift where failure of the lift could endanger existing facilities of one-of-a-kind equipment or processes.
- Any load where special lifting or rigging equipment configurations are used.
- Any crane lift where the crane is set up over manholes, catch basins, sewers, sinkholes or other known surface or sub-surface interferences, or potential causes of instability.

Serious Lift Controls

A serious lift will be controlled by completing a lift plan or hazard assessment. The following items shall be considered but not limited to:

- Percent of crane capacity.
- Verifying the weight of the load.
- Change or transition of critical workers associated with the lift.
- Ground conditions.
- Compaction.
- Overhead lines, obstructions, etc.
- Underground equipment or hazards.
- Trajectory of load if dropped (which way will it fall?).
- Electrical equipment, conductors in area.
- Weather conditions.
- Outrigger and track loading.
- Matting.
- Process operations, local process hazards.
- Area workers.
- Multi-lift plans.

The information recorded will, as a minimum, include weight, radius, crane type, percentage of chart, rigging components, rating capacities and also the signatures of those involved in the review.

NOTE: Additional controls may be required, given the exact nature of the lift to be performed.

Standard Lift Criteria

- A standard lift is any other lift that is not categorized as "serious" or "critical".

Standard Lift Controls

- Ropes, Chains, Slings, and Cables:

A competent / qualified person shall inspect wire ropes, certified lifting chains, or slings prior to use. If equipment is worn, frayed, kinked, twisted, or showing signs of damage or excessive wear, it shall be not be used.

- Defective equipment shall be removed from service, tagged and repaired or disposed of.
- Ropes and cable shall be protected from sharp edges, etc. during any lift and shall be properly stored when not in use.
- Lifting chains, slings, cables, hooks and any accessories shall be clearly labeled and rated for hoisting as per legislative requirements. Each chain, cable, sling shall have a tag attached indicating the manufacturer and the safe working limits.

11.8.5 Excavating Equipment Used for Material Lifting

WARNING: Never attempt to raise a load that exceeds the lifting capacity of the equipment.



Before using excavating equipment as material-lifting equipment (e.g. gradalls, backhoes), the worker directing the lift shall ensure:

- The operator is aware of the weight of the load being lifted.
- The operator has the Lifting Capacity Chart for the specific piece of excavating equipment.
- The excavating equipment is equipped with a factory-supplied lift point, e.g. a welded plate with an eye or a bolted-on hook with a safety latch.

- The operator has a magnetic particle inspection report dated within the previous 12 months that certifies the fit condition of the lifting point and its method of attachment, (e.g., welds or bolts).
- The lifting point is visually inspected before each lift.

NOTE: Bolts used to attach hooks or other attachment points shall be rated higher than the lifting capacity of the excavation equipment.

- Connect slings to the lifting point with a clevis or shackle.
- Unattended loads shall be lowered to the ground or blocked in position.



WARNING: Hydraulic systems of excavating equipment are subject to hydraulic drift and are not designed to hold materials without movement.

11.8.6 Ditching Machines

- Wiping, oiling, adjusting or repairing shall not be undertaken while any part of the machine is in motion. An Oiler or Serviceman may carry out oiling and greasing with only the power unit left running if done under the direction of an operator who remains at the controls of the ditching machine.
- When adjustments or repairs are necessary, all power units shall be shutdown before such adjustments or repairs are commenced.
- Where the operator is required to carry out any of the above-mentioned functions unassisted, all power units shall be shutdown before leaving the controls.
- No machine shall be operated unless the machine guards are installed and properly maintained.
- The ditching machine operators shall keep their helpers in sight or know where they are at all times.
- No manual cleaning of buckets shall be undertaken when the digging wheel is in operation.
- Operators and helpers shall not climb on the ditching machine while it is in motion.
- The operator shall not leave the controls of the machine unless the main transmission and digging wheel are out of gear and the traveling brakes set.

11.8.7 Safety for ATV / Snowmobiling

The use of ATV's / snowmobiles on Company worksites shall comply with all applicable legislative requirements. This will include but is not limited to the following:

- Written safe work practices in accordance with the authorities having jurisdiction.
- Only those who are deemed competent and authorized by their employer shall operate an ATV / Snowmobile.

- The employer shall keep records of competency (in-house evaluation or training and/or from a training agency) for their workers and make these records available to the Company for review upon request.
- The ATV/snowmobile shall be properly registered and insured as per legislative requirements. Copies of insurance and registration shall be carried on each piece of equipment in a waterproof container.
- A license plate shall be securely attached in a visible location as per legislative requirements.
- Permission shall be received prior to riding on private property.
- Drivers shall operate at speeds appropriate for the terrain, visibility, conditions and experience.
- Always wear an approved D.O.T. helmet unless ATV is equipped with manufacturer approved ROPS (rollover protective structure) seatbelts.
- Always wear appropriate PPE (protective goggles and/or other suitable devices to prevent eye and face injuries from twigs, flying debris and weather conditions).
- Operators shall wear a high visibility outer vest and clothing suitable for the work site conditions.
- The ATV/snowmobile shall be inspected prior to use.
- All ATV/snowmobiles shall be equipped with an aerial whip complete with a flag, First Aid kit, tool kit, 5 lbs ABC fire extinguisher and portable communication equipment, e.g. hand-held radio or cellular phone.

11.9 Hand and Portable Power Tools

Contractors shall ensure that their workers are trained in the safe use of hand and power tools. The Contractor shall ensure the safe condition of tools and equipment used by workers, including tools and equipment that may be supplied by Subcontractors.

- Hand tools are to be used only for their intended purpose only and shall not be modified.
- All hand and portable power tools shall be inspected for defects prior to use and if found defective, shall be taken out of service and labeled defective.
- All equipment shall be operated and maintained in accordance to manufacturer specifications and regulatory standards.
- Hand tools shall be raised and lowered to different working levels using tool buckets, ropes or other suitable devices.
- All electric tools shall be unplugged when a bit, blade, or other accessory is removed or replaced.
- Drill chucks shall be closed against the drill stem by a chuck key if applicable.

11.9.1 Air Operated Tools

- The air supply shall be set in accordance with the manufacturers' recommendations for the particular tools being used.

- All quick connectors (if designed) shall be secured to prevent accidental release. In addition, hose whip checks will be used to prevent hoses from accidental release.
- The air hose shall be placed to ensure it does not become a tripping hazard or subject to damage by vehicles running over it.
- Proper personal protective equipment shall be worn when using air-operated tools.
- The air supply shall be shutoff and the air drained from the hose before disconnecting the tool being used.
- Air grinders shall be checked periodically for maximum speed using the speed counter once the wheel has been disconnected. If the air grinder speed is over the recommended rpm, the tool shall be tagged and taken out of service. The maximum rpm rating shall be clearly indicated on the grinders and grinding discs.
- If impact wrenches are used, check to see that the directional lever is in the right position for the job that is being done.
- Be sure that enough help is available and that a firm footing and working clearance is maintained.
- If a locking mechanism is required when attaching a socket to a larger impact wrench, use a one-piece neoprene retaining ring. Install the retaining ring according to the manufacturer's instructions.



WARNING: Steel locking pins with separate rubber O-rings may result in serious injury should the O-ring become dislodged, causing the steel locking pin to protrude.

- When using a scaling hammer, chipping hammer, or jackhammer the operator shall ensure that the tool is locked in place. If it is of a type that does not lock, place the bit up to the working area before the tool is put into operation.

11.9.2 Explosive Actuated Tools

- If an explosive actuated tool is to be used, the Company Site Inspector shall be advised prior to use.
- The Contractor shall provide copies of training for workers required to use Explosive Actuated tools.
- No live power load shot is to be disposed of in the garbage.

11.9.3 Grinders

The Contractor shall ensure that all guards on handheld grinders used for grinding/buffing are in accordance with manufacturer's specifications. The Contractor shall ensure:

- Approved safety glasses with side shields and a full face shield shall be worn when using a fixed or hand held grinder or buffer. When grinding in congested areas where the direction of sparks is difficult to control, the use of mono goggles rather than safety glasses with side shields shall be worn.

- Grinder and buffer guards shall not be modified or removed and must be the correct size, as per manufacturers' specifications. .
- Before each use, check the grinding disc for cracks. If cracked, discard.
- Any grinder accessory installed is the correct type and correct size for the grinder and is rated for equal or greater revolutions per minute (RPM) than the grinder shaft RPM.
- When removing or installing grinding discs or wire/buffing wheels, grinder must be unplugged.
- Prior to starting to grind or buff, warn other workers in the immediate work area to turn away from the flying sparks or wire wheel particles. In addition, the operator shall stand to one side when starting the grinder.
- All bench grinders have a tool rest adjusted to a maximum of 3 mm from the face of the stone and shall project 6 mm on either side of the grindstone.

11.9.4 Chain Saws

The use of chain saws shall be in accordance with all legislated requirements and shall include, but not be limited to the following:

- Operators shall meet legislated training/certification requirements.
- Saws shall be operated and maintained in accordance with manufacturer's specifications.
- Operators shall wear appropriate personal protective equipment (i.e. head, face and hearing protection, gloves, safety boots and chain-saw pants).
- All saw Operators shall be provided with a personal first aid kit and an effective means of communication, for summoning assistance in an emergency, as defined in applicable legislation.
- The Contractor shall complete a Task Hazard Assessment and ensure the appropriate PPE for the task is available and worn by the workers.

11.10 Ladder Safety

11.10.1 General

The Contractor shall ensure that:

- Ladders shall be inspected before and after each use for any cracks or defects. If defected, repair immediately, or tag and remove from service.
- Makeshift items such as chairs, barrels, or boxes shall not be used in place of a ladder.
- Ladders shall not be used in place of a scaffold or temporary work platform.
- Ladders shall not be erected on boxes, carts, tables, or other unstable surfaces.
- Workers shall face the ladder when going up, down, or performing any work activity.
- Workers maintain a three point contact whenever the worker extends an arm beyond a side rail.
- Small articles are carried in pockets or in a belt. Larger articles shall be lifted or lowered from elevated locations by a hand line or a hoist.

- When working from ladders at heights greater than 2 meters (6 ft.), and it is not possible to maintain a three-point contact, then fall protection is required
- Workers shall use the proper type of ladder best suited for the job (step, extension, aluminum, non-conductive).
- Only non-conductive ladders shall be used in or around electrical cubicles, switchgear rooms, or when working on any electrical installation and shall be carried horizontally below shoulder level.
- Workers shall not straddle the space between a ladder and another object.
- Barricades and warning signs shall be set up when using a ladder in a doorway or passageway.
- Ladders shall be tied off at the top to prevent it from slipping or being blown over.

11.10.2 Step Ladders

Workers shall:

- Open step ladders and check stability of ladder ensuring all four legs are on firm, level ground.
- Face step ladder when climbing up or down.
- Place the step ladder at right angles to the work.
- No worker shall work from either of the top two rungs.
- A stepladder shall not be used to brace or support a work platform or plank.

11.10.3 Extension Ladders

- Place the base of the ladder one foot out for every four feet in height to obtain a safe operating angle.
- Extend the ladder at least 1 meter above the landing platform.
- Set the ladder on secure footing. Ensure ladder has slip-resistant feet.
- Grasp rungs, not the side rails, when climbing a ladder.
- Erect the ladder so that the proper section rests on the bottom section maintaining the minimum overlap of sections as shown on the ladder label.
- Ensure locking ladder hooks are secure before climbing.
- Stand no higher than the fourth rung from the top.
- Constructed job-site ladders shall meet or exceed applicable regulations for the type of work it is being used for.
- Where a ladder is not secured at the top, another worker shall hold it in place while the ladder is being used or until it is secured.

11.11 Trenches and Excavations

11.11.1 Purpose

- Contractors performing work for the Company shall follow the precautions and regulatory standards in this subject when operating mechanized excavating equipment, drilling, boring, grading, pile driving or performing any other below grade activity with the potential for damage near Company or foreign facilities.
- Excavating, which includes clean-out, trim and backfill, shall always be done by two people; the excavator operator and a spotter unless exempt by the Company.

NOTE: Unreported contact between excavating equipment and a facility will result in disciplinary action.

11.11.2 Responsibilities

Company Site Inspector

A Company Site Inspector will be assigned to oversee any mechanized excavation work and other destructive activities within stations and on the right-of-way (ROW).

The Company Site Inspector, who shall be a competent worker, shall ensure:

- Activities involving powered equipment operated by Contractors are adequately supervised.
- Ensure that 10, 2, and 1 foot rules are adhered to at all times
- Company facilities in the work area are surface located, identified, and hydrovaced before beginning any destructive below grade activity.
- Excavation hazards and controls are identified on the work permit and are reviewed by all workers directly involved in the work.
- Excavation hazards are controlled in accordance with Task Hazard Assessment and the Permit.
- Work stops if there is a concern for injury, or damage to pipes, conduits, cables, equipment and facilities.
- Exposed pipes, conduits and cables are not damaged, confirmed by visual inspection in the ditch/excavation before backfilling.
- A professional Engineer is consulted if the stability of any structure or foundation may be affected by an excavation or trench.
- A professional Engineer is consulted if the total depth of the excavation exceeds 6 meters

NOTE: If required, a temporary protective structure shall be designed, constructed and installed to support the structure or foundation in accordance with the specifications of a professional Engineer.

Contractor Representative

The Contractor representative identified on the Work Permit as being in charge of the work shall be a competent worker who is responsible to:

- Become thoroughly familiar with the Company's requirements concerning trenching and excavating.
- Assist the Company Site Inspector in identifying excavation hazards and controls when completing the daily Work Permit.
- Obtain authorization to proceed with the excavation from the Company Site Inspector.
- Ensure equipment Operators are qualified and skilled in working around below-grade facilities, and that each is assigned a competent swamper/spotter.
- Ensure below-grade facilities are day-lighted to the satisfaction of the Company Site Inspector before allowing excavation to begin, and to carry out further day-lighting if in doubt.
- Complete a walk-through inspection of the excavation area to identify hazards each day before allowing excavation to begin.
- Initiate a review of excavation scope and the Task Hazard Assessment with the Company Site Inspector.
- Hold a daily tailgate meeting with all excavation workers to review any new hazards.
- Be present at the excavation and continuously monitor the excavation activity.

NOTE: If a Contractor representative assigned to an excavation leaves an excavation area, excavation activities must stop immediately and shall not recommence until that person's return.

- Ensure the operator and spotter fulfill their assigned responsibilities and carry out excavation activities according to the Company's safe work practices.
- Coordinate visual inspections by the Company Site Inspector, which shall be done before backfilling.
- Stop work if there is a concern for injury, or damage to pipes, conduits, cables, equipment and facilities.
- Stop work and consult with the Company Site Inspector upon the discovery of a previously un-located facility, or if there is any contact between equipment and a Company facility or its coating.
- Obtain a registration number if required by Provincial Regulations (e.g. in Manitoba).

11.11.3 Qualifications

The Company Site Inspector and Contractor representative shall have the following minimum qualifications:

- Thorough understanding of the Company Contractor Safety Manual.
- Completed a Ground Disturbance Level Two course and provide a copy of the current certification as part of the project documentation. (For Engineering and Construction Service Projects).
- Must be familiar with all applicable legislative requirements.
- Must have the ability to read and understand construction drawings, as-built drawings and station photographs.
- Knowledge of surface staking and line locating practices.
- Experience working with and around a variety of heavy equipment, including a practical knowledge of the capabilities and limitations of the equipment.
- Ability to assess the competency of an equipment operator.
- Knowledge of basic operator signaling.
- Ability to recognize any potential or actual hazards of an unsafe excavation.
- Knowledge of emergency contingency plans in the event of an unplanned contact with a facility.
- Knowledge of the right and responsibility to stop unsafe work.

EQUIPMENT OPERATOR

Operators of excavation equipment shall be:

- Qualified on the type of equipment used;
- Competent working around below grade facilities and within congested areas;
- Completed a Ground Disturbance Level Two course and provide a copy of the current certification as part of the project documentation. (For Engineering and Construction Service Projects).
- Before operating powered excavating equipment in the work area, the equipment operator must:
- Review items in the excavation checklist;
- Check the location of above and below grade pipes, cables, and conduits in the work area;
- Follow appropriate procedures for hydrovacating;
- Immediately report any equipment contacts with new or existing above or below grade pipe, conduits, cables, communication lines, power lines or structures;
- Ensure a designated spotter is utilized for all excavating including clean-out, trim, and backfill activities, unless exempt by the Company;
- NOTE: Failure to immediately report a contact shall result in disciplinary action.
- Use extreme caution when machine excavating in high-risk areas containing buried facilities (e.g., limit the size of the lift);
- Use extreme caution if buried flagging or planking is uncovered as this often indicates a powered cable or pipe is located below;
- Maintain safe clearances as required by the Company.

SPOTTER

The spotter shall:

- Completed a Ground Disturbance Level Two course and provide a copy of the current certification as part of the project documentation. (For Engineering and Construction Service Projects).
- Check the location of above and below grade pipes, cables, communication lines, power lines and conduit in the work area;
- Use agreed upon hand signals to provide direction to the equipment operator, and to alert the operator to potential dangers (e.g., contact with a facility).
- Where the operator loses sight of a facility, probe to locate the facility.
- Manually remove soil within 0.3 meters (1 ft) of a facility.
- Stop the work if unmanaged or unexpected hazards arise (e.g. unidentified facilities, contact between the excavation equipment and a facility).

11.11.4 General Requirements

11.11.4.1 Equipment

- Under normal circumstances, buckets without teeth shall be utilized.

11.11.4.2 Pressure Limitations

- When powered excavating equipment is operated within 3 meters of a pressurized pipe, Operations management may require a reduction in operating pressure.

11.11.4.3 Monitoring of Contractors

A competent worker shall be present in the immediate work area to monitor all the excavation activities.

The Company Site Inspector shall remain onsite (e.g. at the station or on the right-of-way) to continually monitor any mechanized excavation or other activity with the potential for damage that takes place within 3 meters (10 ft) of a Company facility, whether located above or below grade. The Company Site Inspector will determine whether periodic or continuous monitoring at the excavation site is required based on circumstances such as:

- Scope and complexity of excavations.
- Type and quantity of underground facilities.
- Number of tasks onsite that require the Company Site Inspector to be present.
- Number of other Company Site Inspectors on site.
- Other risks associated with the excavation.
- Presence of a competent Contractor person.
- Where continuous monitoring is required Company Site Inspector shall be present in the immediate work area whenever powered equipment is being operated.
- Where periodic monitoring is permitted, Company Site Inspector and the Operations Worker responsible for the location shall pre-establish the frequency of monitoring

required. Where not required to be available on site the Company Site Inspector shall maintain a means of communication with the Contractor representative at all times.

11.11.4.4 Excavation Guidelines and Hazard Assessment Checklist

Excavation hazards shall be identified prior to starting each excavation and each day as the work proceeds. Complete a pre-excavation hazard assessment for each excavation indicating the controls necessary by using either the Excavation Checklist found on the Safe Work Permit or the Excavation Guidelines and Hazard Assessment form (see Appendix R). In addition, any other underground facilities that encroach within 1 meter (3 ft) of the proposed outside perimeter of the excavation must also be positively confirmed.

The Contractor shall ensure that a competent worker shall periodically inspect excavations as needed throughout the day for:

- Situations that could result in cave-ins.
- Indications of failure of protective systems, hazardous atmospheres.
- Any other hazardous conditions (e.g. water accumulations, slip/trip hazards, etc.).
- Hazards shall also be re-evaluated when resuming an excavation previously initiated by other workers.

Before Excavating:

- Determine the outer limits and estimated depth of the proposed excavation.
- Ensure the limits of the excavation are reviewed with the equipment operator and the spotter.
- Review all applicable drawings with on-site Operations workers such as as-built drawings and site photos. Ask Operations workers familiar with the work area if there are any other underground facilities not shown on the as-built drawings.
- Operations workers will surface locate all identified facilities within the proposed perimeter of excavation at appropriate intervals.
- Positively confirm the location of the underground facilities by probing, hand digging, or by water-washing. As a minimum, existing pipelines, cables or conduits that enter or cross the proposed excavation have the top and sides confirmed at points 1 meter (3 ft.) beyond each side of the excavation and at the midpoint of the excavation.
- Determine allowable clearances of excavation equipment once day lighted.
- Determine necessary rescue or other emergency procedures.
- Determine if temporary crossing ramps are required.
- Determine if powered equipment is required to operate within 3 meters (10 ft.) of an underground facility.

During Excavation:

- Provide a competent person to monitor the excavation.
- Determine if a standby person is required on the surface of the excavation when workers are within the excavation.

- Ensure operator and spotter is familiar with above ground facilities. Erect warning signs or mark as required.
- Ensure spotter is familiar with probing requirements and that the operator understands to excavate cautiously when near a facility.
- Classify the type of soil by visual or mechanical methods.
- Determine angle of cutback sloping and height of sidewalls as per local regulations.
- Maintain minimum allowable clearances to facility with powered excavation equipment until day lighted.
- Provide necessary means of exiting the excavation such as ladders, stairs, or sloped walkways. Maximum of 8 Meters (25 ft) egress in any direction.
- Ensure spoil materials and equipment is set back at least 1 meter (3 ft.) from the edge of the excavation.
- Spoil pile shall be sloped at an angle of no less than 45 degrees to the vertical.
- Ensure rocks or soil does not fall or roll into the excavation.
- Provide necessary means of shoring or trench box as per the Task Hazard Assessment.
- Ensure workers do not enter into unsafe or unprotected areas of the excavation.
- Support exposed piping at adequate intervals as per 11.11.4.11
- Periodically inspect the excavation for hazards.

Preceding the Excavation:

- As practicable, keep excavations free from accumulated water.
- Erect fences, barricades, or suitable warning devices around unattended excavations.
- Prior to backfill, visually inspect the exposed facilities for damage.

11.11.4.5 Surface Locating

Before beginning mechanical excavating/trenching or other potentially destructive below grade activity, all facilities:

- Within the perimeter of the excavation, and
- Extending 3 meters outside the perimeter of the excavation shall be surface located and identified (e.g., stakes, flags, high visible paint marks on the ground).
- Additional locates beyond the perimeter may be required to verify alignment or location of facilities.
- An Operations worker or designate will surface locate and identify Company facilities. As-built drawings (i.e., latest construction mark-up drawings, route sheets, station piping, instrumentation and Cathodic protection drawings, electrical drawings etc.) and station photographs should be reviewed to determine the quantity and type of facilities and their general location in the excavation area. Furthermore, Operations workers familiar with the site shall be consulted to determine if there are any other below-grade facilities that are not documented.
- Where a one-call service is available, notify the service to locate and identify all foreign facilities. If a one call service is not available, an Operations worker or designate shall

check the excavation area for foreign facilities by reviewing registered survey plans, contacting landowners and facility owners, and reviewing any evidence of a foreign facility near the work site (i.e. facility warning signs etc.).

- A pipe and cable locator shall be used to locate below-grade facilities; however, do not rely solely on it in extremely congested areas or in areas exposed to induced voltage or other stray electric current.



WARNING: When in doubt, hand excavate or hydrovac to positively locate and identify a facility

- Locate the centerline of facilities using identification markers such as stakes, flagging or paint markings at appropriate intervals. Ensure any changes in direction or elevation are identified and adequately marked. There shall be a clear line of vision between stakes, flagging or paint markings identifying a particular facility location. Markings shall be highly visible to equipment Operators.

NOTE: Consider the size of the excavation and size and complexity of the underground facilities to determine the spacing of stakes, flagging or paint markings.

- Confirm the number, locations and dimensions of surface located facilities with as-built drawings and other field records to ensure all known facilities have been located. Update drawings and field records as required where facility locations differ from as-built information.
- The location and identification (type of facility, depth below grade, direction, etc.) of below-grade facilities shall be reviewed with the equipment operator and spotter prior to excavating. In addition, necessary drawings shall be left at the excavation site for ongoing review.
- Facilities shall be relocated as required when:
 - identification markers become dislodged or otherwise removed and their original location is uncertain
 - resuming an excavation previously initiated by others
 - cleaning out or increasing the size of an excavation

11.11.4.6 Positive Confirmation of Facilities

Before beginning mechanical excavation or any other potentially destructive below-grade activity, the location, depth, and size of below-grade facilities within the perimeter of the proposed excavation shall be positively confirmed by hand digging or hydrovac, to ensure clearances and alignment. All hand-dug or hydrovac holes shall be identified, covered and guarded by a suitable barricade.

WARNING: Positively confirm any changes in pipe alignment and elevation as well as the presence of fittings, such as plugs, weldolets, flanges and branch piping.



When facilities are positively identified, a visual check shall be conducted to confirm that the stakes accurately reflect the location of the known facilities.

11.11.4.7 Clearances

Mechanized equipment shall remain at least 0.6 meters away from any below grade facility until the facility is positively identified to the view of the equipment operator or spotter.

NOTE: Where safe to do so, probe while excavating to ensure minimum clearances are maintained until the below grade facility is exposed to view.

- With the facility exposed and in view of the equipment operator or spotter, the cutting edge of mechanized equipment shall remain clear of below grade facilities by at least 0.3 meters. Final exposure of underground facilities shall be done by hand.
- Powered equipment shall also maintain at least 0.6 meters clearance from aboveground facilities in the work area such as valves, piping, power lines, cable trays and pipe racks. Mark facilities as required (barricades, warnings signs, flagging) as a means to ensure they are clearly visible to the equipment Operator.
- When working with frozen material, rocky material or when using a sideways motion of the bucket or if there are other adverse conditions the clearance distance shall be adequate to ensure contact is avoided, and that energy from the equipment is directed horizontally away from the facility.
- Clearance requirements are to be reviewed with the Company Site Inspector at frequent enough intervals to ensure appropriate clearances for the conditions.

11.11.4.8 Spoil Piles, Materials, Tools and Equipment

- Store spoil piles, materials, tools, vehicles and equipment at least 1 meter from the edge of an excavation, trench or borehole.

NOTE: Do not operate powered excavating equipment closer than 1m from the edge of an excavation. Slope spoil piles next to excavations, trenches or boreholes at an angle not less than 45° to the vertical. Ensure rocks or soil do not fall or roll into the excavation.

- Any contaminated soil shall be stockpiled in a designated location as determined by the person responsible for the location.

11.11.4.9 Protection from Cave-Ins

- Excavations shall be large enough in all dimensions for safe and easy working conditions.
- All existing underground facilities shall not be used as part of the excavation protective system. Exposed facilities must be identified, protected and supported throughout the excavation process
- Scrape all loose materials from the sides of an excavation, and from walking and working areas where workers will be present.
- When an excavation is more than 1.2 meters (4 ft) deep, workers shall be protected from cave-ins by sloping the sides of the excavation and/or installing a temporary protective structure (i.e. shoring, trench box).

NOTE: Workers shall be prohibited from entering any unprotected portions of an excavation more than 1.2m deep.

- If a worker must lie down or kneel in a trench without an approved temporary protective structure, slope the trench wall from the bottom of the excavation where the work will occur.

Sloping:

- A competent Contractor representative shall examine the composition of soil to determine the angle of sloping used for excavations and trenches. The angle of sloping shall not be less than required by Provincial Regulations.
- Treat natural frozen soil conditions the same as unfrozen soil conditions.

NOTE: Stable rock is comprised of solid mineral matter and does not require sloping.

Benching:

- Benching is a type of sloping that applies to deeper excavations and looser soils. Think of it as sloping the sides of the trench back in a series of steps (or "benches") instead of a steady angle. Benching reduces the chance of material running down the slope in a sort of avalanche and knocking more material loose as it advances.

Shoring:

- Timber shoring used in trenches and excavations shall be in accordance with Provincial Regulations.
- Hydraulic air and mechanical (e.g. screw jacks) shoring shall be assembled and installed in accordance with the manufacturer's instructions.
- Persons installing stringer and brace components in a shoring system shall work downward from the surface, using a ladder to install each brace in descending order. The reverse order shall be used to remove components, unless conditions make it

unsafe to enter the excavation. In such cases, an alternate method of removal that protects workers from injury shall be used.

- Shoring shall extend a minimum of 450 mm above the vertical walls of the excavation.
- A professional Engineer shall design any support system used in a trench greater than 6 meters deep.

Trench Box (Shields):

- As protection against cave-ins, place trench boxes in excavations before workers enter and place egress ladders inside the trench box before workers enter.
- Trench boxes shall be designed by a professional Engineer, and shall be constructed, inspected and maintained in accordance with the engineering or manufacturer's specifications.
- Before installing a trench box, the Company Site Inspector shall be provided with a copy of the Engineering Certificate or a stamped Engineering Drawing.
- Where trench boxes are designed to be "stacked" in deep excavations, they must be adequately secured to one another.
- Trench boxes shall have continuous sides and shall extend a minimum of 450 mm above the vertical wall of the excavation.
- A professional Engineer shall design and approve hoisting hook-up and drag points.
- Workers shall remain inside the box as long as they are in the trench, and leave if the trench box shall be moved.
- Excavation shall be done to minimize the space between the trench box and the excavation wall in order to allow closer access to the top of the box and to limit soil movement in case of cave-ins.

11.11.4.10 Entrances/Exits:

- Where work is taking place on both sides of the pipe, entrance/exits shall be available on both sides of the excavation.
- Situate entrances/exits so that no worker shall travel more than 8 meters in either direction to exit the trench.
- Entrances/exits shall be ladders, steps, or sloped walkways of not more than 3:1 slope. It is recommended that sloped walkways be complemented with temporary handrails for worker protection.
- Side rails of ladders shall extend 1 meter out of the trench or excavation.

11.11.4.11 Pipe Support

When excavating an existing pipe, keep disturbance of soil supporting the pipe to a minimum. When removing bearing soil from under an existing pipe, adequately support the pipe at intervals no greater than those distances described in the following table. This distance does not take into account any accessories such as valves or other fittings located in the unsupported span.

Consult the Company's Engineering Department if there are accessories in an unsupported section or if a greater distance between supports is required. Small diameter pipe, conduit and

cables also require adequate support that prevents damage. Support new pipe installation, and backfill with acceptable fill material in a manner that doesn't damage the pipe coating.

Maximum Unsupported Pipe Length (in feet)

Diameter	.250 wt	.281 wt	.312 wt	.375 wt	.406 wt	.500 wt
12	44	45	47	49	50	52
16	46	47	49	52	53	56
20	47	49	51	54	55	59
24	48	51	52	56	57	61
30	50	52	54	58	60	64
34	50	53	55	59	61	65
36	51	53	55	59	61	66
42	51	54	56	60	62	67
48	52	54	57	61	63	69

NOTES:

- The pipe is filled with a fluid with a specific gravity = 1.
- Length does not include any accessories, such as valves or other fittings. Consult Engineering if there are accessories in an unsupported section.
- Small diameter pipe, conduit, and cables also require adequate support that prevents damage.
- Additional supports may be required based on bends and other pipe configurations

11.11.4.12 Hazardous Atmospheres

A hazardous atmosphere may exist or have the potential to develop within an excavation (due to previous unplanned releases). Hazardous atmospheres may be toxic, flammable, or oxygen deficient. Control measure may include gas monitoring, mechanical ventilation, or use of respiratory protection.

11.11.4.13 Water Accumulation

Keep all excavations, trenches and boreholes free of accumulations of water where workers shall be present. A competent worker shall monitor water removal equipment and implement controls as required to eliminate risk of drowning during dewatering. Discharge water pumped from an excavation by a method that limits soil erosion. If the water is contaminated contact the environment department for directions.

11.11.4.14 Safety Watch

A competent Safety Watch shall be stationed on the surface of the excavation to alert workers in the excavation to unsafe conditions and to provide assistance in an emergency when:

- specified by Provincial Regulations based on depth; and
- a hazardous atmosphere (oxygen deficiency, toxic or flammable atmosphere) exists or is likely to develop within the excavation.

11.11.4.15 Emergency and Rescue

Emergency and rescue procedures shall be established and communicated to all workers where a hazard exists or is likely to develop within an excavation. These written procedures will identify methods to alert and evacuate workers from within the excavation, and to remove workers if required. Appropriate rescue equipment shall be available and ready for use at the excavation.

11.11.4.16 Fences and Barricades

General Requirements

Barricades shall be:

- Erected to prevent workers from falling into the hazard area.
- Approximately 1 meter high.
- Secured in place.
- Support the fencing at a maximum spacing of approximately 3 meters, and secure the fencing to each support using tie wire or zip ties.
- Erect barricades or fences approximately 1 meter from the excavation to maintain an adequate walkway around the excavation.
- In addition to barricades/fences, use suitable warning devices (reflective signs or flashing light) to provide advance warning of excavations, trenches, or boreholes that may present a hazard to night traffic.

Within fenced areas:

Barricade or fence off unattended excavations, trenches and boreholes within fenced areas (e.g., stations, valve sites, etc.). The type of guarding (e.g. barricades, snow fences, rope or ribbon) used depends upon the level of risk associated with the excavation. In determining the level of risk, consider:

- location of the excavation;
- degree of worker/public access or exposure to the excavation;
- size of the excavation (depth, length, etc.);
- potential for workers or the public falling into the excavation;
- potential for drowning;
- number of exits, if any;
- condition of the excavation, e.g. wet, muddy; and
- length of time the excavation will be left unattended.

Along the Right-Of-Way as required by Construction Management

- Unattended excavations on the right-of-way shall be adequately guarded from unintentional entry using highly visible material (e.g. orange snow fencing). In addition, use barbed wire where livestock are present.
- Where a long trench is left open, e.g. for a new pipeline, use other reasonable methods to secure the excavation, including placing berms, stringing pipe along the ROW, and stripping topsoil.

11.11.4.17 Mechanical Protection and Warning Tape

- Plastic warning tape/ribbon and mechanical protection are used as a means to warn future excavators that are unaware of the presence of a below grade facility.
- Plastic warning tape/ribbon and mechanical protection shall be placed over all electrical services and station piping 50.8 mm diameter or larger during backfilling. Plastic warning tape/ribbon may also be required to be installed over larger station piping during construction or as otherwise deemed necessary by the Company Site Inspector and Operations worker or designate responsible for the location.
- Warning tape and mechanical protection for conduits and cables shall be installed in accordance with the applicable electrical codes (CSACZZ.1-02 or CEC Part 1) except where the Company Specifications for Station Construction (D10.201) exceed the minimum requirements as outlined in the applicable code.
- As a guideline, plastic warning tape/ribbon shall be buried approximately 30 – 45 cm below grade and centered over the facility, unless otherwise specified by the applicable code or the Company Specifications. Where practical, yellow tape labeled “Caution” shall be used for station piping and red tape labeled “Caution – Buried Electrical Lines” shall be used for conduits and cables.
- Treated planks are acceptable for use as mechanical protection above small station piping. Protective caps are used to safeguard below-grade fittings (e.g. nipples, etc.) on large diameter piping. The Company Specifications for Station Construction require treated planks to be used as mechanical protection above electrical services of 480 volts or less. Electrical services of 5 kV and over require poured concrete with a red additive on top.



CAUTION: Ensure all facilities are surface located and positively confirmed prior to excavating. Limit depth of cuts when machine excavating and ensure minimum clearances are maintained. Be aware that all below grade facilities are not marked with warning tape or provided with mechanical protection.

11.11.4.18 Temporary Crossing Ramps

Use temporary crossing ramps when vehicles pass over existing pipelines where:

- Ruts are likely to develop at the crossing.
- Depth of cover is less than 1.3 meters (52 in.).
- Vehicle single axle loading exceeds 12,000 kg (25,000 lb.).
- Vehicles will be continually crossing, e.g. logging trucks.

- The pipeline to be crossed has been installed for under a year.
- The crossing lies in a wet area, e.g. marsh, swamp, peat bog.
- Temporary crossing ramps may not be required where:
 - ◆ Equipment crossing the pipeline are low ground pressure (LGP) tracked equipment exerting 5.80 psi or less ground pressure, the depth of cover is no less than 0.9 meters of consolidated clay soil, and repeated crossings are not required, e.g. a crossing by a D6 with 76.2 cm or larger track width, or a D5 with 61 cm or larger track width.
 - ◆ The depth of cover is or is increased to 1.3 meters or greater, the vehicle axle loading is highway legal, conditions are dry, and a Company Site Inspector is on site when vehicles are crossing the pipeline.
- Construct temporary crossing ramps in accordance to provide 1.6 meters of cover over the pipeline. In situations that do not fit the listed conditions, or before relaxing the standard, consult with the Company's 'Land and Right-of-Way' department.
- If soil conditions are questionable, contact the respective Engineer or the Company's 'ROW & Crossings' department before construction temporary crossing ramps.
- Remove temporary access ramps upon completion of the work.

11.11.4.19 Hydrovacing

Hydrovacing is an approved method of positively confirming the location of below grade facilities prior to excavating.

NOTE: Hydrovacing presents little risk to facilities but introduces hazards to nearby workers..

Hydrovacing equipment shall include:

- A relief system to protect the weakest component in the system that is capable of relieving the full capacity of the pump at maximum rpm.
- Systems capable of constant monitoring of temperature and pressure to ensure these limits are not exceeded.
- Hoses, fittings and attachments rated and designed for the maximum specified operating pressures of the equipment.
- A shut-off valve on the wand or provision to shut off the water flow by use of a switch on a remote control manned by a second worker.
- Restraining devices on couplings to prevent accidental disconnection (where couplings provide for such devices).
- Wands of sufficient length to exceed the reach of the operator.
- Wand tips that are of the design to prevent a concentrated water stream.
- A neoprene or equivalent lip on the vacuum tube end to eliminate any mechanical damage to the facility.

NOTE: Equipment must be operated within manufacturer's specifications and applicable regulations.

Workers shall be trained on the equipment and procedures, and shall fully understand the hazards and precautions of hydrovacating as a method to expose existing facilities.

Hydrovac operators and assistants shall wear appropriate personal protective equipment (PPE), including:

- dielectric safety boots
- hard hats
- hand protection
- safety glasses with side shields and face shield constructed of mesh or plastic.
- hearing protection

Ensure the excavation area is barricaded prior to commencing work and when open excavations are left unattended.

Erect shields to prevent flying particles from injuring passing workers or damaging equipment as required.

Do not leave loose rock embedded in the sides of the excavation that could fall on pipe or cable.

Complete water-washing of the underground facility by a sweeping motion until the facility is sighted. After the facility has been sighted, the facility must not be continually contacted by direct spray.

Build a sump below the level of facility that is being exposed to limit the amount of abrasive material available to impinge on the facility.

The working water pressure must not exceed 17250 kPa (2500 psi).

When excavating within 0.3 meters (1 ft.) of known or suspected underground facilities the pressure must be reduced to less than 10350 kPa (1500 psi) and the water temperature limited to 38° C (100° F). Whenever practical, any known electrical cables should be de-energized as an added precaution.

Inspect all underground facilities for damage before backfilling.



CAUTION: Operators shall use caution to avoid directing high pressure water or dislodged material in the direction of themselves or others in the vicinity.

11.11.5 Boring Operations

11.11.5.1 Horizontal Directional Drilling (HDD) / Horizontal Bores

Prior to commencement of drilling operations, the operator of the HDD unit shall perform a documented inspection of all parts of the equipment that are likely to cause injury or damage if they fail. The HDD work will commence only when the operator is satisfied that the job can be done safely.

The Contractor shall ensure that One-Call has been made and all facilities are located and properly marked. The Contractor shall also verify that all facilities are located by comparing the route sheets to the One-Call locates on site. If there are any facilities that have been located by One-Call that are shown on the route sheets, then the Contractor is responsible to locate these facilities.

- All cables used to lift drill stems shall be in good condition and there shall be no knots at the cable ends.
- All personnel shall stand clear of rotating parts or drill pipe at all times.
- The Contractor will ensure that all required warning signs are posted prior to drilling operations.
- Calibration of the HDD unit shall be conducted prior to drilling operations. This calibration shall be done while the Company Site inspector is present.
- Before boring operations begin, all below grade cables and pipelines in the excavation area shall be accurately located and positively identified by Hydrovacing.
- When boring to cross multiple pipelines or other buried facilities, confirm the location of the boring device by excavating test holes in advance of each pipeline or facility to be crossed.
- Excavation walls shall be adequately sloped to prevent collapse, including the wall next to the road, railway or other crossing.
- Chain sprocket and V-belt drives on boring machines shall be guarded.
- Where internal combustion engines are used in or near excavations, adequate ventilation shall be provided or workers shall wear approved breathing apparatus.
- Equipment used in Boring or pile driving operations that are in close proximity to an excavation shall be adequately secured to prevent any movement towards the excavation.
- Fire extinguishers shall be placed at the excavation as directed by the permit issuer

NOTE: If workers intend to work or enter an excavation near an un-sloped wall, and it is not practical to slope the wall, then trench boxes or shoring shall be used as per regulations.

11.11.5.2 Signs and Barricades

- Before excavation starts for a road or railway crossing, erect barricades, flashers or reflectors, warning signs, and/or other suitable devices on each side of the road or railroad.
- For highways, place adequate warning signs on the vehicle approach side at intervals of 50 meters, 100 meters and 150 meters from the center line of the pipeline ditch as required by local and provincial requirements. In addition, place five or six red danger flags at 15 meters intervals.
- For municipal and secondary roads, place one warning sign on the vehicle approach side 50 meters from the center line of the pipeline, and use an adequate number of red flags.
- Barricades, flashers, and reflectors shall be used at night.
- Vehicles shall not be parked on the approach to the pipeline side of the road where the warning devices have been erected.
- Warning signs shall not be removed until road and highway crossings are properly leveled and cleaned, shoulders repaired, and ditches cleared.

11.11.5.3 Equipment Crossing

- When moving equipment across a highway, station flag-persons on each side of the crossing at a distance adequate to allow motorists to come to a complete stop.
- When moving mobile equipment equipped with cleats across any hard road surface, appropriate measures shall be taken to ensure the surface is not damaged (e.g. placing tires on the surface in the path of the equipment)
- Crossing material shall be placed at least 1 meter off the highway surface when not in use.

11.11.5.4 Vertical Bores and Piles

- Prior to commencement of work, the operator of the vertical boring equipment shall perform a documented visual inspection of all parts that are likely to cause injury or damage if they fail. The work will commence only when the operator is satisfied that the job can be completed safely.
- When using a crane boom for driving piles with a vibratory hammer, the contractor shall ensure that it is inspected as per applicable regulations and certified by a professional engineer as safe for continued use.
- Review as-built drawings to establish the location of the proposed vertical bores or piles in relation to existing underground and above ground facilities.
- All below grade facilities within a 3 meters radius of the proposed bore hole shall be located, staked and day lighted to confirm direction and depth.

11.11.5.5 Pilot Holes

- Where bore holes or piles are located in congested areas with high risk potential for damage to underground facilities, a pilot hole shall be Hydrovaced to a minimum depth of 3 meters 10 feet and to a diameter equal to that of the pile.
- The Company Site Inspector will determine which areas have a high risk potential, and whether deviations from pilot-hole requirements will be allowed.

NOTE: The first 1m of pilot hole may be hand excavated, but the remaining depth shall be done by hydrovac.

11.11.5.6 Open Bore Holes

- The Contractor shall clearly identify and barricade all open bore holes.
- The Contractor shall ensure the Task Hazard Assessment clearly identifies all hazards related to an open bore hole and must have controls identified to prevent a worker from falling in.
- The Contractor shall review the hazards, controls and permit requirements with all workers on the site.
- The Contractor shall have a rescue plan and all equipment on site. This rescue plan must be reviewed prior to the permit being approved.
- Ensure that all workers not directly involved in the operation are kept a safe distance.
- All holes must be barricaded during boring operations. The type of barricades shall be identified as part of the completed Task Hazard Assessment.
- Upon completion of, or during interruption of work on a Hydrovac hole or a vertical bore hole, the opening shall be immediately safeguarded with a securely attached cover designed to support an anticipated load,
- The cover shall be marked with the words "Danger Open Hole", and an additional visual marker shall be provided if vehicles or heavy equipment are, or may be, operating in the area.
- Barricade fencing shall be erected prior to leaving the site.
- Upon completion of concrete and rebar installation, end caps shall be put onto the rebar ends to prevent workers from personal injury.
- When soil conditions are soft or sandy, the pre-cast piles shall be suspended by the pile driving unit or by a secondary method (service crane).
- The swing area shall be barricaded.

11.11.5.7 Pile Driving

Prior to commencement of work, the operator of the vertical boring equipment shall complete a documented inspection of the equipment and surrounding area to ensure that no worker, including the operator, is endangered by the work. The Contractor shall ensure that:

- On the pile driving equipment having pressure hammers, the pressure hoses are equipped with safety chains or safety ropes on the pressure side of all hose connections on the pile driving equipment having pressure hammers, designed to protect workers if the hose or connections should fail.
- The brake bands and clutches are inspected at the start of each shift.
- Where inspection indicates contamination of brake bands or clutches on pile driving equipment by oil or grease, the contaminated units are dismantled and cleaned or replaced before further use.

- Chain blocks, chains, hooks, cables, and slings are inspected before use and throughout the shift.
- A crane boom used for driving piles with a vibratory hammer shall be inspected and certified by a Professional Engineer as safe for continued use at intervals no greater than 600 operating hours while in such use, and before being returned to lifting service.
- A crane boom with a vibratory pile extractor used for dynamic compaction shall be inspected and certified by a Professional Engineer as safe for continued use at intervals no greater than every 200 operating hours while in such use, and before being returned to lifting service. The operator of the pile driving equipment shall ensure that:
 - ◆ A pile hammer is securely chocked while suspended by the hammer line when the equipment is not operating.
 - ◆ Pilings are not hoisted in the leads when worker nor directly involved in the operation are on the superstructure or within range of falling piles.

The Operator of the pile driving equipment shall ensure that:

- A pile hammer is securely chocked while suspended by the hammer line when the equipment is not operating.
- Pilings are not hoisted in the leads when workers not directly involved in the operation are on the superstructure or within range of a falling pile.
- Outriggers are used at all times.
- Pre-cast piles are not left unsupported while in pilot holes and will be suspended by the pile-driving unit until driven.
- Workers do not remain or ride on a load of or part of a load being moved, raised or lowered.
- The swing area shall be identified and where possible cordoned-off.

11.12 Portable Heaters

All heaters shall be approved for the service for which they are being used. There shall be adequate ventilation to prevent a build-up of exhaust fumes to prevent the fumes from being drawn through the heater and into the space heated. Carbon monoxide monitors may be required on an intermediate basis to ensure the air within the space is safe. All combustible material shall be removed from the immediate area of the heater.

- Portable fuel heaters may only be installed, ignited, or serviced by a competent person, in accordance with manufacturer's instructions.
- A competent safety watch shall monitor all fuel heaters operated within hazardous or restricted areas at all times.
- When monitoring fuel heaters alone at night, a Contractor worker shall make periodic contact (i.e. phone, radio) with Company on-shift workers to inform them of their whereabouts and expected movements. In the case where the fuel heaters are not monitored at night within an unclassified area, local Operations approval shall be obtained.
- Electric heaters wired for hazardous or restricted areas are permitted and do not require continuous monitoring.

11.13 Radiography

In all instances where X-ray or gamma ray equipment is being used, the use, storage, handling, transportation, or disposal of radioactive substances shall be in compliance with regulations made under the Atomic Energy Control Act (Canada) and any regulations made under applicable Federal or Provincial Legislation.

- All radiographic work shall be performed under the direction of a federally licensed worker responsible for radiation safety in the area.
- Only federally licensed radiation specialists with appropriate training are authorized to install, remove, or reinstall nuclear densitometers.
- Contractors may service the electronic package only after following the manufactures lockout procedures.
- All personnel shall wear a personal Dosimeter.
- During radiography by means of X-ray machines or radioactive sources, distinctive warning signs, such as “DANGER, RADIATION AREA” shall be displayed and the area roped off to prevent unauthorized entry.
- Other workers, vehicles and equipment shall stay clear of an area where radiographic inspection is being carried out and shall wait for the radiographic technician to indicate when it is safe to pass by.
- A qualified person responsible for radiation safety shall be present when a radioactive source is outside its container, or a gamma camera or X-ray machine is in use.
- When not in use, radioactive material shall be stored in a locked shielding camera or container, which shall be marked with a label bearing the words “DANGER! RADIOACTIVE MATERIAL”. A nameplate shall also be affixed to the container showing the owner’s name, the maximum quantity, and the kind of radioactive material.
- The storage container shall be kept in a locked enclosure or room in which the radiation level shall be less than 2 ½ mill roentgen per hour.
- In an emergency or facility evacuation, the radiography crew shall ensure that the radioactive source is in a secure position before leaving the work area.
- Where permitted, radiographic inspection trucks are to be equipped with 360° rotating amber lights on top of the unit clearly visible to all workers. The rotating light shall be on when x-raying is in progress.

11.14 Safeguards, Barricades, and Warning Signs

- Suitable safeguards or barricades with warning signs or flashing lights shall protect any work activity that may endanger workers. These activities may include sand blasting, open excavations, temporary openings in floors, construction, arc flash in pre-fab areas, pressure testing, overhead work, etc.
- Cover all unprotected temporary openings in floors or elevated work platforms with plywood that is at least ¾ of an inch in thickness. This plywood shall be capable of supporting twice the maximum intended load. Secure the plywood over the opening and only remove it to perform a particular task. Ensure it is replaced immediately after the task is complete or if there are other workers in the area.

11.15 Scaffolds

These guidelines are to be used as a supplement to the legislative requirements and the manufacturer's specifications.

11.15.1 Installation, Inspection and Maintenance

The Contractor shall ensure that:

- Scaffolds shall be installed, inspected, maintained, and repaired in accordance to the manufacturer's specifications and applicable legislative requirements.
- Scaffolds are erected and dismantled under the supervision of a skilled and experienced person, competent in their construction and use. The Contractor supervisor shall confirm that the scaffold is erected properly, and attach an inspection tag prior to allowing work to commence.
- The maximum scaffold height is three times the minimum base width unless additional stabilizing supports are used.
- Scaffolds shall be erected plumb to ensure maximum structural capacity of the system.
- All scaffolds in excess of 15 meters (50 ft.) in height shall be designed by a professional engineer, and erected, used and maintained in accordance with the engineered design.
- Workers shall not use a scaffold until it has been inspected and tagged by a competent person.
- Scaffolds have a load rating indicated on the tag.

11.15.2 Use

- Do not place heavy equipment or materials on scaffolds that could exceed manufacture's specifications or design.
- Rolling scaffolds shall be used on a smooth, level surface and shall not be ridden when moved.
- Wheels of rolling scaffolds shall be locked in place by a locking device or by blocking before workers mount the scaffold.
- Workers shall be aware of electrical hazards near metal scaffolds.
- Ladders, saw horses, etc. shall not be used to attain greater heights on scaffolds.
- Damaged scaffolds shall not be accepted for use.
- Tools or materials shall not be carried up or down ladders.

11.15.3 Fall Protection

When working on scaffolds without guardrails at heights greater than 2 meters, workers shall use appropriate fall protection attached to something other than the scaffold.

11.15.4 Components – Base

- All scaffolds shall be set on level and compacted soils.
- Freestanding scaffolds shall have base plates (preferably with screw jacks to allow for adjustment) and should rest centrally on mudsills.
- Mudsills are normally a sawn 2 X 10 in. timber and shall be continuous under at least two consecutive end frames or supports.
- Mudsills shall not be constructed of small pieces of wood or other material pieced together.
- Do not put blocks under supports for wedging and bridging.
- The smallest dimension of a scaffold base shall be not less than 1/3 of the height of the scaffold or extended outriggers shall be used.
- Outriggers shall be fastened to the scaffold at approximately 1/3 of the total height.
- Outriggers shall have base plates and be placed on timber sills.
- If bridging is required, it shall be secured in place.

11.15.5 Components – Supports and Bracing

- All cross braces shall be in place.
- All structural members shall be in place and securely fastened together as designed by the manufacturer.
- Maximum distance between vertical supports is 3 meters for light duty scaffolds
- Maximum distance between vertical supports is 2 meters for heavy-duty scaffolds.
- Scaffolds shall be tied or secured to a building or other structural supports if the height exceeds 3 times the smallest base dimension.
- Ties shall be spaced every 4.5 meters vertically and 6 meters horizontally.
- The number of ties shall be increased if hoarding is used in windy conditions or if there is other dynamic loads caused by the work being done on the scaffold.
- Ties shall be placed as the scaffold is erected and shall not be left until the erection is complete.

11.15.6 Components – Planking

When selecting and using scaffolding planking, the Contractor shall:

- Ensure that a manufactured scaffold plank is used, stored, inspected and maintained according to the manufacturer's specifications.
- Ensure that a solid sawn lumber plank is graded as scaffold grade or better, sized 51 mm by 254 mm and is used, stored, inspected and maintained according to the manufacturer's specifications.
- Ensure that all light duty scaffold platforms are at least 500 mm wide and all heavy duty scaffold platforms are at least 1 meter wide.

- Ensure that a scaffold plank:
 - is visually inspected by a competent worker before installation into a scaffold;
 - is subjected to a load test if the visual inspection required by subsection (a) reveals damage that could affect its strength or function and the plank will continue to be used;
 - extends at least 150 mm but no more than 300 mm beyond a ledger;
 - is secured to prevent movement in any direction that may create a danger to a worker; and
 - extends at least 300 mm beyond a ledger if it is an overlapping plank

11.15.7 Components – Guardrails and Toe boards

- Unless appropriate fall protection is used, guardrails are required on the outer edges and ends for all working surfaces above 2 meters.
- Guardrails shall consist of a top rail 929 mm to 1070 mm above the scaffold planking and a mid-rail half way between.
- If the height of the scaffold planking is greater than 2 meters (6 ft.), a toe board meeting applicable regulations is required on the outer edges and the ends.
- Where wooden guardrails are used, railings shall be constructed, as a minimum, of 2 X 4 in. uprights and 2 X 4 in. railings 1 meter above the working platform, with a 1 X 6 in. intermediate rail and toe boards must be installed as per applicable regulations.

11.15.8 Components – Ladders

- The sides of scaffolds are not to be used as a ladder.
- Ladders shall be installed as the scaffold is being built.
- Portable and built-in ladders shall extend 1 meter 3 feet. above the top of the scaffold platform and shall be secured at the top.
- Portable ladders shall be sloped at a 4 to 1 angle.
- Portable ladders shall be secured at the bottom or tied to the scaffold at waist height and flagged.
- Internal stairways or built-in ladders are required for scaffolds greater than 9.1 meter high.
- Workers are not allowed to climb braces or end frames.
- Attachable vertical scaffold ladders exceeding 6.1 meter in height, shall be equipped with either a safety cage, proper fall protection, or rest platforms.

11.16 Swing Stages and Work Cages

- The platform of the swing stage or work cage shall be capable of supporting all loads to which it is likely to be subject to, without exceeding the manufacturer's rated working load.
- The manufacturer's load rating of the platform shall be clearly labeled and visible to all workers.
- Wire ropes used for suspension lines shall be free of kinks, bird-caging, excessive wear, broken wire, flat spots, or other defects.
- Platforms shall be equipped with handrails, midrails, toeboards, and wire mesh from the top rail to the toe board, skid resistant working surfaces, and properly sized and secured stirrups.
- Rigging hardware such as hooks, shackles, rings, bolts, slings, chains, wire ropes, and splices shall be capable of supporting at least 10 times the maximum load to which it may be subjected.
- A fall prevention system shall be utilized whenever a person is on a wind girder without handrails, to install, adjust, or remove anchorage points.
- Attachment points on swing stages and work cages shall be secured to the structure in which they are suspended to prevent movement or dislodgement.
- A full body harness shall be used for all applications involving suspended access equipment. There shall be one lifeline for each worker on suspended access equipment. Shock-absorbing lanyards shall always be used with wire rope lifelines to keep fall-arrest loads below accepted limits. Each lifeline shall be securely anchored to an independent support so that failure of the equipment will not cause failure of the lifeline.
- Before each use, lifelines shall be inspected for damage from abrasion and chafing. When in use, they shall be protected from such damage.
- Lifelines shall be 15 mm (5/8 inch) polypropylene rope or other fibers of equivalent durability, impact strength, and elasticity. Rope grabs shall be compatible for use with the size of lifeline supplied. Each individual lifeline shall be long enough to reach the ground.
- There shall be two independent means of support for each worker using the equipment. The first means of support is the access equipment itself. The second is usually provided by a fall-arrest system consisting of a lifeline, rope grabbing device, lanyard and shock absorber, and full body harness.
- Emergency rescue procedures shall be in place in the event of an incident and communicated to everyone involved.

11.17 Elevating Work Platforms and Aerial Devices

- Only trained competent workers shall operate elevated work platforms and aerial lift equipment.
- Documented daily checks must be completed on the equipment prior to its use.
- The Contractor shall ensure that workers on a boom-supporting elevating work platform, boom supported aerial device, or telescopic forklift truck work platform uses a personal

fall arrest system connected to an anchor point specified by the manufacturer of the equipment

- Live controls shall be tested each day prior to use to determine that such controls are in safe working conditions.

Articulating boom and extended boom platforms shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission has been obtained from the worker in the lift, except in case of an emergency.

- An elevated work platform shall be used on a firm, level surface and never loaded in excess of its rated working load.
- Elevated work platforms shall not be used for anything other than lifting workers, tools and materials to an aerial work site.
- Do not use the machine as a crane or hoist.
- Do not place or carry loads outside the platform perimeter.
- The brakes shall be set and outriggers, when used, shall be positioned on pads or a solid surface. Wheel chocks shall be installed before using an aerial lift on an incline.
- The Contractor shall ensure that a worker on a scissor lift or an elevating work platform uses a travel restraint system consisting of a full body harness and lanyard connected to an anchor point specified by the manufacturer. When connected to the anchor point, the lanyard, if reasonably practical, is short enough to prevent the work from being ejected from the work platform or aerial device but is long enough to allow the worker to perform his or her work.
- Tying off to an adjacent pole, structure, or equipment while working from the platform shall not be permitted.
- Manufacturer's load rating of the platform shall be clearly labeled and visible to all workers.

11.18 Man-Baskets

- A full body harness and shock absorbing lanyard shall be worn by all workers. The lanyard shall be attached to a suitable anchorage point independent from the work platform (i.e., on the boom of the equipment).
- Any platform or man-basket used for hoisting workers shall be designed and certified by a Professional Engineer. A copy of the certification, equipment drawings, and the most recent inspection certificate shall be available upon request by the Company Site Inspector.
- Workers shall always stand firmly on the floor of the basket and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.
- Boom and basket load limits specified by the manufacturer shall be displayed on the platform and shall not be exceeded.

11.19 Welding and Cutting

- All welding equipment and accessories shall be maintained in safe working order. Defective equipment shall be tagged "out of service" until repaired or replaced.
- Turn welding machines off at the end of each workday or when left unattended.
- When cables are laid on the floor or ground they shall be protected so that they shall not be damaged or become a tripping hazard.
- The ground return line from the work being welded shall be a single cable in good repair. The ground return line shall only be clamped to the material being welded.
- The welder, or welder's helper, shall ensure that no other worker is in the cutting or spark path before commencing work.
- Make sure there are no combustible materials nearby (i.e. oil, rags, gasoline, paper, dry grass, etc).
- Precautions shall be taken against exposure to welders (and other) workers to excessive ultraviolet radiation, fire, explosion, asphyxiation or exposure to toxic gases, fumes or dusts when welding or cutting equipment is used.

11.19.1 Gas Welding and Cutting

- Oil or grease in the presence of oxygen under pressure may ignite violently. Keep oil and grease away from oxygen cylinders or hoses and never lubricate oxygen fittings.
- Oxygen cylinder valve shall be fully open when in use to prevent oxygen leakage around the stem.
- All hoses shall be approved and maintained in good repair.
- Only the torch and regulator valves shall be used to control the flow of gas. The cylinder valves shall be closed and the gauges disconnected when the torch is not in use.
- Where gas-welding/cutting equipment is used, the Contractor shall ensure that a flashback device is installed at either the regulator end and/or the torch end of each hose and a back-flow prevention device is installed at the torch end.

11.19.2 Compressed and Liquefied Gas

Handling, Use, Storage and Transportation

- Do not drop or subject cylinder to severe blows. Transport on proper hand trucks; do not drag, roll or slide cylinders.
- Cylinders shall not be carried by side boom or gin poles unless a suitable cradle or platform is used. Slings or cables shall not be used to pick up cylinders.
- Valve protection caps shall always be in place until the cylinder is properly secured and is ready for use.
- Valve protection caps shall not be used for lifting cylinders from one vertical position to another. Before raising cylinders from a horizontal to vertical position, the cap shall be in place.

- If trouble is encountered with removal of the protective cap or the opening of a valve, contact the supplier. Do not force anything. If, when the valve on a cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed and the gland nut tightened. If this does not stop the leak, move the cylinder out-of-doors to a safe location away from any possible ignition source, place a warning sign, and advise the supplier.
- Cylinders shall never be used as rollers or supports whether full or empty. They shall not be placed where they may become part of an electrical circuit such as an arc welding machine circuit.
- Where a special wrench is required it shall be left in position on the stem of the valve while the cylinder is in use.
- Never tamper with safety devices on cylinder valves. In case of problems, contact the supplier immediately.
- Cylinder storage areas are to be divided into areas marked as "full" and "empty". Appropriate measures shall be taken to separate cylinders containing substances, which if mixed, could produce an explosive hazard.
- Cylinders shall be protected against an excessive rise in temperature.
- A small amount of positive pressure shall always be left in an empty cylinder.
- Compartments/cabinets containing acetylene, oxygen and/or propane cylinders shall be equally vented at top and bottom totaling a minimum of two (2) square feet.
- Compartments containing compressed gas cylinders shall be sealed from other compartments (i.e. welded air-tight) to prevent the migration of gases into other adjoining compartments.
- Electrical components such as lights and switches, wires, cables shall not be located within the gas cylinder storage compartment. If necessary to do so, they shall be designed for use in an explosive atmosphere.
- Acetylene cylinders shall be stored/transported and used in the upright position.

When traveling, the following conditions apply:

- Cylinders stored/transported within secure cabinets (i.e., welded metal cabinets) shall have their valves shut off and hoses depressurized. Cabinets shall be vented to prevent the buildup of combustible gasses.
- Cylinders that are not stored / transported within secure cabinets (i.e. welded metal cabinets) shall have their valves shut off; regulators removed; and valve protection caps installed.
- Cylinders shall be securely fastened so that they cannot become dislodged due to rough terrain or in the event of a vehicle accident.

11.19.3 Propane Safety

Propane is a special concern when it is used on the job-site since it is heavier than air, and invisible.

- All installations and use of propane on the job-site shall comply with the Government Legislation set out for its safe use.

- Nylon slings shall be used in a “choker” fashion when loading, off’ loading or lifting propane tanks.
- “Lifting lugs” provided on tanks are not to be used. Slings shall be wrapped around the shell of the tank.
- Tank valves and regulators are to be removed from the tank prior to any movement of the tank.
- All trucks, cranes or equipment used to handle propane tanks shall be equipped with a fire extinguisher appropriate for the size and type of tank being handled.
- Tanks are not to be heated to increase flow.
- When in use, propane bottles are to be securely held in an upright position.
- Propane is not permitted to be left in excavations or inside enclosed work areas when hot work is being performed
- Propane shall be stored outdoors in a secured upright position.
- Propane cylinders shall not be stored in the same compartment along with oxygen cylinders.

11.19.4 Pressure Reducing Regulators

- Regulators or reducing valves shall only be used for the gas and pressures for which they are intended.
- Pressure adjusting screws on regulators shall always be fully released before the regulator is attached to the cylinder and before the cylinder valve is opened.
- Always return regulators to the supplier for repairs, calibrations, or adjustments. Never attempt to test or lubricate oxygen gauges with oil.
- Union nuts and connections shall be inspected regularly in order to detect faulty seals that may cause leaks. Damaged nuts and connections shall be removed from service.

11.19.4.1 Hand-Held “TIGER” Torches

- Propane fuelled, hand-held torches are not designed to shut off automatically if the flame is extinguished. Propane gas can remain in low areas such as excavations or culverts for an extended period of time, creating a flammable or explosive atmosphere.
- Propane fuelled, hand-held torches shall be used for their intended purpose which is to be hand-held and under constant supervision. They are not to be used for temporary heat in confined spaces, or at any time left unattended.
- Tiger torches, although valuable to a job-site, are sometimes miss-used in a manner that can make them dangerous.
- Tiger torches are only to be used for pre-heating of piping etc. prior to welding.
- When a torch is used, an adequate fire extinguisher shall be present.
- Torches are not to be used for heating of work area or thawing of lines and equipment etc.
- Ensure that the propane bottles are properly shut off when not in use.

- Fuel lines shall have regulators or components rated for the compressed gas bottles pressure.
- Propane bottles shall be secured in an upright position.
- Inspections of all hoses and fittings for damage and leaks shall be conducted prior to use.
- Use only approved hoses and fittings to connect bottles to devices and equipment.
- Care shall be taken when moving a lit torch.
- Bottles shall not be heated with an open flame during periods of cold weather.

11.20 Thermite Welding (Cad-welding)

During Thermite welding activities the operator performing the weld shall wear eye and face protection as well as leather gloves to protect the hands.

To reduce the amount of excessive splatter from the weld, ensure the previously buried cable and the pipe is dry and free of moisture.

11.21 Pipe and Material Handling

The Contractor shall ensure that workers of the Contractor and Subcontractor are trained to safely handle and secure pipe and materials.

- The use of appropriate lifting equipment such as side booms, track-hoes equipped with vacuum devices and cranes shall perform all handling of pipe and materials.
- Pipe and fittings shall be handled using only rigging equipment designed not to damage the load (i.e. Teflon-lined stringing hooks and nylon slings).
- Workers shall not position themselves under a suspended load.
- Workers shall not place themselves between the suspended load and equipment or other pipes/materials.
- Workers shall not physically contact a suspended load. Tag lines must be used.

Rigging shall be done by a qualified rigger:

- Appropriate for the pipe or material and the purpose of handling it.
- Used only to perform the function for which it was intended or designed.
- Used so that the actual working load does not exceed the maximum safe working load.
- Used in accordance with the manufacturer's specifications for the rigging, component parts, and attachments.
- Inspected before each use and removed from service if defective.
- Protected from sharp edges of the loads. When softeners are used they shall be of the type that offers the most stability to the placement of the slings.
- Tension shall be maintained on the rigging and the rigging shall not be unhooked until the load is fully secured.

- Workers shall not approach the pipe or material to unhook until the tension on the rigging is released and there is no sign of movement.
- Wherever practical, place pipe or materials in a flat area or parallel with a slope rather than across a slope.
- Pipe or materials shall be secured from movement by blocking, cradling, or a combination of both, or an approved alternative method.
- Pipe blocks and skids shall be secured to prevent being removed or dislodged.
- Skids are considered to be secured if the weight of the pipe or barrel prevents the skid from being dislodged or removed.
- Pipe blocks shall have sufficient strength to hold the weight of the load.
- Cross timbers shall be placed 3 to 4 feet in from the ends of the pipe.
- All workers shall stand clear when cutting steel bands or the wire securing a load of pipe to a vehicle or rail car.
- Workers shall keep their hands clear of the ends of pipe being butted together. Tag lines shall be used.
- Pipe shall be equipped with end caps or secured to prevent unauthorized entry while being stored in populated areas and at road crossings.

11.22 Safe Use of Load Binders

Failure to use load binders properly may result in serious injury to yourself or others. Following are guidelines for safe use:

- Do not operate a load binder while standing on the load.
- Hook load binder so you can operate it while standing on the ground.
- Position the load binder so its handle can be pulled downward to tighten chain.
- Workers shall position themselves out of the path of the moving handle and any loose chain.
- If sufficient leverage cannot be obtained using the lever type load binder by itself, a ratchet type binder shall be used.
- Cheater pipes (snipes) are strictly prohibited.
- When you release the handle, use an open hand under the handle and push upward. Do not close your hand around the handle.

11.23 Safety around Storage Tanks

The following guidelines apply to work on or within an oil storage tank or other work within the tank firewall. The Contractor shall ensure that;

- No ignition sources of any kind shall be allowed inside tank firewalls unless a work permit has been issued and the area monitored for flammable vapors.
- Firewalls shall be crossed only at stairways or ramps.

- The Company shall have the right to suspend work at any time for pumping in or out of an oil storage tank, or for other operational requirements.
- Procedures for walking on a cone or geodesic dome roof or to descend onto a floating roof (internal and open) shall be reviewed by the Contractor, Company Site Inspector, and the Area Operations Supervisor or designate.
- Abrasive blasting is not allowed within 3 meters of any tank vent, whether or not the vents are open, unless the tank has been cleaned and declared gas free. If a tank has not been cleaned and declared gas free, cleaning of these areas shall be completed with hand tools such as scrapers, wire brushes and similar equipment (cold work).

11.24 Pigging and Testing

- The Contractor shall complete a Task Hazard Assessment prior to the start of any work activities.
- Pigging and testing of pipelines and facilities shall be carried out in accordance with the procedures and applicable regulations made under government legislation. Where necessary, permits shall be obtained by the Company or the Contractor as specified in the contract. Copies of all Permits shall be in the possession of the Contractor Site Supervisor as well as the Company Site Inspector.
- A Company Site Inspector competent in testing procedures shall provide on-site coordination of the test plan and shall also witness the test.
- Pressure shall be released from both ends of the pig or test section prior to loosening or removing any fittings.
- The Contractor shall provide a safe means of access and egress for trenches and proper, safe scaffolding at the test heads, adequate lighting when night work is necessary, and a fire extinguisher at both ends of a pigging or test section.
- Only workers directly involved in pigging or testing shall be allowed in the immediate vicinity of pig catches, test heads, pressure pumps, or exposed sections of pipe or facilities during testing.
- The Contractor shall provide adequate heated and lighted facilities for pigging and test workers located a minimum of 15 meters away from any pigging or testing facilities.
- Temporary piping or hoses used during gases pumping, depressurizing, or dewatering activities shall be anchored or secured by such method(s) as whip check connections, steel braid line wrap, or staking to the ground, to prevent them from moving or violently separating.
- All hoses, piping, fittings, valves, etc. shall be of Specified design for the pressures used and maintained in good condition.
- Persons not directly involved in the testing shall be kept back a minimum of 33 meters from the pipeline by the use of signs, fencing, and verbal warnings. The area directly in front of the pig trap shall be flagged to prevent persons from inadvertently walking or working in the exclusion zone.

11.24.1 Pigging (Compressed Air or Nitrogen)

Hazards associated with nitrogen purging are as follows:

- Noise
- Blow down Fumes
- Oxygen deficiency
- Extreme cold temperatures
- Explosions
- Pressure

The Contractor is required to monitor the area and/or excavation for LEL and oxygen content.

NOTE: The monitor shall be capable of functioning in a nitrogen atmosphere.

SCBA Units shall be made available at all locations where Contractor workers may potentially come into contact with the nitrogen (excavations, blow-down sites, etc.).

- Fire extinguishers shall be made available at each site.
- Personnel shall use approved hearing protection during blow-down operations.
- Leather gloves shall be used to handle hoses, piping and connections that are associated with the nitrogen purging operations.
- The Contractor shall complete a Task Hazard Assessment
- All workers shall be kept clear of the pipe ends during a pig run.
- The dispatching end of the test section shall have a flange, test head, or trap welded to the pipe.
- The receiving end of the pipeline shall have a pig catcher or trap welded to the pipe to eliminate the danger of the pig being blown free of the line at the end of the pig run.

11.24.2 Purging the Pipeline with Nitrogen

Hazards associated with Nitrogen purging are as follows:

- Noise
- Blow down Fumes
- Oxygen Deficiency
- Extreme cold temperatures
- Explosions
- Pressure

The Contractor is required to monitor the area and/or excavation for LEL and oxygen content.

NOTE: The monitor shall be capable of functioning in a nitrogen atmosphere.

SCBA Units shall be made available at all locations where Contractor workers may potentially come into contact with the nitrogen (excavations blow down sites, etc.).

- Fire extinguishers shall be made available at each site.
- Personnel shall use approved hearing protection during blow down operations.
- Leather gloves shall be used to handle hoses, piping and connections that are associated with the nitrogen purging operations.

11.24.3 Low Pressure Air Testing (Less than 700 kPa or 100 psi)

- Both ends of the test section shall have a flange, test head, or trap welded to the pipe.
- All hoses, fittings, valves, etc., shall be of specified design for the pressures used and maintained in good condition.
- Distinct warning signs, such as “DANGER, AIR PRESSURE TESTING IN PROGRESS” shall be posted during air pressure testing.

11.24.4 Hydrostatic Testing

Two zones shall be established around any hydro test, a 15 meters zone and a 33 meters zone. These requirements shall be followed during all hydro tests.

11.24.4.1 15 meters / 50 FOOT ZONE

The boundary shall be marked with CAUTION tape. All unnecessary equipment and workers shall stay out of this zone when the pipe is pressurized above normal operating pressures. Squeeze pumps, water tanks, and temperature recorders may be located in this zone.

Temperature recorders and other equipment shall be checked prior to pressurization and 15 minutes after the pipe reaches full pressure. This will help keep the number of personnel in the area to a minimum during the critical pressurization time.

If it is necessary to test a fabrication indoors, the 15 meters zone shall be the entire room where the testing is done.

The Contractor shall ensure the 15 meters zone applies over the entire length of the pipeline under test. Traffic control within populated areas is required and shall be identified in the Task Hazard Assessment and as part of the permit approval.

Company Personnel shall stay in their vehicles if they are within this zone monitoring the pipeline during the hydro test, with the exception of checking for leaks or opening or closing valves.

Hydro test signs on public roads shall be located at a point 15 meters from the pipeline. Unique circumstances may require additional measures to ensure the safety of the public, contact personnel and Company Personnel.

11.24.4.2 33 meters ZONE

This zone will not be marked, but the public and other personnel shall stay at least 33 meters away from the pipe. This zone applies over the entire length of the pipeline under test. The public shall be kept out, except when crossing the pipeline in vehicles. Landowners along the right-of-way shall be notified in advance of the hydro-test and those living within the 33 meters zone shall be evacuated.

In the event piping and equipment is present in the test area or within 33 meters, of the pressurized components the area shall be flagged and remain off limits to all personnel during the test. When testing trailers or vehicles are parked, extra precautions must be taken (i.e. staged behind staged behind large equipment)

12.0 CHARACTERISTICS OF PRODUCTS PUMPED

The Contractor shall ensure that all workers and Subcontractors who will be involved in the work are informed of the potential hazards of working near the Company's existing high-pressure pipelines. These lines transport hydrocarbons, which can include flammable, volatile liquids under high pressure. Detailed MSDS for common products pumped by the Company are available to the Contractor upon request.

12.1 Crude Oil, Condensate, Gasoline

- All liquids pumped by the Company are flammable.
- If a spill occurs, all liquids give off hazardous vapours, which can be both toxic and flammable.
- All hydrocarbon vapours are heavier than air and will collect in low places or depressions in the ground. Thus, when testing for vapours, tests should be taken at the lowest point in the area.
- All spills must be considered flammable until all liquid has evaporated or has been cleaned up.

12.2 Natural Gas Liquids (NGL)

- Natural gas liquids contain propane, butane, and condensates such as heptane and pentane.
- NGL vapour is invisible. However, a leak may create sufficient refrigeration to condense water vapour in the air, giving the effect of a steam cloud in the immediate vicinity of the leak.
- NGL vapours are heavier than air and will accumulate in low areas.
- "When NGL under pressure is released to atmosphere, it expands at a rate of 200 times"

12.2.1 Odor of the Mixture

Pure propane and butane are practically odourless. However, condensate has a characteristic smell. The smell is somewhat like gasoline, but stronger and less pleasant.

12.2.2 Freezing Effect

- When an NGL mixture is released to the atmosphere, the propane and butane portions will immediately start to expand or boil off. This expansion uses up heat rapidly from the surroundings and creates a refrigerating effect, which will eventually result in temperatures close to -42°C.
- Liquid splashed or sprayed on the body will have an immediate freezing effect. It should be washed off as quickly as possible.
- Metal adjacent to a leak will become very cold and ice may build up on it.



CAUTION: Ice plugs may form when NGL is released through a valve to the atmosphere.

12.2.3 Effect of Breathing NGL Gas

- NGL is an asphyxiant which becomes poisonous when mixed with hydrogen sulphide (H₂S) gas. Higher concentrations of NGL have a narcotic and intoxicating effect, which are soon followed by unconsciousness.

12.2.4 Leaks and Weather

If a leak develops, the wind conditions could affect how the NGL cloud will disperse.

12.2.5 Fires Involving NGL

In case of a fire, the supply of NGL must be shut off as quickly as possible and the fire is allowed to burn itself out. The fire should not be put out as it permits a cloud of vapour to accumulate that might re-ignite explosively.

12.3 Breathing Hazards

12.3.1 Hydrogen Sulphide (H₂S)

Contract employees who may be exposed to H₂S must be properly trained in H₂S Alive (in Canada, or equivalent in US). This training will be the responsibility of the Contractor to their employees, providing:

- The training has been identified as a Hazard Control within the task hazard assessment associated with the work, (i.e. working on an open system)
- The work is being completed within a third party facility where the training is needed to gain site access.
- The Contract worker is hired to provide support to Enbridge Operations or PLM and may be exposed to work on an open system or work near an open system,
- The Contract worker is hired to;
 1. work in or on open systems
 2. clean up of leak sites or contaminated soil
 3. clean hydrocarbon storage tanks.

Respiratory Protection

Concentration ²	Respiratory Protection
10-99 ppm	SCBA or SAR with escape pak ¹
>100 ppm	Planned work is not permitted

- A safety watch with Self-Contained Breathing Apparatus (SCBA) or Supplied-Air Respirator (SAR) must be present for communications, emergency response and rescue.

Hazard Description

- The Company transports several crude oils that contain H₂S. Even at acceptable exposure concentrations, H₂S has a very strong “rotten egg” odour that rapidly deadens the sense of smell.
- Hydrogen Sulphide is a highly toxic and flammable gas. Exposure above 300 ppm rapidly results in unconsciousness and death. Lower concentrations cause eye, nose, throat and lung irritation, dizziness, headaches and nausea.
- Hazardous levels of H₂S at Company facilities are usually limited to confined spaces such as tanks and buildings, or to low area with little or no air movement. Since H₂S is heavier than air, it can also accumulate in low areas, inside firewalls and in ditches.
- Although the air in a sump or tank may test very low for H₂S, hazardous levels of H₂S may release into the air when the contents in the sump or tank bottoms is stirred.



WARNING: H₂S is soluble in most liquids, but releases into the atmosphere when a solution is agitated or heated.

12.3.2 Petroleum Vapors

Respiratory Protection

Concentration	Respiratory Protection
0-3%	None
4-5%	Half mask APR with organic vapor cartridge (for exposure periods exceeding 30 minutes)
6-10%	Half mask APR with organic vapor cartridge
11-20%	SCBA (or equivalent) for cold work; hot work is not permitted
>20%	Planned work is not permitted ¹

¹If quantitative fit testing is performed

- Emergency work, such as rescuing workers or shutting down equipment is permitted, provided SCBA is used and all ignition sources are removed.

Hazard Description

- Petroleum vapours are flammable and toxic. Hazardous levels of petroleum vapours at Company facilities are usually limited to confined areas such as tanks and buildings, or to low area with little or no air movement.

12.3.3 Benzene

Respiratory Protection

Concentration	Respiratory Protection
---------------	------------------------

0-0.5 ppm	None
0.6-5 ppm	Half mask APR with organic vapor cartridge
6-25 ppm	Full face APR ¹ with organic vapor cartridge, SCBA or SAR
>25 ppm	SCBA or SAR
>500 ppm (IDLH) ²	Planned work is not permitted

²Immediately dangerous to life and health

- Emergency work, such as rescuing workers or shutting down equipment is permitted, provided SCBA is used.

Hazard Description

Benzene is a carcinogen. Hazardous levels of benzene are a particular concern in confined area such as inside tanks or buildings during spills, and in low area with little air movement.

NOTE: The threshold limit value (TLV) for benzene exposure is 0.5 ppm.

Benzene is a clear, colourless and strong-smelling solvent (odour similar to gasoline). It evaporates quickly under normal circumstances and its vapours are heavier than air. Benzene vapours are hazardous when inhaled or absorbed through the skin. Immediate physical effects may include dizziness, drowsiness, headache and nausea.

Long-term health problems associated with repeated exposure to benzene vapours above acceptable limits for extended periods. Long-term exposure (5-30 years) to high benzene levels associated with leukaemia and other blood-producing organ diseases, and with damage to the immune system.

12.3.4 Carbon Monoxide

To guard against exposure to carbon monoxide, maintain automotive exhaust systems in good working order. If it is necessary to remain in a parked vehicle with the engine running, keep a window open to provide adequate ventilation.



WARNING: Space heaters produce carbon monoxide. If space heaters are in enclosed areas (e.g. leak trailers), exhaust systems must be provided.

Respiratory Protection

Concentration	Respiratory Protection
25 ppm – 500 ppm	SCBA or SAR
> 500 ppm	Planned work is not permitted

- Emergency work, such as rescuing workers or shutting down equipment is permitted, provided SCBA is worn.

Hazard Description

Carbon Monoxide (CO) is produced by incomplete combustion of most fuels (gasoline, diesel or natural gas). It is present in the exhaust of most internal combustion engines.

CO poisoning may occur without symptoms because this gas is non-irritating, colourless and tasteless, and therefore can be present without being detected by the senses. It combines with the haemoglobin in blood, preventing oxygen from being carried to the tissues (asphyxia). Symptoms of asphyxia include a pounding heart, flashes before the eyes, dizziness, ear ringing and nausea.

12.3.5 Mercaptan

Respiratory Protection

Concentration	Respiratory Protection
0 to 0.5 ppm	None
0.6 to 5.0 ppm	Half mask APR with organic vapor cartridge
6.0 to 25 ppm	Full face APR with organic vapor cartridges or SAR
Greater than (>) 25 ppm	SAR or SCBA
Greater than (>) 500 ppm (IDLH)	Planned work is not permitted

12.3.6 Toluene

Before using toluene, the contractor and workers shall review the contained label and the MSDS for toluene and identify the hazards and necessary controls on the Task Hazard Assessment.

NOTE: The TLV for toluene is 50 ppm.

- Use toluene only with local exhaust or general room ventilation.
- Keep toluene away from extreme heat, sparks and open flames.
- Do not use toluene as a cleaning agent, except in the sample room.
- Keep containers of toluene closed when not in use.

Hazard Description

Toluene is a flammable, colourless liquid with a strong aromatic odour, which serves as a warning of high concentrations.

12.3.7 Oxygen Deficiency

Respiratory Protection

Concentration	Respiratory Protection
<19.5% & >23.0	SCBA

NOTE: The minimum requirements for oxygen in breathing air is 19.5% oxygen by volume.

Monitoring

Whenever oxygen deficiency is present or suspected, use portable oxygen detectors to continuously monitor the amount of oxygen in ambient air.

Ventilation

Circulate fresh air before entering a confined space. Wear SCBA if it is necessary to enter a confined space before it is ventilated.

Hazard Description

Normal air contains approximately 21% oxygen and 79% nitrogen. Less oxygen causes deep and rapid breathing. This progresses to dizziness, rapid heartbeat, headache and a possible inability to move as the percentage of oxygen decreases to 16%. At 14% and lower, humans cannot survive.

Oxygen deficiency can develop in enclosed spaces, even in the absence of petroleum vapour. For example, in a sealed, cleaned tank, some oxygen is used up as the interior walls of the tank rust. As well, CO₂ and Halon fire extinguishing systems displace oxygen to put out a fire.

12.3.8 Asbestos

Safety requirements for removing asbestos materials shall be in accordance with the Company's Book 2: Safety Manual. Relevant information from this manual will be included in the bid document.

Hazard Description

Asbestos fibres inhaled into the lungs can lead to lung cancer, asbestosis or mesothelioma.

The following materials are known or presumed to contain asbestos:

- Insulation on abandoned waste heat boilers and piping.
- Plain and perforated asbestos board panels on interior walls and ceilings in some station buildings.

- Insulation on standby generator exhaust piping.
- Some floor tiles.
- Gasket material on pumping units and flanges on piping.
- Some pipe coating.
- Underground concrete electrical duct banks at terminal sites.

12.3.9 Spray Paint Aerosols

Respiratory Protection

To minimize exposure to spray paint aerosols and volatile components, workers engaged in spray painting must wear appropriate respiratory protection identified on the Task Hazard Assessment.

Ventilation

Ensure the work area is well ventilated, particularly when work is in an enclosed space.



WARNING: Do not spray paint in unventilated, enclosed spaces, as the atmosphere may become explosive. Do not spray paint hot equipment since this could result in an explosion or fire.

12.3.10 Crystalline Silica (Refractory Materials)

Respiratory Protection

Any worker entering a crude oil heater or other environment that contains refractory materials must wear a half mask APR complete with a P100 HEPA filter. Due to the difficulty of accurately measuring the quantity of airborne particles, assume that all crude oil heaters contain sufficient amounts of crystalline silica to require respiratory protective equipment.

Hazard Description

The International Agency for Research on Cancer (IARC) has identified crystalline silica as a known carcinogen. Crystalline silica is found in the insulating materials commonly used to insulate crude oil heaters, including:

- Insulating Firebrick and Insulating Castable, which break down through the normal cycling of the heater and the turbulent flue gas, creating dusts that are disturbed on entry.
- Kaowool Blanket Products, which may contain crystalline silica after being exposed to temperatures above 180°F. Such temperatures are not unusual during normal operation of the crude oil heaters.

NOTE: For information on entry procedures and product MSDS, see the Crude Oil Heater Operations and Maintenance Manual onsite.

13.0 HAZARDOUS MATERIALS (WHMIS / HAZCOM)

13.1 Handling and Use

Contractors shall:

- Retain Material Safety Data Sheets (MSDS) for all controlled products they bring on site.
- Maintain an up-to-date inventory list of all controlled products on site.
- Label all containers of hazardous chemicals with the product name, hazardous chemical ingredients, hazard warnings, and manufacturer, temporary containers shall be labelled with the product name and hazard warnings if used more than one day or by more than one worker.
- WHMIS / HAZCOM supplier or workplace label shall be applied to all controlled product containers.
- Provide proof of WHMIS / HAZCOM training as per Federal and or Provincial Regulations for all workers required to work with or in the vicinity of any controlled products. Training shall include information on:
 - Warning labels on containers of hazardous materials:
 - Separate Material Safety Data Sheets (MSDSs) providing further detailed information.
 - Worker training on how to use the information contained on labels and MSDSs.
- Individuals transporting regulated products shall comply with TDG/HazMat regulations, which include having proper certification, manifests and displaying proper placards on vehicles.
- Contractor vehicles transporting more than 200 litres of fuel or liquid hazardous materials to unmanned pipeline locations and/or right-of-way work sites shall be equipped with; a shovel, 30 m² (36 sq yd) of 6-mil polyethylene sheeting and 25 kg (55 lb) of absorbent.

13.2 Solvents, Paints and Chemical Agents

The Material Safety Data Sheet for each, solvent, paint, cleaning agent, or chemical used in the work shall be available at the site and reviewed with each worker involved in their use or storage prior to handling. All requirements for storage, handling, and personal protection shall be followed. When in doubt concerning these requirements, the Company Site Inspector and/or the Company's Construction Safety Representative shall be consulted.

Solvents, cleaners, and cleaning agents shall not be stored or used in unventilated areas or in immediate proximity to any source of ignition. Quantities of such materials greater than that needed for one day's work shall be stored outside work areas in a proper storage facility.

13.3 Coal Tar Pipe Coating Removal

Coal tar enamel outer wrap is commonly used to coat underground pipelines. Pipelines coated with coal tar may contain 5 to 20 percent chrysotile asbestos embedded in the tar coating. Due to the non-friable nature of this material (i.e. the material does not crumble or break easily), the asbestos contained in the coating is not easily released to the environment. Asbestos exposure from coal tar coating chipping operations does not contain any measurable airborne asbestos fibre concentrations.

13.3.1 Procedure for Removal of Coal Tar Wrap

- Disposable dust masks are recommended for nuisance dust exposures.
- Since chipping is the preferred method of removal, safety glasses are required. Coveralls and neoprene gloves are also recommended in order to prevent skin contact with the coal tar.
- The pipe coating shall be wetted down.
- The wet coal tar coatings shall be chipped from the pipe by using a blunt tool so as not to damage the parent pipe, cracking the coating into relatively large chunks that fall into plastic sheeting below the pipe.

13.3.2 Disposal of Coal Tar Wrap Waste Material

Non-friable asbestos contained in the pipeline coating is not considered to be a hazardous waste under government regulations. Material removed from the pipeline shall be disposed of in accordance with Provincial Regulations. For more information, contact the Company's Environment Department.

13.4 Radiation Devices

Nuclear densitometers are located at various Company locations. Warning signs that show a radiation symbol, and the words, "*Caution Radiation Hazard*" or "*Danger Radiation Hazard*" identifies these devices. Other information on the warning sign includes; type and source of radiation and the name or job title of the person to contact in case of an emergency.

14.0 SAFEGUARDING PIPELINES AND FACILITIES

14.1 General Safe Guarding of Pipelines and Facilities

In addition to these requirements, the contractor will follow all requirements covered in tab 11.11 under Trenches and Excavations.

Contractors shall:

- Ensure all workers involved in ground disturbance activities have approved Ground Disturbance Level Two training. Copies of Current certifications shall be provided to the company upon request.
- Ensure all crossing agreements and/or proximity agreements shall be obtained by a company representative and reviewed with the Contractor as part of the line location and verification process. Copies of these documents shall be kept on site as part of the project documentation.
- Ensure that a Company representative is responsible for locating and identifying all Company facilities prior to the commencement of any potentially destructive activity. There shall be no equipment activity within the work area until the required steps have been taken to identify and confirm the location of all facilities.
- Be responsible for initiating and following through with the appropriate “one-call” system (See Appendix Y).
- Provide the required advance notice for third parties to identify and mark known nearby underground utilities has been completed prior to the start of any construction activities. This process shall be documented and all documents kept on site with the project files.
- Provide written verifications of the “One Calls” to the Company Site Inspector.
- Make “One-Call” updates as required based on construction plans, program and legislative requirements.
- Review the “One Call” documents, Company line locates, Survey markers, Hydrovac logs, As Built Drawings, Crossing / Proximity agreements and other related documents shall be available on site. These documents shall be reviewed with all workers prior to the start of any Ground Disturbance Activity.
- Ensure all location findings / data shall be matched up with site drawings, etc to ensure all know facilities have been identified and located.
- Conducts sweeps a minimum of 500 meters / 0.3 miles ahead of any contractor equipment completing Ground Disturbance Activities.
- Ensure that all Company and foreign utilities that cross the proposed width of the excavation or trench shall be exposed the full width of the excavation/trench prior to any mechanical below grade destructive activities.
- Have all operators who will be working within 5 meters / 15 feet of the known facilities have been approved by the Company Site Inspector prior to work taking place.

- Ensure a 1.5 meters / 5 foot buffer zone offset to the adjacent hotlines is established and maintained at all Road and Rail Crossings by the installation of a minimum 16 meters / 50 foot safety fence running parallel to the hotlines.
- Ensure Live lines (Hot Lines) are Hydrovaced, identified and flagged every 65 meters / 200 feet or less where line of site changes. (See Appendix V) by the Company Site Inspector. All Ground Disturbance activities, hazards and controls are documented on a Task Hazard Assessment (THA). All involved workers shall review and sign on the document.
- Ensure all Ground Disturbance activities are conducted under the use of a Ground Disturbance Permit or Excavation & Hazard Assessment Checklist.
- Ensure all below grade facilities within the Company's right-of-way or within ten feet of the identified boundary of a work area on company properties shall be positively located prior to any excavation work.
- Ensure all legislative and company requirements for ground disturbance are met prior to the start of any excavation work.

14.2 10 / 2 / 1 Rule

14.2.1 The Contractor shall follow the 10 / 2 / 1 rule as outlined below:

A 3 meters / 10 foot buffer zone shall be identified and flagged: (see Appendix W)

- ◆ No mechanical excavation shall be permitted within 3 meters / 10 feet offset from the edge of the pipe.
- ◆ No mechanical excavation shall take place prior to positively locating all underground facilities.
- ◆ No teeth or side cutters are permitted on equipment.

0.6 meters / 2 foot Offset from Pipe edge:

- ◆ No mechanical excavation without completely exposing the facility.
- ◆ Probing shall be continuously conducted to confirm maintenance of .6 meters / 2 foot offset prior to excavation.
- ◆ No Teeth or side cutters are permitted on equipment

0.3 meters / 1 foot Offset from Pipe edge:

- ◆ Facility shall be completely exposed by Hydrovac or Hand digging,
- ◆ NO MECHANICAL EXCAVATION IS PERMITTED.
- ◆ see Appendix W

14.2.2 Restricted Equipment Activities

- Only Low Ground Pressure Tracked Equipment such as D6 LGP 36 inch Wide Pad and lower will be utilized near or over buried facilities and must be identified prior to starting work.
- Equipment can only operate at a 45 degree angle with existing buried pipelines.
- No turning of tracked equipment will be allowed over existing facilities.
- No work is allowed over facilities in wet or saturated soils without approval from Operations/Construction Management.
- Attachments of mechanical equipment shall not penetrate below original grade.
- All stakes and flagging shall be periodically maintained and must remain in place until final clean up.
- If there will be sheet piling a detailed ground disturbance plan must be submitted to the Company for review and approval for each location.

14.3 How to Locate

The Contractor shall ensure a competent location company is used for the initial pipe / facility locations. The location shall be confirmed and the facility shall be exposed by Hydrovacing or hand digging. The following procedures shall be used for locating a facility:

- STEP 1:** Refer to the “as-built” drawings (i.e. route sheets, station piping, instrumentation, electrical, and cathodic protection drawings) to determine the number and type of facilities and their general location within the work area.
- STEP 2:** Using a pipe and cable locator, locate and stake all of the facilities within the work area. Continuous pipe, cable, or other facility shall be located in intervals of no more than 10 meters / 30 feet, with shorter intervals incorporated when a change of direction is encountered or indicated on the drawings (i.e. pipe or cable bends, laterals, or fittings).
- STEP 3:** After locating facilities, the information shall be compared with the details on the applicable “as-built” drawings (i.e. route sheets, station piping, instrumentation, electrical, and cathodic protection drawings).
- STEP 4:** If the facility location is in preparation for a “foreign crossing”, a “crossing report” shall be completed and reviewed with the owner of the foreign crossing.

WHEN IN DOUBT, HAND EXCAVATE OR HYDROVAC THE LOCATION
TO POSITIVELY LOCATE AND IDENTIFY A FACILITY!



14.4 Precautions

Potential hazards for this type of work include moving equipment, pinch points in swing radius, vehicle traffic due to congested areas, slip/trip/falls, overhead transmission lines, extreme temperatures, fire/explosion hazards, chemical exposure.

Pipe and cable locators can be inaccurate and should not be relied on solely in extremely congested areas or in areas exposed to induced high voltage or other stray electric current.

Double-check the number of facilities along with their relative locations, dimensions, etc., after the initial location by checking “as-built” drawings and other field records.

When a crossing is constructed by boring, the location of the boring device shall be confirmed by excavating test holes between each pipe line facility. A test hole shall be excavated out in front of the boring machine to ensure that the proper depth is achieved prior to boring under the other facilities.

Ensure that there is a clear line of vision between the stakes that identify a particular facility location. Ensure that all flagging and staking is visible to the equipment operators.

14.4.1 Temporary Marking of Underground Facilities (Refer to Appendix X)

RED	Electrical power lines, cables, conduit and lighting cables
YELLOW	Gas, oil, steam, petroleum or gaseous materials
ORANGE	Communication, alarm or signal lines, cables, or conduit
BLUE	Water, irrigation and slurry lines
GREEN	Sewer and drain lines
WHITE	Location or boundary of proposed excavation
FLUORESCENT PINK	Right-of-Way boundary

14.5 Working Adjacent to Hot Lines

On new line construction within the right-of-way, all equipment activities shall be confined to the staked area and shall not be allowed over the hot lines without the approval of the Company Site Inspector.

All existing lines shall be checked for depth of cover and it shall be properly marked on the stake(s).

All energies shall be directed horizontally away from the pipe in frozen or compacted soils.

14.6 Temporary Ramps for Crossing Pipelines

To ensure that the total circumferential pipe stress does not exceed the specific limits, it may be necessary to install temporary ramps over a pipeline.

Wooden planks, a minimum of 8 cm / 3 inches thick, shall be laid on the ground surface, and extended 2.5 meters / 8 feet on both sides of the pipeline in the direction being crossed.

A minimum of 1.5 meters / 5 feet of cover shall exist between the top of the pipe and the surface of the work pad.

Ramps may be required if any of the following conditions exist, as determined by the Company Site Inspector:

- Single axle loading exceeds 12,000 kg/25,000 lb. This can be estimated by dividing the gross vehicle weight by the number of axles.
- The pipe line to be crossed has been installed for less than one year.
- The depth of cover is less than 1 meter / 3 feet.
- In all situations when the crossing occurs in an area of marsh, swamp, or peat bog.
- Ruts are likely to develop at the crossing.
- Vehicles will be continually crossing.
- Consult with operations services or Regional Engineering as required for further information or guidance requiring temporary crossing ramps.
- Remove temporary access ramps when the work that required their construction is complete.

14.7 Additional Requirements for Pipeline Construction Work

14.7.1 Potential Hazards

Potential hazards for this type of work include moving equipment, pinch points in swing radius, vehicle traffic due to congested areas, slip/trip/falls, overhead transmission lines, extreme temperatures, fire/explosion hazards, chemical exposure.

No mechanical powered equipment shall be allowed over existing facilities with less than 3 feet depth of cover. Including but not limiting to Dozers, work vehicles, excavators, trenching machines, track hoes, skid steers, tractors, graders, dump trucks, side booms, etc. . For additional temporary crossing ramp requirements, see section 11.11.4.18.

14.7.2 Responsibilities

- *Superintendent:*
 - To ensure the appropriate manpower and equipment is available at the proposed work location to fully execute the safe work practices associated with working over buried facilities.
 - The Superintendent is responsible to notify the Chief Inspector of any work activity directly over any existing facilities.

- *Foreman:*
 - To facilitate and/or provide proper instruction to their workers on hazards associated with their job task and ensure that each person is properly trained and mentored if unfamiliar with their task to include all associated hazards.
 - Review and communicate the Construction Work Permit and Hazard Assessment content to the affected crew prior to starting work activities each day.
 - The Foreman shall ensure the Chief Inspector has been notified of any work activity directly over any existing facilities.

- *Ground Personnel:*
 - To be familiar with the items noted on the Work Permit and to understand and execute the procedures communicated on the Hazard Assessment.
 - All workers are to be aware of the danger zones associated with working around equipment as well as understand that they are to have visual contact with the operator prior to moving near equipment.

- *Operators:*
 - It is their responsibility to be aware of their position in relation to any buried facility as well as the depth of cover of the buried facilities.

- *Company Chief Inspector:*
 - Ensure that a qualified member of the Inspection staff is assigned to the proposed work location.
 - The Chief Inspector shall ensure that all elements of the Company Contractor Safety Manual related to work on above or below grade facilities are communicated and followed by the Company Site Inspector.

- *Company Site Inspector:*
 - The Company Site Inspector shall ensure that all “One Call” requirements have been met and all existing facilities are identified and marked.
 - The Company Site Inspector shall complete a Work Permit and issue to the affected work crew.
 - The Company Site Inspector shall monitor and participate in the daily tailgate meeting and provide feedback on any hazards related to the scope of work.
 - Site Inspectors shall be present at the immediate ground disturbance work area at all times during this operation.
 - All work shall stop if the Site Inspector must leave the immediate work area.

14.7.3 Safe Work Practices: Working over Buried Facilities

Approvals for ground disturbance work activity over or near existing facilities are site specific and not a “blanket” procedure. The foreman shall have the most current and up to date pothole log in his possession to compare with the markings on existing flags/stakes along the right of way.

14.7.4 Required Equipment

Inspectors shall be equipped with an adequate means of communications to notify the necessary personnel in the event of an emergency, line contact, personal injury, etc. Cellular phones may not be adequate due to limited coverage areas and communication towers.

14.7.5 Required activities prior to starting the workday

- The Company Chief Inspector shall be notified and approve all work over buried facilities.
- The Company Site Inspector must verify that the local “One Call” Authority has been contacted and all underground facilities located and marked.
- The Company Site Inspector will verify the completion of a four way line sweep within the Right of Way or area of work. The Company Site Inspector shall request a copy of the documented line sweep results.
- The Company Site Inspector shall confirm all existing and below grade facilities have been properly located and marked by means of pot holing and hand probing.
- Pothole logs shall be verified by comparing the date and “depth of cover” markings listed on the flag. If no pothole log is available and no flagging is present, the Foreman shall notify the Company Site Inspector and request the intended work area be surveyed by a means of potholing and hand probing.
- The Foreman and Company Site Inspector shall communicate the daily work activities and associated hazards to the affected crew members conducting ground disturbance work and conduct a walkthrough of the intended work area.
- If there will be sheet piling a detailed ground disturbance plan must be submitted to the Company for review and approval for each location.
- A non-destructive method for potholing will be used such as “hydrovac” or hand digging. No mechanical equipment will be used over the hotlines.
- Required activities prior to ground disturbance work commencing
- The Company Site Inspector and Foreman shall verify potholing at 60 meters/200 foot intervals along straight sections of ROW.
- The Company Site Inspector and Foreman shall verify potholing at 15 meters/50 foot intervals for a minimum distance of 60 meters/200 feet in each bar ditch of all roads, highway, railway, water body crossings, and either side of PI's. At least 1 pothole on each buried facility will be located within each wetland area.
- Barricade fence shall be installed to provide a buffer between the areas where mechanical equipment is allowed to operate and the shallow facility where 1 meter/3 feet depth of cover is identified.
- Barricade fence shall be installed in 8 meters/25 feet sections at no greater than 75 meters/250 feet intervals along the identified shallow facility. In areas with reduced extended visibility and/or significant changes in elevation, distance intervals may be reduced as

deemed appropriate by the Company Site Inspector. The fencing shall be placed at both ends of the shallow pipe indicating that the shallow pipe is between the fenced areas.

- All workers shall be familiar with color code marking systems. Utilize bicycle flagging for the line markers. (See Appendix V).
- For all bores and drills the Company requires a “pothole” window to be placed on the launch pit side in alignment with the bore/drill and a 0.6–1 meter/2-3 foot offset to any planned underground crossing of a communications line, fiber optic line, and foreign pipeline or Enbridge pipeline.

14.7.6 Restricted Equipment Activities

- The 10, 2, 1 foot rules for working near operating Pipelines shall be adhered to at all times. (See Appendix w).
- Only Low Ground Pressure Tracked Equipment such as D6 LGP 36 inch Wide Pad and lower will be utilized near or over buried facilities and must be identified prior to starting work.
- Equipment used by the seeding contractors will be approved by Construction Management.
- Equipment can only operate at a 45 degree angle with existing buried pipelines.
- No turning of tracked equipment will be allowed over existing facilities.
- No work is allowed over facilities in wet or saturated soils without approval from Construction Management.
- Attachments of mechanical equipment shall not penetrate below original grade.
- All stakes and flagging shall be periodically maintained and must remain in place until final clean up.

14.7.7 Variance procedure for work over buried facilities

Interpretations and changes to this procedure are only authorized by completing a documented variance request (See Appendix A).

The following procedure shall be utilized whenever ground disturbance is taking place within 0.6 meters/2 feet of Enbridge facilities or a change in procedures is needed:

- The Contractor shall submit for approval, a work procedure complete with site specific drawings for working within 0.6 meters/2 feet of an existing Company facilities and/or third party facilities.
- All avenues shall be considered and noted in the procedures such as; (a) is an environmental variance request required for the activity, (b) what is the safest and most economical approach.
- Company Project Execution Lead or equivalent shall review the contractor’s proposed procedure and verify the procedure is acceptable. This shall include soil stability and necessary precautions to prevent damage to existing facilities.
- Operations shall be contacted to determine and to verify if any conditions exist that would restrict construction within 0.6 meters/2 feet of Enbridge pipelines. Operations will review and approve the contractor’s proposed procedure for Enbridge facilities only.
- The Contractor will conduct One-calls and verify existing lines have been properly located and marked;
- The Contractor shall notify the assigned Company Site Safety Inspector of the task, location and time. Construction Safety Coordinator or appropriate Company personnel will review the procedure to ensure compliance with all Safety Regulations.
- The Contractor shall determine the distance, location and depth of the existing facilities by following the requirements set forth in the Company Contractor Safety Program.

These locations will be properly marked showing the location and depths of the existing Pipeline.

- Company Construction Inspection will issue a site specific Construction Work Permit prior to any ground disturbance taking place.
- The Contractor and the Company Construction Inspection will conduct a tailgate safety meeting with all workers involved with this ground disturbance prior to work activities taking place to review the Hazard Assessment and Daily Work Permit.
- The Contractor shall ensure that a Company Site Inspector and/or Company Operations Representative (PLM) are on site during ground disturbance activities.



Contractor Safety Variance Request

This form is required to be completed and approved for any variance to the practices, procedures or expectations as outlined in the Contractor Safety Program or the Contractor Safety Manuals.

Date _____
Contractor _____
Project / AFE _____

Current Practice / Procedure

Requested Variance*

Proposed Practice / Procedure

Justification/ Risk Assessment

Originator's Signature

Regional/Construction Safety Coordinator

Area Supervisor / Project Execution Director

**GM / Manager of Construction Safety

Conditions of Approval _____

* Note: Variances are only applicable to a specific project and do not create policy. All variances will be reviewed during annual reviews of the Safety Management System.

** The Regional Manager (OPS) /Manager of Construction Safety (Construction) has final approval of all variances.

PRE-BID MEETING GUIDELINES

Location: _____ Date: _____

Contractor(s): _____

Contract # _____ AFE # _____

Use these guidelines to conduct the pre-bid meetings with Contractors. These guidelines will ensure Contractors have the knowledge and understanding of the specific safety requirements to complete their work for Enbridge, herewith referred to as the Company. These guidelines focus on the safety requirements for typical duties performed by Contractors. For more information, see the Construction Safety Manual/Program.

INSTRUCTIONS

1. Before conducting the meeting, review the Pre-Bid Meeting Guidelines.
2. Determine and discuss the topics pertinent to the work and check the box to the left of the topic.
3. Gather the materials to conduct the meeting.
4. Provide the Contractor(s) with a copy of the Construction Safety Manual
5. Complete the Meeting Checklist form and distribute copies.
6. If necessary, refer to the Construction Safety Manual for more information.

MATERIALS (CHECK APPLICABLE)

- Construction Safety Manual/Program
- Pre-Bid Meeting Guidelines Checklist form
- Health & Safety and Environmental Policies
- Attendance record

A. GENERAL PROJECT INFORMATION

1. INTRODUCTION:

- Introduce the meeting participants and guests, and sign an attendance sheet
- Define the roles and responsibilities of the Company and Contractor attendees

2. BONDING/INSURANCE REQUIREMENTS:

- Performance bond
- Comprehensive general liability insurance
- Automobile liability insurance
- Contractor's equipment insurance
- Other additional insurance as required
- Proof of registration and good standing with the Worker's Compensation Board of the Province/State having jurisdiction

3. SCHEDULE:

Contractor will be requested to:

- Submit a work schedule (overall and two shift look ahead)
- Highlight key times or dates (bid close, bid award, start, finish and/or outage requests)
- Provide monthly progress updates and changes that will affect overall completion date (Discuss weekly meeting and intent)

4. HOURS OF WORK:

- Review with Operations when permit can be obtained (may influence start and stop)
- Normal start and stop times
- Days on and off
- Extended hours (any schedule changes must be approved by the Company)
- Weekend work
- Weather delays

5. CREW SIZE:

- Number of expected workers (maximum) at peak, including Subcontractors

6. PROJECT DESCRIPTION / NOTIFICATION:

- Project details, including why the work is required and what should be accomplished
- Expectations of Contractor quality and control (ie. competent workers, documentation)
- Review need for applicable external permit (i.e. notice to construct)

7. TECHNICAL:

- Clarification of outstanding technical issues relating to the project
- Material transport, supply and storage requirements; how to and who unloads material
- Questions and answers about project

8. AS BUILTS:

- Maintained up-to-date
- Reviewed weekly with site representative

9. SITE PROJECT SPECIFIC DETAILS:

- Laydown area
- Fab area
- Smoking area
- Contractor office and lunch trailer area
- Parking
- Security requirements (restricted areas, access to work area, construction gates)
- Permitting
- Power, electricity, telephone supply

B. SAFETY INFORMATION

NOTE: For more safety details, see the Construction Safety Manual/Program.

1. FOREWORD:

- Safety is of prime importance to Enbridge
- The Company is committed to continuous improvement
- Expectations:
 - Be pro-active, not reactive. Contractor supervisor or safety representative to closely evaluate the safety of the work for which the Contractor is responsible
 - Contractor will be familiar with and comply with all Federal, Provincial/State, and/or Municipal OHS Acts, Regulations, and Codes applicable to the work.
 - Contractor will be familiar with and have knowledge of the safety manuals (own and Company's)

2. Health & Safety and Environmental Policies

- Contractors must follow, as a *minimum*, the Company's Health & Safety and Environmental Policies
- Contractors to be provided with copies of the Company's Health & Safety and Environmental Policies

3. INTENT:

- To achieve an incident frequency rate below construction industry averages
- To have zero recordable incidents (vehicle incidents, property damage, days away, and medical aid injuries) on this project
- To ensure every individual exerts every effort, as reasonably practicable, to eliminate the hazards and the associated risks to prevent the occurrence of an incident

4. RESPONSIBILITIES (SAFETY):

The Company:

- On site, the Company Site Inspector is responsible to implement the Enbridge Construction Safety Program
- All Company workers and their representatives have the authority to stop work when:
 - There is a serious violation of Company or government requirements
 - There is a failure to correct a violation that could result in an incident (injury or damage to property/equipment)
 - The likelihood of an injury or damage to property/environment is imminent
- The Company will monitor the work to ensure compliance of safety rules and procedures by performing field inspections and/or incident investigations

The Contractor:

- No work shall be performed if the Contractor's Safety Representative/Supervisor is not on the project site or actively engaged in his/her duties. The Contractor will have representation by means of:
 - A Supervisor or Worker Safety Representative when the Contractor has 15 people or less on site
 - A full-time Safety Representative when the Contractor has 16 or more people on site (additional representation may be required if deemed necessary)
- The Contractor's Safety Representative/Supervisor will:
 - Be familiar with and comply with all Acts, Regulations, and Codes applicable to the work
 - Be thoroughly familiar and in compliance with the Construction Safety Manual/Program
 - Be on site for the duration of the project
 - Provide verification of training for Contractor and Subcontractor workers who perform the necessary tasks associated with the work, which may include:

<input type="checkbox"/> First aid/CPR	<input type="checkbox"/> Lockout procedures
<input type="checkbox"/> Confined space entry	<input type="checkbox"/> Operator certification/competencies
<input type="checkbox"/> Call protection	<input type="checkbox"/> Excavations/ground disturbance

- | | |
|---|--|
| <input type="checkbox"/> Hoisting and rigging | <input type="checkbox"/> Journeymen certification |
| <input type="checkbox"/> Fire extinguisher | <input type="checkbox"/> Personal protective equipment |
| <input type="checkbox"/> Air monitoring/gas detection | <input type="checkbox"/> WHMIS/TDG (CAN) |
| <input type="checkbox"/> Scaffolding | <input type="checkbox"/> HAZMAT/HAZWOPER (USA) |
| <input type="checkbox"/> Elevated work platforms | <input type="checkbox"/> CSTS or PSC training |
- Ensure that Provincial/State OHS Acts, Regulations and Codes are on site (or electronically accessible), made available to workers and pertinent sections are periodically reviewed with workers. (i.e. Worker and Supervision responsibilities)
 - All foremen or supervisors who direct personnel must meet minimum Company-approved safety training requirements (Refer to Section 5.2)
 - Remove any contract worker from the site who does not comply with the safety policies and procedures
 - Conduct formal and informal safety inspections
 - Make available to workers the Enbridge Construction Safety Manual/Program
 - Maintain at site all the necessary safety equipment and tool certifications
- The Contractor's workers will:
- Follow safe work practices
 - Wear all required personal protective clothing and equipment
 - Report all incidents immediately
 - Understand their right to refuse to perform unsafe work
 - Ask questions if more information or clarification is required
 - Be familiar with and comply with all Acts, Regulations, and Codes applicable to the work

5. PROJECT REQUIREMENTS:

- The Contractor shall be registered with ISNetworld, and participate with the review and verification (RAVS) process
- The Contractor shall make available copies of their Health and Safety Program/Manual to the Company Site Safety Inspector
- Visitors and access must be approved by Company Site Inspector or Operations, where applicable
- Contractor to provide and maintain adequate clean toilet and washing facilities
- Portable toilet facilities must be secured, maintained, and clean
- Contractor to provide gas detection equipment and bump/calibration gas
 - Personal Monitors: 4-head (H2S/CO/O2/LEL) or single H2S may be required
 - Area Monitors: 4-head gas detection monitor may also be used
- Contractor must perform functional bump tests on gas detector(s) prior to each day's use, as per manufacture's specifications
- Documentation of calibration and bump testing must be kept at the bump test station

Safety Orientation (two parts)

- Basic Safety Orientation
- Site Specific Orientation
 - Contractor to have their own project orientation program to familiarize new workers with their own rules, policies, procedures, site specific hazards and any other relevant requirements. This orientation shall be presented to the Company for approval, prior to commencement of the project.

6. HAZARD ASSESSMENT, ELIMINATION, AND CONTROL:

Contractors shall:

- Prior to work commencing, prepare a written pre-job hazard assessment, identifying and defining critical tasks with identification, assessment and control of any associated hazards. A copy shall be provided to the Company for review prior to site mobilization
- Provide adequate notice and scope definition to the Company Site Inspector when requesting Safe Work Permits. The Company Site Inspector will request the work to be deferred if either of these expectations is not met
- Assist in completing the hazard assessment contained in the daily work permit
- If required, perform task hazard assessments utilizing the daily toolbox forms

- Ensure the results of all hazard assessments are communicated to the affected workers
- Ensure that workers continually re-assess hazards as work progresses
- Ensure a new hazard assessment is completed when the scope of work or conditions change

7. EMERGENCY PREPAREDNESS

- Prepare a detailed written emergency response plan (ERP) prior to the work commencing (Refer to Section 7.1)
- Site ERP shall include, but is not limited to:
 - Primary and alternate evacuation areas
 - Emergency exit gate locations
 - Head count
 - No smoking in assembly areas
 - Wind socks
 - Alarms/sirens
 - Emergency numbers (internal, external & Contractor)
 - STARS communication procedures (where applicable)

Incident Reporting

- Immediately report all incidents (close call, first aid, medical aid, days away, Company property damage and Contractor vehicle incidents) to the Company Site Inspector
- Within two working days, submit a written report to the Company Site Inspector

Statistical Reporting

- Provide the total number of hours worked and the number of first aid, medical aid or days away injuries for Contractor and Subcontractor personnel

First Aid Requirements

- Provide adequate first aid supplies and equipment in a clean, accessible dry location
- Provide adequate signage, posted in a conspicuous place, showing location of first aid supplies and equipment
- Provide trained and qualified personnel to render first aid treatment
- Provide a suitable means of transporting injured workers, as required
- Meet first aid requirements, in accordance with the first aid regulations for the locations where the work takes place

Fire Prevention and Protection

- Provide at least the minimum number of fire extinguishers:
 - two 20 lb dry-chemical fire extinguishers in each work area
 - one 20 lb dry-chemical fire extinguisher within 7.6 m (25 ft.) of refuelling or fuel storage area
 - one 20 lb dry-chemical fire extinguisher on each welding vehicle
 - one 20 lb dry-chemical extinguisher in each storage and lunch trailer
 - one 10 lb dry-chemical extinguisher mounted on each piece of power mobile equipment
- Ensure extinguishers are in working order, tagged and inspected monthly

8. SAFE WORK PERMITS:

- Contractors require a minimum of one daily Construction Work Permit, valid for a maximum period of 12 hours
- Each afternoon, the Contractor must review with the Company Site Inspector the planned work activities for the following day and, together, they must complete a Safe Work Permit form
- Contractor signs as being the Receiver of the permit and all Contractor workers must understand all of the conditions outlined on the permit.
- Confined space entry requires unique permit procedures and a safe work procedure

9. PERSONAL PROTECTIVE EQUIPMENT:

- Minimum PPE includes:

- Hard hats must be worn at all times except when sheltered in motor vehicles, equipment with enclosed cabs or specified areas within buildings (Welders actively engaged in welding must wear hard hats, as per Provincial/State regulations)
- Steel-toed boots (CSA Grade 1 or ANSI approved) must be worn at all times
- Shin and metatarsal guards must be worn if working with or around equipment that poses a risk to feet or shins (i.e. jumping jack compactors, jack hammers, etc)
- Safety glasses with side shields or goggles are required at all times (must meet CSA/ANSI standards)
- Hearing protection, when applicable
- Limb and body protection, such as properly fitting hand, arm, leg or body protective equipment, must be worn when there is a danger to hands, arms, legs or trunk of body
- For protection against flash fires, Contractor personnel must wear flame resistant (FR) clothing as the outer garment. Fabrics must meet the CAN/CGSB 155.20 or the NFPA 2112 standard. Rainsuits must be labelled "flame resistant", meet the NFPA 701 or CGSB 155.2 standard, and be worn over the FR clothing.
- High visibility apparel must be worn (CLASS 2), as required
- Respiratory Protection Plan shall be submitted to the Company Site Inspector and should include worker training, fit-testing, cleaning and storage procedures

10. SAFE WORK PRACTICES:

Abrasive Blasting

- Appropriate respiratory protection must be utilized
- Abrasive medium selection must be in accordance with Provincial/State regulations and/or Company approval

Electrical Safety

- The Contractor is responsible to provide electrical testing equipment (i.e. voltmeters, high voltage probes, and high voltage gloves) to verify that electrical lines/equipment are de-energized and safe to work on
- Electrical cords used for outside construction must be GFCI protected
- Proper signage is required at approaches to overhead lines

Spark Arrestor and Positive Air Shutoff

- Positive air shut-off and spark arrestors are required on diesel-driven equipment when operated in hazardous or restricted areas.
- Turbo charged engines are exempt for spark arrestors
- Exemptions will be granted for service or delivery type vehicles if continuous air monitoring occurs

Refuelling

- Use only approved containers complete with all components
- Fuel storage tanks and portable containers must be appropriately labelled as per WHMIS/TDG requirements
- Grounding is required for the fuel storage tank
- Bonding is required between the fuel source and the vehicle/equipment/container being refuelled.

Backup Alarms

- Required on all heavy equipment (including bobcats), on all trucks over ¾ ton, and on any vehicle where rear vision is partially or totally obstructed

Excavation and Safeguarding Pipelines and Facilities

- Company to surface locate and stake existing facilities
- Contractor to day-light by hand-exposing or by water-washing
- Contractor must obtain all external permits required for excavation (i.e. Manitoba requires an excavation registration number)
- Contractor must provide a competent person to be onsite to supervise the excavation at all times

- Contractor representative, operator and spotter are to have Ground Disrurbance Level Two training.
- Standby person must be stationed on surface to direct operator of excavating equipment or to observe workers required to enter a trench (as per regulations)
- Shoring must be certified by a professional engineer, as required
- Drawings and instructions for installing shoring must be maintained on site
- Support of adjacent structures must be certified by a professional engineer

Safeguards, Barricades and Warning Signs

- Any work that may endanger workers shall be identified by suitable barricades, working signs or flashing lights
- Unattended excavations left overnight require barricades or a snow fence and must be properly supported

Scaffolds

- Must be erected and dismantled under the supervision of a competent person
- Must be inspected and tagged by competent person
- Must be installed as per applicable OH&S regulations

Swing Stages and Work Cages

- Load rating must be clearly labelled and visible
- Work platform must be designed and certified by a professional engineer

Powered Elevating Work Platforms

- Workers must be competent in use of the model being used

Manbaskets

- Copy of certification must be available

Welding and Cutting

- Minimum of two 20-lb fire extinguishers must be immediately available in the work area
- Flashback arrestors are required at regulator end of hoses

11. CHARACTERISTICS OF PRODUCTS PUMPED:

- Appropriate MSDSs must be made available upon request

12. WAREHOUSE AND STORAGE DEPOT:

- Dangerous goods must have Transportation of Dangerous Goods (TDG) documentation

13. SPECIALIZED PERSONNEL:

- when applicable, trained and competent workers may be required for the following positions:
 - Attendant Safety Watch, for confined space entry
 - Spark or Fire Watch
 - Equipment Spotter(s)
 - Flag Person(s) or Signal Person(s)
 - Safety Watch, for work within substations

SAFETY RECOGNITION:

- Review requirements if applicable

Signature of Enbridge Safety Representative

Signature of Contractor Representative

PRE-JOB MEETING GUIDELINES

Location: _____ Date: _____

Contractor(s): _____

Contract # _____ AFE # _____

Use these guidelines to conduct the pre-job meetings with Contractors. These guidelines will ensure Contractors have the knowledge and understanding of the specific safety requirements to complete their work for Enbridge, herewith referred to as the Company. These guidelines focus on the safety requirements for typical duties performed by Contractors. For more information, see the Construction Safety Manual/Program.

INSTRUCTIONS

1. Before conducting the meeting, review the Meeting Guidelines.
2. Determine and discuss the topics pertinent to the work, and check the box to the left of the topic.
3. Gather the materials to conduct the meeting.
4. Provide the Contractor(s) with a copies of the handouts, manuals and booklets that are required during the meeting.
5. Complete the Meeting Checklist form and distribute copies.
6. If necessary, refer to the Construction Safety Manual/Program for more information.
7. Complete a safety orientation for those at the pre-job meeting. Identify the Contractor representative (if applicable) who will conduct safety orientations for the Contractor's personnel. Ensure the Contractor representative understands the information provided and the orientation process.

MATERIALS (CHECK APPLICABLE)

- TV, complete with VCR/DVD player
- "Your Safety is on the Line" video
- "NGL Planned Ignition" video
- Safety and Environmental Guidelines for Contractors Handbook
- Safety orientation hard hat decals
- Construction Safety Manual/Program
- Additional information from the company's Operating & Maintenance Procedures
- Pre-Job Meeting Guidelines Checklist form
- Site Safety Plot Plan
- Emergency Procedures and Evacuation Plan
- Incident Report form
- Field Inspection form
- Health & Safety and Environmental Policies
- Contractors Safety Meeting form
- Monthly Safety Analysis form
- Contractor Safety Award Record form
- Attendance record

A. GENERAL PROJECT INFORMATION

1. INTRODUCTION:

- Introduce the meeting participants and guests, and sign an attendance sheet
- Define the roles and responsibilities of the Company and Contractor attendees

2. BONDING/INSURANCE REQUIREMENTS:

- Performance bond
- Comprehensive general liability insurance
- Automobile liability insurance
- Contractor's equipment insurance
- Other additional insurance as required
- Proof of registration and good standing with the Worker's Compensation Board of the Province/State having jurisdiction

3. SCHEDULE:

Contractor will be requested to:

- Submit a work schedule (overall and two shift look ahead)
- Highlight key times or dates (bid close, bid award, start, finish and/or outage requests)
- Provide monthly progress updates and changes that will affect overall completion date (Discuss weekly meeting and intent)

4. HOURS OF WORK:

- Review with Operations when permit can be obtained (may influence start and stop)
- Normal start and stop times
- Days on and off
- Extended hours (any schedule changes must be approved by the Company)
- Weekend work
- Weather delays

5. CREW SIZE:

- Number of expected workers (maximum) at peak, including Subcontractors

6. PROJECT DESCRIPTION / NOTIFICATION:

- Project details, including why the work is required and what should be accomplished
- Expectations of Contractor quality and control (ie. competent workers, documentation)
- Review need for applicable external permit (i.e. notice to construct)

7. TECHNICAL:

- Clarification of outstanding technical issues relating to the project
- Material transport, supply and storage requirements; how to and who unloads material
- Questions and answers about project

8. AS BUILTS:

- Maintained up-to-date
- Reviewed weekly with site representative

9. SITE PROJECT SPECIFIC DETAILS:

- Laydown area
- Fab area
- Smoking area
- Contractor office and lunch trailer area
- Parking
- Security requirements (restricted areas, access to work area, construction gates)
- Permitting
- Power, electricity, telephone supply

B. SAFETY INFORMATION

NOTE: For more safety details, see the Construction Safety Manual/Program.

1. FOREWORD:

- Safety is of prime importance to Enbridge
- The Company is committed to continuous improvement
- Expectations:
 - Be pro-active, not reactive. Contractor supervisor or safety representative to closely evaluate the safety of the work for which the Contractor is responsible
 - Contractor will be familiar with and comply with all Federal, Provincial/State, and/or Municipal OHS Acts, Regulations, and Codes applicable to the work.
 - Contractor will be familiar with and have knowledge of the safety manuals (own and Company's)

Health & Safety and Environmental Policies

- Contractors must follow, as a *minimum*, the Company's Health & Safety and Environmental Policies
- Contractors to be provided with copies of the Company's Health & Safety and Environmental Policies

2. INTENT:

- To achieve an incident frequency rate below construction industry averages
- To have zero recordable incidents (vehicle incidents, property damage, days away, and medical aid injuries) on this project
- To ensure every individual exerts every effort, as reasonably practicable, to eliminate the hazards and the associated risks to prevent the occurrence of an incident

3. VARIANCES:

- The Company's Construction Safety Manual/Program is a minimum standard and where exceeded by the Contractor's own manual or Federal, Provincial/State, and/or Municipal Acts, Regulations and Codes, the more stringent standard will govern.
- Any and all variances to Federal, Provincial/State, and/or Municipal Acts, Regulations and Codes pertaining to health and safety MUST be obtained by the Contractor
- The Contractor shall provide the construction/regional safety coordinator with a copy of the variance, containing the name and phone number of the issuing office
- Any deviation must be carefully considered and approved by the respective Company Management
- Prior to the variances being considered, a Variance Form (See Appendix A) must be completed
- This document (Pre-Job Meeting Guidelines) must be kept on file with the project documentation

4. RESPONSIBILITIES (SAFETY):

The Company:

- On site, the Company Site Inspector is responsible to implement the Enbridge Construction Safety Program
- All Company workers and their representatives have the authority to stop work when:
 - There is a serious violation of Company or government requirements
 - There is a failure to correct a violation that could result in an incident (injury or damage to property/equipment)
 - The likelihood of an injury or damage to property/environment is imminent
- The Company will monitor the work to ensure compliance of safety rules and procedures by performing field inspections and/or incident investigations

The Contractor:

- At the beginning of the project the Contractor will:
 - Make available to inspection a copy of their health and safety manual for review

- Have a process in place for Subcontractor selection
- Develop and provide a Project Safety Plan to the respective Regional Safety Coordinator/Site Inspector prior to commencement of the work. (Refer to Section 5.1.1)
- Submit certificates of approved training requirements of their safety representative
- Have appropriate plans, programs or policies in place, including but not limited to:
 - Drug and Alcohol
 - Fatigue Management (5.14)
 - After Hours Work (5.15)
 - Severe Weather (5.25)
 - Modified Work
 - Emergency Medical Response, meeting the Provincial/State first aid requirements
 - Emergency Response, meeting the requirements of Section 7 (workers must be familiarized with this plan during orientation.)
 - Workplace Violence
 - Work in the Dark (5.16)
 - Working Alone (5.17)
 - Preventative Maintenance (5.29)
- Have processes in place that will meet the hazard assessment requirements
- Have current MSDSs available for applicable products
- No work shall be performed if the Contractor's Safety Representative/Supervisor is not on the project site or actively engaged in his/her duties
- The Contractor's Safety Representative/Supervisor will:
 - Be familiar with and comply with all Acts, Regulations, and Codes applicable to the work
 - Be thoroughly familiar and in compliance with the Construction Safety Manual/Program
 - Be on site for the duration of the project
 - Provide verification of training for Contractor and Subcontractor workers who perform the necessary tasks associated with the work, which may include:
 - First aid/CPR
 - Confined space entry
 - Call protection
 - Hoisting and rigging
 - Fire extinguisher
 - Air monitoring/gas detection
 - Scaffolding
 - Elevated work platforms
 - Lockout procedures
 - Operator certification/competencies
 - Excavations/ground disturbance
 - Journeymen certification
 - Personal protective equipment
 - WHMIS/TDG (CAN)
 - HAZMAT/HAZWOPER (USA)
 - CSTS or PSC training
 - Verify proof of minimum Company-approved safety training before commencing work, and maintain at site copies of all safety training certificates held
 - Ensure that Provincial/State OHS Acts, Regulations and Codes are on site (or electronically accessible), made available to workers and pertinent sections are periodically reviewed with workers. (i.e. Worker and Supervision responsibilities)
 - Ensure that in Saskatchewan or Manitoba that safety committee or representative requirements are met
 - Ensure a minimum of two qualified safety persons are present on site. Additionally, all foremen or supervisors who direct personnel must meet minimum Company-approved safety training requirements (Refer to Section 5.2)
 - Ensure the safety of the Contractor's and the Subcontractor's workers
 - Remove any contract worker from the site who does not comply with the safety policies and procedures
 - Conduct formal and informal safety inspections
 - Make available to workers the Enbridge Construction Safety Manual/Program
 - Conduct scheduled safety meetings and forward the meeting minutes to the Company Site Inspector (one per week/shift)
 - In addition to safety meetings, on a weekly basis, a foreman/superintendent safety meeting will be held and the minutes submitted to inspection. The Contractor will be given a copy of the Contractors Safety Meeting form
 - Submit a Monthly Safety Analysis before invoicing (if required)
 - Orient each new or transferred worker or Subcontractor worker before commencing work
 - Ensure daily tailgate safety meetings are being held and documented
 - Maintain at site all the necessary safety equipment and tool certifications
 - Ensure proper tools, equipment and materials are available and used in a manner for which they are designed

- Ensure the workers have and are wearing/using the required personal protective equipment (PPE)
 - Provide workers with responses to any regulatory concerns regarding occupational health and safety requirements
 - Inform workers of potential hazards in the workplace and advise of precautionary measures/controls
 - Continually identify hazards, assess risks, and implement controls
 - Administer and reiterate the Company's and the Contractor's construction safety practices and procedures
 - Ensure injured persons have received appropriate medical attention
 - Report and investigate all incidents with the Project Safety Inspector and ensure that oral and written reports are completed as required
- The Contractor's workers will:
- Follow safe work practices
 - Wear all required personal protective clothing and equipment
 - Report all incidents immediately
 - Understand their right to refuse to perform unsafe work
 - Ask questions if more information or clarification is required
 - Be familiar with and comply with all Acts, Regulations, and Codes applicable to the work
 - Use the appropriate tools and equipment for the job as per the manufacture's recommendations and operate machinery and equipment only if qualified and authorized to do so
 - Remove from service any defective tools, equipment, structures, and any worn or defective personal protective equipment/clothing
 - Immediately report all unsafe conditions or acts to the Contractor's Safety Representative/Supervisor
 - Actively participate in required project meetings

5. PROJECT REQUIREMENTS:

- The Contractor shall be registered with ISNetworld, and participate with the review and verification (RAVS) process
- The Contractor shall make available copies of their Health and Safety Program/Manual to the Company Site Safety Inspector
- The Contractor shall be prepared to demonstrate their process and justify selections based on their established criteria and shall submit their Subcontractor's safety programs upon the Company's request
- The Contractor shall develop and provide a Project Safety Plan to the Regional Safety Coordinator prior to commencement of the work. (Refer to Section 5.1.1)
- All Contractors shall familiarize themselves with the sections of the Construction Safety Manual/Program that apply to their work and the Contractor shall ensure that each worker receives a copy of the summary of this manual in handbook form, titled "*Safety & Environmental Guidelines for Contractors Handbook*"
- The Contractor shall ensure that each worker has received the annual Enbridge Safety and Environmental Orientation prior to commencing work
- For Construction Projects, the Company's video "*Your Safety is On the Line*" must be viewed. (Refer to Section 5.4)

General Requirements

- Visitors and access - verify with Operations
- Vehicles and parking - verify with Operations
- Contractor to provide and maintain adequate clean toilet and washing facilities
- Portable toilet facilities must be secured, maintained, and clean
- Alcohol, drugs, cameras, firearms and illicit pornographic photographs are prohibited
- Smoking is only permitted in designated areas, and otherwise prohibited (including the use of strike anywhere matches or butane)
- Cellular phones are prohibited in hazardous or restricted areas
- Housekeeping

- Maintained at all times
 - Keep walkways clear
 - Remove trash/trash bins, as required
 - Remove slipping and tripping hazards
 - Store materials appropriately
- Contractor to provide gas detection equipment and bump/calibration gas
- Contractor must perform functional bump tests on gas detector(s) prior to each day's use, as per manufacture's specifications
- Documentation of calibration and bump testing must be kept at the bump test station

Safety Orientation (two parts)

- Basic Safety Orientation
- Allow two hours per orientation
 - All Contractor personnel must read, complete, sign and return the last page of the "Safety & Environmental Guidelines for Contractors Handbook" to the Company Site Inspector
 - Upon completion of the "Your Safety is on the Line", Contractor personnel must complete the questionnaire at the back of the handbook and return to completed form to the Company Site Inspector
 - A minimum of one basic safety orientation is required per calendar year per worker
 - Company Site Inspector will issue a hard hat decal to indicate that the basic orientation has been completed
- Site Specific Orientation
- Each worker must be given a site specific orientation before work commences
 - Review the pertinent information found in Section 5.5 of the Construction Safety Manual/Program
 - The orientation is to include information about the function and purpose of the flashing lights in the ESB, as well as the lights at Line 1 pump shelter, if applicable. (Refer to Section 5.5)
 - Contractor to have their own project orientation program to familiarize new workers with their own rules, policies, procedures, site specific hazards and any other relevant requirements. This orientation shall be presented to the Company for approval, prior to commencement of the project.

6. HAZARD ASSESSMENT, ELIMINATION, AND CONTROL:

Contractors shall:

- Prior to work commencing, prepare a written pre-job hazard assessment, identifying and defining critical tasks with identification, assessment and control of any associated hazards. A copy shall be provided to the Company for review prior to site mobilization
- Provide adequate notice and scope definition to the Company Site Inspector when requesting Safe Work Permits. The Company Site Inspector will request the work to be deferred if either of these expectations is not met
- Assist in completing the hazard assessment contained in the daily work permit
- If required, perform task hazard assessments utilizing the daily toolbox forms
- Ensure the results of all hazard assessments are communicated to the affected workers
- Ensure that workers continually re-assess hazards as work progresses
- Ensure a new hazard assessment is completed when the scope of work or conditions change
- Ensure warning signs identifying known hazards are posted to warn workers and others in the area of the specific hazard

7. EMERGENCY PREPAREDNESS/RESPONSE/REPORTING:

Emergency Evacuation Procedures

- Prepare a detailed written emergency response plan (ERP) prior to the work commencing (Refer to Section 7.1)
- Site ERP shall include, but is not limited to:
- Primary and alternate evacuation areas
 - Emergency exit gate locations
 - Head count

- No smoking in assembly areas
- Wind socks
- Alarms/sirens
- Emergency numbers (internal, external & Contractor)
- STARS communication procedures (where applicable)
- Provide a copy of the most current site safety plot plan, to be posted in trailer (verify with Operations)
- The Company may, at any time, perform a mock evacuation exercise

Incident Reporting

- Immediately report all incidents (close call, first aid, medical aid, days away, Company property damage and Contractor vehicle incidents) to the Company Site Inspector
- In the event of an incident, immediately shut down the work in the immediate area until the work can be safely resumed.
- In the event of a major injury, shut down the entire jobsite. Contact Provincial/State OHS regulators, as required. Do not disturb the scene; only as required to prevent further damage or injury
- Within two working days, submit a written report to the Company Site Inspector
- Written reports must include details of any treatment given at a medical facility
- Work with inspection to complete an investigation and submit the Contractor investigation to inspection.
- Ensure a Physicians Report form is completed for days away or modified work incidents and is submitted with an Incident Investigation report
- Contractor to be given a copy of the Incident Report form

Statistical Reporting

- Provide the total number of hours worked and the number of first aid, medical aid or days away injuries for Contractor and Subcontractor personnel
- Contractor to be given a copy of the Monthly Safety Analysis form

First Aid Requirements

- Provide adequate first aid supplies and equipment in a clean, accessible dry location
- Provide adequate signage, posted in a conspicuous place, showing location of first aid supplies and equipment
- Provide trained and qualified personnel to render first aid treatment
- Post near first aid station(s) the names of trained and qualified first aid personnel
- Provide a suitable means of transporting injured workers, as required
- Meet first aid requirements, in accordance with the first aid regulations for the locations where the work takes place

Fire Prevention and Protection

- Provide at least the minimum number of fire extinguishers:
 - two 20 lb dry-chemical fire extinguishers in each work area
 - one 20 lb dry-chemical fire extinguisher within 7.6 m (25 ft.) of refuelling or fuel storage area
 - one 20 lb dry-chemical fire extinguisher on each welding vehicle
 - one 20 lb dry-chemical extinguisher in each storage and lunch trailer
- Ensure extinguishers are in working order, tagged and inspected monthly
- Supply and maintain adequate fire fighting equipment sufficient to respond to any expected fire emergencies
- Contractor to take all necessary precautions to prevent fires

8. INSPECTIONS:

- Keep works areas free of hazards
- Cooperate fully with the Inspectors
- Conduct informal safety inspections daily
- Perform formal documented weekly field inspections of the site (see Appendix N)

- Document corrective actions

9. SAFE WORK PERMITS:

- Contractors require a minimum of one daily Construction Work Permit, valid for a maximum period of 12 hours
- Contractor to arrange times with the Company Site Inspector for authorization calls and issuing of permit
- Permit extensions require approval and verification from the Company Site Inspector
- Each afternoon, the Contractor must review with the Company Site Inspector the planned work activities for the following day and, together, they must complete a Safe Work Permit form
- Contractor signs as being the Receiver of the permit and all Contractor workers must understand all of the conditions outlined on the permit.
- All workers must be made aware of any other permitted activities in their work area
- Contractor may be required to submit several separate requests for Construction Work Permits depending on the scope of work, as several operations/trades may be performing tasks
- Job Safety Analyses (JSAs) may be required for non-routine work and will be attached to the Construction Work Permit request (if applicable)
- At the end of the day, the signed and completed Construction Work Permit and the daily tool box talk for that activity (including the JSA, if applicable) will be placed together and filed by the Company Site Inspector
- A new permit must be issued if the scope of work or conditions change during the day. The Company Site Inspector must be informed of any such changes and hazards must be re-assessed prior to proceeding with the new work
- Contractor must perform only the work that is covered by the permit, and return the permit upon completion of that work or upon expiry of the permit
- Once the permit is returned and signed off, no other work will be performed
- Confined space entry requires unique permit procedures and a safe work procedure
- Contractor shall obtain a burning permit from the local authority prior to commencement of burning

10. PERSONAL PROTECTIVE EQUIPMENT:

- Hard hats must be worn at all times except when sheltered in motor vehicles, equipment with enclosed cabs or specified areas within buildings
- Welders actively engaged in welding must wear hard hats, as per Provincial/State regulations
- Steel-toed boots (CSA Grade 1 or ANSI approved) must be worn at all times
- For electrical work, dielectric soles (OMEGA - CAN) must be utilized
- Shin and metatarsal guards must be worn if working with or around equipment that poses a risk to feet or shins (i.e. jumping jack compactors, jack hammers, etc)
- Safety glasses with side shields or goggles are required at all times when working on site
- Hearing protection must be worn:
 - In posted areas where equipment is operating
 - When operating any piece of heavy equipment
 - When operating packing or tamping equipment
 - When operating percussion tools
 - Where noise levels exceed 85 decibels (dBA)
- Limb and body protection, such as properly fitting hand, arm, leg or body protective equipment, must be worn when there is a danger to hands, arms, legs or trunk of body
- High visibility apparel must be worn (CLASS 2)
 - When acting as a designated signaller or spotter
 - When working on or adjacent to roadways
 - When working near mobile earth-moving equipment, or
 - As directed by the applicable regulations
- For protection against flash fires, Contractor personnel must wear flame resistant (FR) clothing as the outer garment. Fabrics must meet the CAN/CGSB 155.20 or the NFPA 2112 standard. Rainsuits must be labelled "flame resistant", meet the NFPA 701 or CGSB 155.2 standard, and be worn over the FR clothing.

- For work activities where there is potential for the FR outerwear to become contaminated with flammable products (eg. tank cleaning or fibreglassing) impermeable FR rainsuits or FR fabric disposable coveralls may be worn over top
- Respiratory protection must be provided, fit properly and be worn when required
- Fall protection is required if working at or above:
 - 2.4 m (8 ft.) (CAN)
 - 1.8 m (6 ft.) (USA)
 - Iron workers are not exempt
- Contractor shall ensure workers are trained in the proper fit, use, limitations, cleaning, maintenance, and storage of personal protective equipment

11. SAFE WORK PRACTICES:

Blasting

- Detailed blasting and safety procedures must be submitted to the Company for approval
- Company requires 48 hours notice before detonation

Abrasive Blasting

- Appropriate respiratory protection must be utilized
- Exposure must be minimized
- Abrasive medium selection must be in accordance with Provincial/State regulations and/or Company approval

Compressed Air

- Not to be used to clean clothing, work benches or work areas
- Whip checks are required to secure quick connectors on all hose fittings

Confined Space Entry

- Compliance with the procedures in the Construction Safety Manual/Program (Section 11.4)
- Proper permits must be obtained and proper signage must be utilized
- Ensure affected workers are trained and qualified
- A Task Hazard Assessment and a Confined Space Entry Permit are required, and must be retained with permits as a permanent record

Hot Work in Enclosed Spaces

- Enclosed spaces include pump shelters/rooms, densitometers, and instrument or sample buildings
- Flame resistant barrier or partitions must be utilized
- Control ignition sources (i.e. use explosion-proof adaptor cords, where possible)
- Ensure adequate fire protection
- Provide a safety watch within the hazardous area, as required
- Provide gas detection equipment

Electrical Safety

- Electrical lines and equipment to be energized or de-energized by Company workers ONLY
- Electrical lines or equipment must be de-energized, locked out, grounded and tagged out before any work is performed on or around them
- The Contractor is responsible to provide electrical testing equipment (i.e. voltmeters, high voltage probes, and high voltage gloves) to verify that electrical lines/equipment are de-energized and safe to work on
- Any work that would require arc flash protection will be performed by Company workers ONLY, unless other arrangements have been made
- Metal ladders are not permitted
- Electrical cords must be approved three-wire type and in good repair
- Electrical cords used for outside construction must be GFCI protected
- As per manufacture's specifications, electrical equipment (i.e. generators) must be grounded
- Electrical equipment used in a hazardous area requires a Safe Work Permit for hot work

- Clearances to transmission lines and exposed electrical equipment must be in accordance with the Construction Safety Manual/Program for workers and equipment, unless otherwise exempt
- Proper signage is required at approaches to overhead lines
- Where equipment is in vicinity of overhead lines, a signal person must be used to ensure clearances are maintained
- Prior to conducting work in the substation, a safe work plan must be developed
- Water washing in a live substation requires an outage. Contact Company Site Inspector ahead of time if a variance is required
- Ensure limited access to ESB's
- A safety watch must be present within the substation for work to occur or for workers to enter the substation

Lockout Procedures

- Ensure a One Lock One Key system - one lock per person responsible
- Each trade to insert approved lock and tag on same clevis
- Tags to indicate "Do No Operate," and must be removed only by the person whose name appears on the tag
- In the event of an emergency, if safe to do so, locks and tags may be removed by a Company worker with approval from regional management
- Contractors shall provide a written procedure for removing locks when a worker is unavailable to remove their lock but has been confirmed to be safe

Spark Arrestor and Positive Air Shutoff

- Positive air shut-off and spark arrestors are required on diesel-driven equipment when operated in hazardous or restricted areas.
- Turbo charged engines are exempt for spark arrestors
- Exemptions will be granted for service or delivery type vehicles if continuous air monitoring occurs

Refuelling

- Use only approved containers complete with all components
- Fuel storage tanks and portable containers must be appropriately labelled as per WHMIS/TDG requirements
- Grounding is required for the fuel storage tank
- Bonding is required between the fuel source and the vehicle/equipment/container being refuelled.

- Refuelling is only permitted in designated safe area, where smoking is prohibited
- One 20 lb dry-chemical fire extinguisher is required within 7.6 m (25 ft.) of refuelling or fuel storage area

Vehicles and Mobile Equipment

- Obey posted speed limits
- No one is permitted to ride in truck box
- Driver must have a valid license for jurisdiction and type of vehicle
- Do not leave unattended vehicles/equipment running
- Seat belts must be worn at all times when vehicle/equipment is in motion
- Vehicles must be backed into parking spot when parking at site office trailers and designated parking areas
- Spotters are required for trucks and equipment in congested areas, while reversing, or where vision is obstructed
- Clear communication must be made with all drivers entering the site, regarding required PPE and spotter requirements

Backup Alarms

- Required on all heavy equipment (including bobcats), on all trucks over ¾ ton, and on any vehicle where rear vision is partially or totally obstructed
- Alarms must be audible above surrounding noise levels and must operate automatically when the vehicle/ equipment controls are positioned to move in reverse

Mobile Hoisting Equipment

- Proper equipment for hoisting must be utilized
- Log books must be kept (in accordance with NSC/DOT requirements)
- Operator must be certified and rigger must be competent/qualified
- Signal person must be present
- Cranes to be equipped with anti-two-block device and load indicator, if applicable
- Provide planning requirements for "critical" and "serious" lifts
- Ensure accurate weights and lifting techniques for transported skid racks, etc.
- Manufacturer's recommendations are to be followed for any hoisting done with a zoom boom.
- Zoom boom and forklift operators must meet Provincial/State training requirements for operation of that equipment.
- Tag lines are to be used when rotation or uncontrolled motion or a load being hoisted is anticipated
- Workers should never be positioned on or under the load, or between the load and the ground
- Workers should never have any physical contact with a suspended load
- Perform daily equipment checks

Ropes, Chains, Slings and Cables

- Ropes, chains, slings, and cables must be inspected by a competent/qualified person prior to use, clearly labeled and rated for hoisting
- Ropes, chains, slings, and cables must be protected from sharp edges and properly stored when not in use
- Safety latches must be in place on all hooks

Hand and Portable Power Tools

- Must be maintained and in good operating condition
- Electric tools must be unplugged when changing bits, blades or accessories
- If the tool is unsafe to use, it must be tagged "Out of Order"

Air Operated Tools

- Hose whip checks must be used to prevent accidental release
- Neoprene/rubber retaining rings are required for securing a socket to a larger impact wrench
- Air supply must be shut off and the hose must be drained before disconnecting

Explosive Actuated Tools

- Advise Company Site Inspector prior to use
- Contractor to provide training records for workers required to use explosive actuated tools
- Live power load shot is NOT to be disposed of in garbage

Grinders

- RPM of grinding disc must be greater than RPM of the grinder
- Guards must be in place, as per regulations
- Prior to use, workers in immediate work area must be warned to turn away

Ladder Safety

- Ladders to be inspected before and after each use to ensure good condition
- Extension ladders are to be positioned at a 4:1 angle, tied off at the top, and extended 1 m (3 ft) above level of access
- Step ladders are to be opened to full extension and have all four legs on firm, level ground
- DO:
 - Maintain 3-point contact
 - Use fall protection if 3-point contact is not possible above 2m (6 ft)
 - Grasp rungs (not side rails)
 - Face ladder when going up, down, or performing any work activity
- DO NOT:
 - Work off top two steps

- Erect ladders on unstable surfaces

Excavation and Safeguarding Pipelines and Facilities

- Company to surface locate and stake existing facilities
- Contractor to day-light by hand-exposing or by water-washing
- Any facilities within the outer limits of the proposed excavation must be day-lighted prior to any ground disturbance.
- When in doubt, hand-expose, excavate or water-wash to positively locate and identify any underground facility
- Excavating will always done by two people: an excavator operator and a spotter
- Cutting edge of excavating equipment must clear underground facilities by 0.6 m (2 ft) until the top and sides of the facility are exposed by hand-exposing or water-washing
- Once exposed, equipment must operate no closer than 0.3 m (1 ft) of the underground facility
- Contractor must obtain all external permits required for excavation (i.e. Manitoba requires an excavation registration number)
- As determined by Operations, a Company Site Inspector or Contractor designate must be present when excavating within 3 m (10 ft) of a facility (15 ft for Enbridge Athabasca)
- The operator and the spotter require a drawing indicating the location of any facilities within 3m (10 ft) of the proposed excavation. Caution is to be used, as some services may not indicated on drawings and therefore may not be located
- Contractor must provide a competent person to be onsite to supervise the excavation at all times
- Contractor representative, operator and spotter are to have Ground Disrurbance Level Two training.
- Standby person must be stationed on surface to direct operator of excavating equipment or to observe workers required to enter a trench (as per regulations)
- Proper sloping or shoring or approved protective structures must be in place
- Shoring must be certified by a professional engineer, as required
- Drawings and instructions for installing shoring must be maintained on site
- Support of adjacent structures must be certified by a professional engineer
- Ditches must have side walls and slopes that are clean and shaved
- Situate entrances/exits every 15 m (50 ft) in trench (minimum two per excavation), such that no worker shall travel more than 8 m (25 ft) in either direction to exit the trench
- Maintain access and egress routes at all times
- Do not let water accumulate in excavation
- Ensure spoil piles and tools are a minimum of 1 m (3ft.) from the wall of a trench
- Frozen ground allows no deviations

Portable Heaters

- Adequate ventilation must be provided and combustable materials must be removed
- Portable heaters must be monitored by a competent person

Radiography

- Warning signs, ropes, barriers, etc. must be used while x-raying is in progress
- Truck(s) must be equipped with a rotating amber light indicating x-raying is in progress
- Workers are to wear a personal Dosimeter
- Other workers, vehicles and equipment not directly involved in the x-raying process shall stay clear of the area
- A qualified person responsible for radiation safety shall be present when a radioactive source is outside its container, or is in use

Safeguards, Barricades and Warning Signs

- Any work that may endanger workers shall be identified by suitable barricades, working signs or flashing lights
- Activities such as sand blasting, x-rays, pressure testing, road crossings, prefab areas or open excavations must have warning signs
- Unattended excavations left overnight require barricades or a snow fence and must be properly supported

Scaffolds

- Must be erected and dismantled under the supervision of a competent person
- Inspected and tagged by competent person
- Installed as per applicable OH&S regulations
- Use of proper mud sills or bases
- All components must be properly connected and plumb
- All components must be in sound condition (i.e. wood not painted)
- Access and egress must be available by built-in scaffold ladder
- Vertical ladders more than 20 ft must have safety cage
- Must be equipped with guardrails, or fall protection must be utilized

Swing Stages and Work Cages

- Load rating must be clearly labelled and visible
- Work platform must be designed and certified by a professional engineer
- Every worker must wear full body harness attached to suitable anchorage point independent from work platform
- Each worker must have his/her own life line
- There shall be two independent means of support for each worker using the equipment

Powered Elevating Work Platforms

- Workers must be competent in use of the model being used
- Fall protection must be utilized at all times
- Wheels must be chocked on uneven terrain

Manbaskets

- Copy of certification must be available
- Fall protection must be utilized at all times
- Basket load limits must be displayed on platform

Welding and Cutting

- Cylinders must be stored upright and in a designated storage area
- Proper placement of cables (tripping hazards)
- Welding machines must be turned off when left unattended
- Minimum of two 20-lb fire extinguishers must be immediately available in the work area
- Flashback arrestors are required at regulator end of hoses
- Cylinder valves must be closed, and hoses bled down when work is finished
- Ventilation in welding truck cabinets as per Construction Safety Manual/Program

Pipe and Materials Handling

- Proper lifting and rigging equipment must be used to lift items
- Workers should never be positioned on or under the load, or between the load and the ground
- Tag lines to be used to direct a suspended load
- Workers should never have any physical contact with a suspended load
- Pipe or materials stored and blocked securely

Safety Around Storage Tanks

- Monitor for flammable/toxic vapors inside firewalls
- Firewalls may be crossed only at stairways or ramps
- Tank cleaning requires monitoring of all airborne contaminants and use of appropriate respiratory protection

Manual Lifting

- Use mechanical equipment when available
- Use proper lifting practices or seek assistance

Pigging and Testing

- A Task Hazard Assessment must be completed prior to the start of any work activities

- Safe distances for workers are to be identified by signage, fencing, barricades, etc.
- Critical time for failure is during pressurization and depressurization
- Area and/or excavation must be monitored for LEL and oxygen content

12. CHARACTERISTICS OF PRODUCTS PUMPED:

- Products include crude oil, condensate, gasoline and NGL
- NGL contains propane, butane and condensates
- Source of NGL leak may create a steam cloud
- NGL causes dizziness or intoxicating effect - leave the area immediately
- All liquids give off hazardous vapours
- Vapors are toxic and flammable
- MSDS must be available upon request

13. HAZARDOUS MATERIALS:

- WHMIS (CAN), HAZCOM (USA):
 - Workplace and supplier labels (cylinders, fuel containers and other controlled products)
 - Material Safety Data Sheets (for each product on site available to workers)
 - Workers must be trained (use of labels, MSDSs and precautions when using controlled products)
- TDG (CAN), HAZMAT (USA)
 - Placards
 - Documents
 - Training
- Radiation
 - Location of devices onsite
 - Special precautions

SAFETY RECOGNITION:

- Review requirements if applicable

Signature of Enbridge Representative
Conducting Meeting

Signature of Contractor Representative



CONTRACTOR'S WEEKLY SAFETY MEETING RECORD

General Information			
Contractor:		Date:	
Supervisor:		Site Inspector:	
Location:		AFE Number:	
Number Attending:		Number in Crew:	
<i>Minutes</i>			
Review Last Meeting			
Topic(s) Discussed			
Employee Suggestions			
Review Incidents/ Close Calls			
Corrective Action			
Signature of Supervisor			
<i>Signature of Attendees</i>			

**Table 4
TLVs Work/Warm-up Schedule for Outside Workers based on a Four-Hour Shift***

Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
°C (approx)	°F (approx)	Max. work Period	No. of Breaks**	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26° to -28°	-15° to -19°	(Norm breaks) 1		(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4
-29° to -31°	-20° to -24°	(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4	30 min.	5
-32° to -34°	-25° to -29°	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease	
-35° to -37°	-30° to -34°	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease			
-38° to -39°	-35° to -39°	40 min.	4	30 min.	5	Non-emergency work should cease					
-40° to -42°	-40° to -44°	30 min.	5	Non-emergency work should cease							
-43° & below	-45° & below	Non-emergency work should cease									

*2008 TLVs and BEIs - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati: American Conference of Governmental Industrial Hygienists (ACGIH), 2008 - page 213

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Project Hazard Assessment

Project Name:

Assessment Location(s):

Time/Date Completed or Revised:

Worker(s) Completing Assessment:

(Print Name)

Completed By/in Conjunction With: Company employee Contractor or Owner/Operator Customer Other (List Below)

Comments on Other:

Job Task	Hazards Identified	Risk Rating	Corrective Actions

Foreman/Supervisor: _____
(Print Name)

Foreman/Supervisor Signature: _____

Date of Review: _____

Task Hazard Assessment

Job Position A/O Task: _____

Position Status: Company Contractor

Project & Site Location: _____ / _____

Date Completed A/O Revised: _____

Key Job Functions A/O Tasks	Equipment, Materials, Tools & Machinery Utilized	Risks (Health & Safety Hazards)	Hazard Controls (Protective Devices & Equipment, Safe Work Procedures)

Worker (Print Name): _____

Worker Signature: _____

Foreman/Supervisor: _____

Foreman/Supervisor Signature: _____

FIELD LEVEL HAZARD ASSESSMENT

JOB LOCATION: _____ FOREMAN: _____

DATE: _____ TIME: _____

EMERGENCY CONTACT PHONE/RADIO# : _____

1. Circle Task: Erect, modify or Dismantle. Circle Type: Tower/Cantilever/Hanging/Suspended/Hoarding Tag# _____		YES	NO	ACTION NECESSARY	STATUS
2.	Any Trades Working Above/Below?	<input type="checkbox"/>	<input type="checkbox"/>		
3. IDENTIFY SPECIFIC HAZARDS					
What Precautions are Necessary?					
A. Fall Protection (Plan Prepared)		<input type="checkbox"/>	<input type="checkbox"/>		
◆ Adequate Anchor Points		<input type="checkbox"/>	<input type="checkbox"/>		
◆ Vertical/Horizontal Lifeline		<input type="checkbox"/>	<input type="checkbox"/>		
◆ Alternative protection methods fall restraint, guardrails, ladder cages, vertical ladder systems		<input type="checkbox"/>	<input type="checkbox"/>		
B. Flagging /Flag Information Tags:		<input type="checkbox"/>	<input type="checkbox"/>	Circle type: Yellow - "CAUTION" Red - "DO NOT ENTER"	
C. Ladder requirements for task:					
◆ Step, Extension, Scaling		<input type="checkbox"/>	<input type="checkbox"/>		
D. Tripping Hazards:		<input type="checkbox"/>	<input type="checkbox"/>		
E. Overhead Protection Required:		<input type="checkbox"/>	<input type="checkbox"/>		
F. Moving Equipment Nearby:		<input type="checkbox"/>	<input type="checkbox"/>		
G. Electrical Hazards:					
◆ Power Sources		<input type="checkbox"/>	<input type="checkbox"/>		
◆ Is Lockout Necessary		<input type="checkbox"/>	<input type="checkbox"/>		
◆ Equipment checked prior to use		<input type="checkbox"/>	<input type="checkbox"/>		
H. Asbestos or Toxic Chemical Risk:		<input type="checkbox"/>	<input type="checkbox"/>		
◆ What Precautions are Necessary?					
◆ Availability of MSDS		<input type="checkbox"/>	<input type="checkbox"/>		
I. Other - Identify:					
4. PRE USE CHECK:					
A. Power Tools		<input type="checkbox"/>	<input type="checkbox"/>		
B. Hand Tools		<input type="checkbox"/>	<input type="checkbox"/>		
C. Rope Pulley/Hooks/Rope/Grab etc.		<input type="checkbox"/>	<input type="checkbox"/>		
5. WHAT PPE REQUIRED?					
A. Hard Hats, Safety Glasses, Gloves, Safety Boots, Hearing Protection		<input type="checkbox"/>	<input type="checkbox"/>		
B. Respirator (Identify Type)		<input type="checkbox"/>	<input type="checkbox"/>		
C. Specialized coveralls		<input type="checkbox"/>	<input type="checkbox"/>		
D. Other - Identify:		<input type="checkbox"/>	<input type="checkbox"/>		
6. LOCATION OF EMERGENCY FACILITIES:		<input type="checkbox"/> Eyewash Stn <input type="checkbox"/> Meeting Points _____ <input type="checkbox"/> Shower <input type="checkbox"/> Emergency Assembly Area _____ <input type="checkbox"/> Fire Extinguisher <input type="checkbox"/> Medical Centre			
7. ENVIRONMENTAL CONDITIONS - IDENTIFY		Temp: <input type="checkbox"/> Dry <input type="checkbox"/> Hot <input type="checkbox"/> Ice			
		<input type="checkbox"/> Wet <input type="checkbox"/> Cold <input type="checkbox"/> Snow			
◆ What Precautions are Necessary?		<input type="checkbox"/>	<input type="checkbox"/>		
◆ Lighting		<input type="checkbox"/>	<input type="checkbox"/>		
◆ Noise		<input type="checkbox"/>	<input type="checkbox"/>		
8. Are Ground Conditions Suitable?		<input type="checkbox"/>	<input type="checkbox"/>		
9. TYPE OF PERMIT(s) REQUIRED? #		<input type="checkbox"/> Hot <input type="checkbox"/> Cold <input type="checkbox"/> Con/Space <input type="checkbox"/> Ground Disturbance <input type="checkbox"/> Electrical			
◆ Is Co-Signature Required? Area?		<input type="checkbox"/>	<input type="checkbox"/>		
10. ARE ENGINEERING DWGS REQ. ?		<input type="checkbox"/>	<input type="checkbox"/>		

(USE REVERSE SIDE FOR ADDITIONAL INFORMATION)

TYPE OF OCCURRENCE	INJURY CLASSIFICATION <small>for office use only</small>
<input type="checkbox"/> Occupational Illness / Injury <input type="checkbox"/> Near Miss <input type="checkbox"/> Personal Injury <input type="checkbox"/> Other (specify): _____	<input type="checkbox"/> Days Away <input type="checkbox"/> Modified Work <input type="checkbox"/> Medical Aid <input type="checkbox"/> First Aid <input type="checkbox"/> Other _____
Severity Ranking <input type="checkbox"/> Critical <input type="checkbox"/> Severe <input type="checkbox"/> Moderate <input type="checkbox"/> Low	

AFE or Contract Number _____ Mainline Facilities Work Location _____
 Project Name _____ Date of Incident _____ Time of Incident _____
 Name of Enbridge Project Manager _____ Date Reported _____ Time Reported _____
Contractor Name (if applicable) _____ No. of hours worked that day _____ Day of the week _____
Subcontractor Name (if applicable) _____ No. of continuous days worked _____ Weather Conditions _____

Alcohol & Drug Testing Was A&D testing done? YES NO

PERSONAL INFORMATION

Person injured / involved in incident _____ Age of Injured Person (ie 25 – 30) _____
 Occupation _____ Years Experience in Occupation _____
 Employer Address _____ Injured transported to Medical Aid? YES NO
 Employer Telephone () - _____ If "yes", by whom? _____
 Was First Aid given? YES NO Name of Medical Facility _____
 If "yes", by whom? _____ Name of Attending Physician _____
 Qualification of First Aid Provider _____

PERSONNEL CLASSIFICATION

Enbridge Employee Enbridge Contractor Employee Summer Student
 Contractor Subcontractor Third Party / Other

NATURE OF INJURY (check all that are applicable)

<input type="checkbox"/> Abrasion	<input type="checkbox"/> Dermatitis / Skin Irritation	<input type="checkbox"/> Inhalation	<input type="checkbox"/> Unconscious
<input type="checkbox"/> Allergic Reaction	<input type="checkbox"/> Dislocation	<input type="checkbox"/> Laceration or Cut	<input type="checkbox"/> Other (describe) _____
<input type="checkbox"/> Amputation	<input type="checkbox"/> Foreign Body	<input type="checkbox"/> Pinched Nerve	_____
<input type="checkbox"/> Bite or Sting	<input type="checkbox"/> Fracture	<input type="checkbox"/> Poisoning	_____
<input type="checkbox"/> Burn	<input type="checkbox"/> Frostbite / Hypothermia	<input type="checkbox"/> Puncture	
<input type="checkbox"/> Carpal Tunnel	<input type="checkbox"/> Heat Exhaustion / Stroke	<input type="checkbox"/> Sprain or Strain	
<input type="checkbox"/> Contusion or Bruise	<input type="checkbox"/> Hernia	<input type="checkbox"/> Tendonitis	

<p>BODY PART (check all that are applicable)</p> <input type="checkbox"/> Abdomen <input type="checkbox"/> Face / Jaw <input type="checkbox"/> Mouth / Teeth <input type="checkbox"/> Ankle <input type="checkbox"/> Feet / Toes <input type="checkbox"/> Neck <input type="checkbox"/> Arms <input type="checkbox"/> Fingers <input type="checkbox"/> Scalp <input type="checkbox"/> Back <input type="checkbox"/> Groin <input type="checkbox"/> Shoulders <input type="checkbox"/> Chest <input type="checkbox"/> Hands <input type="checkbox"/> Wrists <input type="checkbox"/> Ears <input type="checkbox"/> Hips <input type="checkbox"/> Other (specify) _____ <input type="checkbox"/> Elbow <input type="checkbox"/> Knee <input type="checkbox"/> Eye(s) <input type="checkbox"/> Leg	<p>LOCATION OF BODY PART</p> <input type="checkbox"/> Upper <input type="checkbox"/> Lower <input type="checkbox"/> Top <input type="checkbox"/> Bottom <input type="checkbox"/> Front <input type="checkbox"/> Back <input type="checkbox"/> Left <input type="checkbox"/> Right <input type="checkbox"/> Other (specify) _____
---	---

TYPE OF INCIDENT OR EVENT

<input type="checkbox"/> Airborne Particles	<input type="checkbox"/> Fall on Same Level	<input type="checkbox"/> Overstress	<input type="checkbox"/> Welding Flash
<input type="checkbox"/> Caught Between, In or On	<input type="checkbox"/> Fall to Lower Level	<input type="checkbox"/> Radiation	<input type="checkbox"/> Other (specify) _____
<input type="checkbox"/> Chemical Exposure	<input type="checkbox"/> Fire / Explosion	<input type="checkbox"/> Slips or Trips	
<input type="checkbox"/> Electric Shock	<input type="checkbox"/> Noise	<input type="checkbox"/> Smoke or Gas	
<input type="checkbox"/> Ergonomics	<input type="checkbox"/> Overexertion	<input type="checkbox"/> Struck By	
<input type="checkbox"/> Exposure to Elements	<input type="checkbox"/> Overpressure	<input type="checkbox"/> Struck Against	

INCIDENT DESCRIPTION

Briefly describe how incident happened, tools, equipment or objects involved, and damages.

If more room is necessary to outline details,
use an attachment.

Attach photographs, diagrams and additional information if required.

Were there witnesses? Yes No

Witness Name _____

See Witness Statement (see Attachment "A")

Witness Employer _____

Contact Info _____

NOTE: A copy of the **Hazard Assessment, Permit(s)** and **Contractor Investigation Report(s)** must be attached to this report.

MEDICAL TREATMENTBriefly describe medical treatment provided to injured person by registered Medical Practitioner, including what (if any) prescriptions were given.

EQUIPMENT OR PROPERTY DAMAGE

Was there damage to Enbridge equipment or property?

 Yes No**Briefly describe Enbridge damages**

Estimate to repair or replace < \$10,000 \$10,000 - \$100,000 \$100,000 - \$1,000,000 > \$1,000,000

Was there damage to equipment or property belonging to others?

 Yes NoIf "YES", to whom did the property belong?

Briefly describe other parties' damages

Estimate to repair or replace < \$10,000 \$10,000 - \$100,000 \$100,000 - \$1,000,000 > \$1,000,000

IMMEDIATE / DIRECT CAUSES Check all that apply**SUBSTANDARD ACTS**

What action happened immediately prior to the incident?

- Displaying symptoms of alcohol or other drugs
- Failure to check / monitor
- Failure to follow rules or procedures
- Failure to communicate / coordinate
- Failure to use protective equipment properly
- Failure to identify hazard or risk
- Failure to warn
- Failure to react or correct
- Failure to secure
- Horseplay
- Improper lifting
- Improper loading
- Improper placement
- Improper position for task
- Making safety devices inoperable
- Operating at improper speed
- Operating equipment without authority
- Servicing equipment in operation
- Using defective equipment
- Using equipment improperly
- Other (specify)

Provide supporting comments for choices above - Substandard Acts / Practices

To be completed by Enbridge Lead Investigator**SUBSTANDARD CONDITIONS**

What conditions were present that contributed to the incident?

- Congestion or restricted movement
- Defective tools, equipment or materials
- Fire and explosion hazards
- Inadequate support or assistance
- Inadequate preparation / planning
- Inadequate instructions / procedures
- Inadequate guards or barriers
- Inadequate or excess illumination
- Inadequate or improper protective equipment
- Inadequate ventilation
- Inadequate warning system
- Inadequate communications hardware or software
- Inadequate information data
- Noise exposures
- Poor housekeeping or disorder
- Presence of harmful materials
- Radiation exposure
- Road conditions
- Temperature exposure
- Weather conditions
- Other (specify)

Provide supporting comments for choices above - Substandard Conditions

BASIC / ROOT CAUSES Check all that apply

What underlying factors contributed to the incident?

PERSONAL FACTORS

- Improper motivation
- Inadequate decision-making capabilities
- Inadequate physical capabilities
- Lack of knowledge
- Lack of skill
- Physical stress
- Mental stress
- Abuse or misuse
- Other (specify)

Provide supporting comments for choices above - (Personal Factors)

To be completed by Enbridge Lead Investigator**JOB / SYSTEM FACTORS**

- Inadequate communication
- Inadequate engineering
- Inadequate leadership and/or supervision
- Inadequate maintenance
- Inadequate purchasing
- Inadequate tools / equipment / materials
- Inadequate work standards / procedures
- Excessive wear and tear
- Other (specify)

Provide supporting comments for choices above - (Job / System Factors)

ANALYSIS OF INCIDENT**Preventative Action** What are recommendations to prevent recurrence?**To be completed by Enbridge Lead Investigator**

Action Items	Assigned to	Completion Date	
1. _____	_____	_____	
2. _____	_____	_____	
3. _____	_____	_____	
Name of Lead Investigator (please print)	Title	Signature	Date

COMMENTS

To be completed by Enbridge Site Safety Inspector

Name - Enbridge Site Safety Inspector
(please print)

Signature

Date

AREAS FOR CORRECTIVE ACTION Check all that apply

To be completed by Enbridge Safety Coordinator

- | | | | |
|--|--|--|--|
| <input type="checkbox"/> Leadership & Administration | <input type="checkbox"/> Emergency Preparedness | <input type="checkbox"/> System Evaluation | <input type="checkbox"/> Materials & Services Management |
| <input type="checkbox"/> Leadership Training | <input type="checkbox"/> Rules & Work Permits | <input type="checkbox"/> Engineering & Change Management | <input type="checkbox"/> Off-the-Job Safety |
| <input type="checkbox"/> Planned Inspections & Maintenance | <input type="checkbox"/> Incident Analysis | <input type="checkbox"/> Personal Communications | <input type="checkbox"/> Environmental Management |
| <input type="checkbox"/> Critical Task Analysis & Procedures | <input type="checkbox"/> Knowledge & Skill Training | <input type="checkbox"/> Group Communications | <input type="checkbox"/> Quality Management |
| <input type="checkbox"/> Incident Investigation | <input type="checkbox"/> Personal Protective Equipment | <input type="checkbox"/> General Promotion | |
| <input type="checkbox"/> Task Observation | <input type="checkbox"/> Health & Hygiene Control | <input type="checkbox"/> Hiring & Placement | |

Supporting comments for choices above:

Action Items

Assigned to

Completion Date

1. _____
2. _____
3. _____

Name - Enbridge Safety Coordinator
(please print)

Signature

Date

ADDITIONAL ACTIONS TO PREVENT RECURRENCE

To be completed by Enbridge Team or Project Leader/ Manager

Comments

Action Items

Assigned to

Completion Date

1. _____
2. _____
3. _____

Name - Enbridge Team or Project Leader / Manager
(please print)

Signature

Date



First Aid Report

***First aid injuries that require outside medical attention must be immediately reported and followed by a written report using the Enbridge "Incident Report".**

General Details

Contractor:	Subcontractor (if applicable):
Work Location:	Date and Time of Injury:
Occupation:	Date and Time of Treatment:
AFE or Contract#:	Years of Experience in Occupation:

Brief Description of Injury

Nature of Injury (Check all that are Applicable)

<input type="checkbox"/> Abrasion	<input type="checkbox"/> Dermatitis/Skin	<input type="checkbox"/> Hernia	<input type="checkbox"/> Strain or Sprain
<input type="checkbox"/> Amputation	<input type="checkbox"/> Foreign Body	<input type="checkbox"/> Laceration or Cut	<input type="checkbox"/> Tendonitis
<input type="checkbox"/> Bite or Sting	<input type="checkbox"/> Fracture	<input type="checkbox"/> Pinched Nerve	<input type="checkbox"/> Unconscious
<input type="checkbox"/> Burn	<input type="checkbox"/> Frostbite/Hypothermia	<input type="checkbox"/> Poisoning	<input type="checkbox"/> Other (specify) _____
<input type="checkbox"/> Carpal Tunnel	<input type="checkbox"/> Fumes	<input type="checkbox"/> Puncture	
<input type="checkbox"/> Contusion or Bruise	<input type="checkbox"/> Heat Exhaustion/Stroke	<input type="checkbox"/> Respiratory Disorder	

Body Part (Check all that are Applicable)

Location of Body Part

<input type="checkbox"/> Abdomen	<input type="checkbox"/> Elbow	<input type="checkbox"/> Hands	<input type="checkbox"/> Scalp	<input type="checkbox"/> Upper	<input type="checkbox"/> Lower
<input type="checkbox"/> Ankle	<input type="checkbox"/> Eye (s)	<input type="checkbox"/> Hips	<input type="checkbox"/> Shoulders	<input type="checkbox"/> Top	<input type="checkbox"/> Bottom
<input type="checkbox"/> Arms	<input type="checkbox"/> Face/Jaw	<input type="checkbox"/> Knee	<input type="checkbox"/> Wrists	<input type="checkbox"/> Front	<input type="checkbox"/> Back
<input type="checkbox"/> Back	<input type="checkbox"/> Feet/Toes	<input type="checkbox"/> Leg	<input type="checkbox"/> Other (specify) _____	<input type="checkbox"/> Left	<input type="checkbox"/> Right
<input type="checkbox"/> Chest	<input type="checkbox"/> Fingers	<input type="checkbox"/> Mouth/teeth	_____	Other (Specify): _____	
<input type="checkbox"/> Ears	<input type="checkbox"/> Groin	<input type="checkbox"/> Neck			

Type of Incident or Event

<input type="checkbox"/> Airborne Particles	<input type="checkbox"/> Fall to Lower Level	<input type="checkbox"/> Slips or Trips	<input type="checkbox"/> Welding Flash
<input type="checkbox"/> Caught Between, In or On	<input type="checkbox"/> Fire/Explosion	<input type="checkbox"/> Smoke or Gas	<input type="checkbox"/> Other (Specify)
<input type="checkbox"/> Chemical	<input type="checkbox"/> Noise	<input type="checkbox"/> Struck by	_____
<input type="checkbox"/> Electricity	<input type="checkbox"/> Overexertion	<input type="checkbox"/> Struck Against	
<input type="checkbox"/> Exposure to Elements	<input type="checkbox"/> Radiation		
<input type="checkbox"/> Fall on Same Level			

ENBRIDGE
Monthly Safety Analysis

Location: _____
 Project: _____
 AFE: _____

Month Ending: _____
 Project Manager: _____

CONTRACTOR	PREVIOUS YTD	HOURS		MEDICAL AID		DAYS AWAY	
		CURRENT MONTH	YTD	CURRENT MONTH	YTD	CURRENT MONTH	YTD
General Contractor			0		0		0
Sub-Contractor			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
			0		0		0
TOTALS	0	0	0	0	0	0	0
Non-Manual Hours (SUPERVISORY)			0				
TOTAL HOURS	0	0	0				
Enbridge Site Inspectors			0				

INSTRUCTIONS
 TYPE OR COMPLETE IN INK ALL
 BOXES HIGHLIGHTED. BOXES NOT
 HIGHLIGHTED ARE TOTALED
 AUTOMATICALLY WHEN
 COMPLETED ELECTRONICALLY.

I certify that the reported hours and incidents are accurate _____
 Please type / print name

Please provide a contact number



Incident Classification Guidelines 2008

Days Away (DA):

Any work-related injury or illness that prevents the worker from reporting to work on the next calendar day.

Observation Period, if a worker is injured on the job and the physician places them in a hospital (or at home) for observation only and the worker misses a scheduled work day, it is classed as a Days Away incident.

Medical treatment, when a worker loses part or all of a work day following the day of injury due to medical treatment, it is classed as a Days Away incident.

Medical Aid (MA):

Any work related injury or illness that requires treatment outside of the definitions defined below under the First Aid, by a physician or by registered professional personnel under the standing orders of a physician. (defined as; Physician's Assistants, RN, Paramedic, Chiropractors, and Physiotherapists)

All diagnosed occupational illnesses are considered at least Medical Aid (MA) cases; no illnesses are considered First Aid (FA). Loss of consciousness due to an injury or exposure in the work environment is a MA and must be recorded as such until it meets the requirements of Days Away (DA).

Modified Work (MW):

Any work related injury or illness that prevents a worker's ability to perform their regularly assigned duties, but are medically able to perform alternate, modified or restricted work.

First Aid (FA): Minor injury requiring usually a one-time treatment, regardless of the professional status of the person providing the treatment. Even when a physician or other registered medical professional provides these treatments.

First Aid includes the following;

- Using an over-the-counter medication at non-prescription strength.
- Administering tetanus immunizations (other immunizations, such as hepatitis B Vaccine or Rabies Vaccine, are considered Medical Aid (MA))
- Cleaning, flushing, or soaking wounds on the surface of the skin
- Using hot or cold therapy
- Using wound coverings such as bandages, band-aids, gauze pads, etc or using butterfly closures or steri-strips. (other wound closures such as sutures, staples are considered Medical Aid (MA))
- Using non-rigid means of support, such as elastic bandages, wraps, back belts. (devices with rigid stays or other systems designed to immobilize parts of the body are considered Medical Aid (MA))
- Removing foreign objects from the eye using only irrigation or a cotton swab
- Using eye patches
- Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister
- Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs, or other simple means
- Using finger guards
- Using massages (physical therapy or chiropractic treatment is considered a Medical Aid (MA))
- Drinking fluids for relief of heat stress.



MVI (motor vehicle incident): Any incident involving a licensed motor vehicle in the care of, while performing work for, or for the purpose of Enbridge. (Non MVI classes would be; ATV's, cranes, powered mobile equipment, side booms, loaders, and are included in property damage)

Use of a vehicle covers driving a company or contractor owned, leased or rented vehicle for business use, or use of a personal vehicle for which the operator is eligible for reimbursement for the mileage driven.

Non-collision incidents of the upset, rollover, jackknife, or run-off-the-road types that cause fatality, injury or damage are MVI's.

Any incident that may be the result of a driver's error, but does not result in a contact with his vehicle causing a fatality, injury or damage are considered an Other Occurance.

Shifting cargo, when abnormal driving causes the shifting of cargo, which results in a fatality, injury or damage is considered a MVI. (examples are materials coming off trailer while in transit)

Towing or Pushing; Damage resulting from towing or pushing actions is considered Property Damage. A towed vehicle while in transit causes a fatality, injury or damage is classed as a MVI.

Contact with animals, birds and other objects while in motion that cause fatality, injury or damage is considered a MVI. Rocks, gravel and tar damage would not be considered an MVI.

Environmental: Spill, leak, release or loss of means of containment which results in a potential impact to soil, water or air.

Close Call: (Near Miss) Any potential incident or injury that could or would have occurred. The potential must have been significant.

Other Occurrence: All other incidents falling outside of the above definitions. (examples; fire, theft, vandalism)

Property Damage: Incident involving contact by machinery or energy other than MVI or Line Contact that results in damage. This includes contractor damage while working on or for Enbridge. (examples; crane upset, un-secure loads)

Line Contact NR (NLC): Incident involving contact (regardless of damage) with a non regulated (NR) pipeline or utility. Utility or non regulated pipeline is best described as; water or irrigation lines, power cables, water pipelines, fire water systems, fibre optics, telecommunication, steam lines, sewage lines, chemical lines, or air lines.

Line Contact Reg (LC): Incident involving contact (regardless of damage) with a regulated pipeline or facility. This would include buried or surface utilities such as oil pipelines, gas pipelines, high voltage cables, high pressure gases, that are licensed and regulated.

Significant: Having or likely to have a major effect, example; fatality, third party involvement, dollar value >\$10,000.00, or regulatory notification.

Working for: The definition of off site vs. onsite, any work performed on the property of, or while in the care of, or for the purpose of Enbridge. (examples; delivery truck with material onboard for Enbridge, travel to work for Enbridge, operation of equipment for the purpose of Enbridge.)



FIELD INSPECTION / OBSERVATION (Safety, Environment and Security)

Location/Project/AFE:		Date:
Contractor:		
Subcontractor:		
Conducted By:	(Name and Signature)	(Name and Signature)
	(Name and Signature)	(Name and Signature)
Reviewed With:	(Name and Date)	(Name and Date)
	(Name and Date)	(Name and Date)
Distribution:	(Original Sent To)	(Copy Sent To)
	(Copy Sent To)	(Copy Sent To)

ANY SERIOUS SAFETY INFRACTIONS MUST BE ADDRESSED IMMEDIATELY

Classifications	C - Commendable U - Unsatisfactory NA - Not Applicable	S - Satisfactory O - Outstanding Item from Previous Inspection R - Recommendation
Plan the Inspection	<ul style="list-style-type: none"> Verify previous items were addressed and safety checks completed in the previous period. Record any outstanding item(s) from the previous inspections on the Field Inspection report. Review the above classes and the categories listed on the following pages. Assign categories that each Inspector should focus on when more than one Inspector is available. Review the guidelines for tips on "What to Look For". 	
Perform the Inspection	<ul style="list-style-type: none"> Request any serious safety infraction be addressed immediately. Number each item. Record the practice or condition observed and the location. Record the class for each observation. Refer to guidelines if required for tips on "What to Look For". Record overall classification for each category. 	
Debriefing	<ul style="list-style-type: none"> The Inspector(s) and person responsible for the site will record the target date for items requiring attention and the person assigned for that action item. The Inspector will complete the cover page of the inspection report and ensure appropriate distribution of Pages 1 and 2 as required by region/district management or the projecting engineering team. 	
Follow-up	<ul style="list-style-type: none"> The person responsible for the site being inspected will maintain a copy of the inspection reports and record the date of completion of any unsatisfactory items. 	

Item No.	Description of Substandard Practices/Conditions and Locations	Class C, S, U, O, R	Target Date for Correction	Person Assigned	Actual Date of Completion	Initials of Person Verifying Completion
Categories		Overall Class	Categories			Overall Class
1.	Work Practice & Position of People		7.	Excavations		
2.	Personal Protective Equipment		8.	Fire Protection		
3.	Working at Heights		9.	Tools and Guarding		
4.	Hazard Control		10.	Rigging and Hoisting		
5.	Workplace Conditions		11.	Vehicles and Mobile Equipment		
6.	Security		12.	Contractor Safety Program		
Class: C Commendable		U Unsatisfactory	NA Not Applicable			
S Satisfactory		O Outstanding Item from Previous Inspection	R Recommendation			



GUIDELINES FOR FIELD INSPECTIONS “WHAT TO LOOK FOR”

<p>1. Work Practices and Position of People</p> <ul style="list-style-type: none"> 1.1 Safe position maintained with respect to loads 1.2 Limits of approach maintained near electrical utilities 1.3 Path of hazards avoided (i.e., from grinding debris or pressure release) 1.4 Workers warn others of potential hazards 1.5 Extended reach avoided 1.6 Three point contact used to step down from equipment or elevated surface 1.7 Warning signs and safety instructions followed 1.8 Workers review and comply with work permit or exemption 1.9 Record of injuries available 1.10 Walking on pipe avoided 1.11 Proper lifting techniques used 	<p>2. Personal Protective Equipment</p> <ul style="list-style-type: none"> 2.1 PPE requirement reviewed prior to work 2.2 Hard hats worn in designated areas 2.3 Eye and face protection worn when required 2.4 Safety boots worn when required 2.5 Hearing protection worn when noise exceeds 85 dBA 2.6 Fire retardant clothing worn when required 2.7 Respiratory protection worn when required 2.8 Appropriate hand protection worn where required 2.9 Personal protective equipment available and clean 	<p>3. Working at Heights</p> <ul style="list-style-type: none"> 3.1 Approved fall protection used when working at heights over 2.4 m (Canada) or 1.8 m (US) 3.2 Secure anchor points used 3.3 Guardrails, handrails, midrails and toeboards installed 3.4 Scaffolding level, well-braced, secure and planking sufficient 3.5 Scaffolding approved and tagged by a competent person 3.6 Extension ladder angled 4 to 1 ratio and secured near top 3.7 Non-conductive ladder used near electrical equipment 3.8 Equipment and materials hoisted up (not carried)
<p>4. Hazard Control</p> <ul style="list-style-type: none"> 4.1 Hazards assessed and communicated to all workers 4.2 All energy sources locked out and tagged prior to work being done 4.3 Perimeter and road signs in place 4.4 Warning and hazard signs posted, legible/adhered to (i.e., x-ray, H2S) 4.5 Site evacuation/site safety plt plan current and posted 4.6 Evacuation and rescue equipment on site and checked 4.7 Eye/wash, emergency showers, first-aid kits and other safety equipment checked 4.8 Hazardous areas and work activities barricaded or secured 4.9 Gas detectors calibrated and used when required 4.10 Confined spaces identified 4.11 Emergency switches in prominent location and easily identifiable 4.12 Hazardous chemicals stored in proper containers and labeled 4.13 Material safety data sheets readily available 4.14 Transportation of dangerous goods legislation adhered to 	<p>5. Workplace Conditions</p> <ul style="list-style-type: none"> 5.1 Wind socks adequate and in good condition 5.2 Floors, walkways, stairs and exits free of obstructions, tripping hazards, snow and ice 5.3 Walkways, work areas adequately illuminated while occupied 5.4 Ventilation adequate to maintain a safe atmosphere 5.5 Adequate washing and toilet facilities 5.6 Waste in approved containers, with correct/legible labels and stored at designated locations 5.7 Daily housekeeping done 5.8 Valves and equipment accessible from work surface 5.9 Leaking equipment repaired, cleaned up or contained 5.10 Facilities at ground level protected against impact 5.11 Berms maintained 5.12 Contaminated soil/water contained and reported if necessary 5.13 Withering vegetation reported 5.14 Vegetation and soil erosion controlled 5.15 Site water drainage valves controlled and monitored 5.16 Materials stacked securely 5.17 Spill containment in place 	<p>6. Security</p> <ul style="list-style-type: none"> 6.1 “Authorized Persons Only” or “No Trespassing” signs posted 6.2 Security fence maintained 6.3 Site entry/exit procedures followed 6.4 Buildings not regularly used, gates and designated valves locked 6.5 Key and padlocks for facility secure 6.6 Any signs of tampering with equipment reported 6.7 Security lighting on and working 6.8 “If You Receive a Threat” form readily available 6.9 Copy of bomb and security threat procedures readily available 6.10 Regional specific security response plan available 6.11 Security system working (if applicable) 6.12 Security Officers easily identifiable (if applicable) 6.13 Confidential information is secure and not readily visible

GUIDELINES FOR SAFETY INSPECTIONS

“WHAT TO LOOK FOR”

<p>7. Excavations</p> <p>7.1 Excavation hazards/procedures assessed and reviewed</p> <p>7.2 Two means of exit available (i.e., ladder and steps)</p> <p>7.3 Standby person present when workers in trench (per regulation)</p> <p>7.4 Openings covered or barricaded</p> <p>7.5 Spoil pile and equipment well back of excavation</p> <p>7.6 Underground facilities identified and surface located</p> <p>7.7 Excavations backfilled on completion and identified with ribbon/planking where required</p> <p>7.8 Underground utilities hand exposed within one foot</p> <p>7.9 Excavation permit obtained from regulatory agency where required</p> <p>7.10 Stripped topsoil separated from subsoil</p> <p>7.11 Withering vegetation reported</p> <p>7.12 Backfilled excavation is re-seeded</p> <p>7.13 Vegetation and soil erosion adequately controlled</p>	<p>8. Fire Protection</p> <p>8.1 Fire extinguishers inspected and check indicated on tag</p> <p>8.2 Fire extinguishers accessible and adequate number available</p> <p>8.3 Permanent fire extinguishers mounted</p> <p>8.4 Fire blankets available and in good condition</p> <p>8.5 Ignition sources controlled</p> <p>8.6 Flammables stored away from ignition sources and in approved containers</p> <p>8.7 Fire protection systems inspected</p> <p>8.8 Foam truck/trailer inspected</p> <p>8.9 Fire watch and fire extinguisher comply with safe work permit</p> <p>8.10 Fire watch knowledgeable in fire extinguisher operation and in position to respond to a fire</p> <p>8.11 Bonding and grounding used for transfer of flammable fluids</p> <p>8.12 Smoking only in designated areas</p> <p>8.13 Flashback arrestors on acetylene regulators</p> <p>8.14 Storage cabinets ventilated where required</p>	<p>9. Tools and Guarding</p> <p>9.1 Tools appropriate and used correctly</p> <p>9.2 Manufacturer's guards on power tools</p> <p>9.3 Tools properly stored</p> <p>9.4 Tools and equipment in good condition</p> <p>9.5 Defective tools and equipment tagged “out of service”</p> <p>9.6 Power cords grounded or double insulated</p> <p>9.7 Power tool attachments exceed RPM rating</p> <p>9.8 Rotating equipment covered with guards</p> <p>9.9 Air-hose coupling secured by wire or whip checks</p>
<p>10. Rigging and Hoisting</p> <p>10.1 Chains, cables and slings in good condition</p> <p>10.2 Equipment labeled for maximum capacity</p> <p>10.3 Load charts and log books located at operator's station for mobile equipment</p> <p>10.4 Proper loading and securing practices used</p> <p>10.5 Good rigging practices used</p> <p>10.6 Approved safety latch on all lifting hooks</p> <p>10.7 Tag lines used when required</p> <p>10.8 Designated signal person using proper hand signals</p> <p>10.9 Loads not suspended over workers</p> <p>10.10 Proper lifting equipment used</p> <p>10.11 Crane operator certified/licensed where required</p>	<p>11. Vehicles and Mobile Equipment</p> <p>11.1 First-aid kits, fire extinguishers and other safety equipment inspected</p> <p>11.2 Defensive driving, back up and parking practices observed</p> <p>11.3 Seat belts supplied and used</p> <p>11.4 Spark arrestor installed and positive air shut-off operable</p> <p>11.5 Back-up alarm audible (if applicable)</p> <p>11.6 Rollover protection adequate (if applicable)</p> <p>11.7 Spotters used when required</p> <p>11.8 Trailers are maintained</p> <p>11.9 Boats are maintained (where applicable)</p> <p>11.10 Emergency conveyance vehicle available (where required)</p> <p>11.11 Vehicles refueled more than 100m (330') from any watercourse</p>	<p>12. Contractor Safety Program</p> <p>12.1 Weekly safety meetings held and minutes distributed</p> <p>12.2 Pre-job meetings held and documented when required</p> <p>12.3 Self inspections performed by Contractor staff</p> <p>12.4 Specific work procedures on site (pigging, pressure testing, etc.)</p> <p>12.5 Emergency procedures, transportation plan and emergency equipment provided</p> <p>12.6 Adequate number of first aiders and certificates posted</p> <p>12.7 Safety regulations on site</p> <p>12.8 Company Safety & Environmental policies posted, Company Contractor Safety Manual and contractor's safety manual on site for large projects</p> <p>12.9 Emergency procedures understood and numbers posted</p> <p>12.10 Qualified contractor safety representative on site</p> <p>12.11 Safety orientation completed</p> <p>12.12 Workers have required training</p> <p>12.13 Drug testing compliance in US</p> <p>12.14 Regulatory permits or approvals for work available on site</p>



Construction Work Permit Guidelines

Construction Work Permits (CWP)

CWP's are required for all work performed or on the behalf of Engineering and Major Projects Execution. All exemptions shall be authorized by an Enbridge Safety Coordinator or Safety Supervisor.

* Field level Site Safety, Operators and Site Inspectors can NOT authorize an exemption.

Preparing Construction Work Permits (ensure all sections of the permit are completed):

- Completed by Lead Inspector or Designated Safety Representative
- Check off all pertinent hazards and applicable controls
- Conduct initial Atmospheric Testing if applicable
- Complete one permit for each contractor work area (i.e. civil tank bases, welding, and scaffold erection). The intent is to avoid blanket permits covering all contractors and all tasks

The Permit receiver (Contractor Foreman/Supervisor) must:

- Review the noted hazards and controls then perform a hazard assessment specific to the work being conducted
- Ensure that all of the "Controls Required" and "Hazards Identified" are clearly communicated to and understood by all workers involved

Permit Validity:

- Permits are valid for a 12 hour period, and only for the date issued.
*Exceptions may be applied for by contacting the Enbridge Safety Coordinator.
- All permits are cancelled during any emergencies or evacuation and must be re-issued.
- A new permit is needed when significant change to the work area has been done which would require a new assessment of the job hazards
- The permit is a permit to work, as such any company (Enbridge) representative, Inspector or Safety personnel can pull the work permit if he/she believes an unsafe condition exists that the permit or workers have not adequately controlled

Distribution of the Work Permit Copies:

White: Records – remains in booklet for file retention
Yellow: Foreman/Supervisor –readily available at the immediate work area
Green Operations
Pink: Inspector/Issuer – current daily activity tracking

*** Special Conditions**

Where construction activities directly affect or are affected by Live Operations, the contract worker(s) performing the work and the Site Inspector shall review and sign on the Operations Safe Work Permit/ Hazard Assessment in addition to the Construction Work Permit



Construction Work Permit

Permit # 000000

Project: _____ AFE#: _____ Contractor: _____
 Date: _____ Time Issued: _____ Time Expires: _____

Purpose & Description of Work: _____

Type of Construction: New Construction Live Facility Operations Permit Reviewed Reference # _____
 Area: Hazardous Restricted Unclassified
 Type of Permit: Hot Cold Electrical
 Have Environmental considerations been addressed? Yes No
 Have all Land Owner/Access Agreement conditions been addressed and communicated? Yes No

Hazards Identified	Controls Required	Additional Controls
<input type="checkbox"/> Open Excavation/Pits <input type="checkbox"/> Soil Conditions (sand / gravel / frozen /compacted/ etc.) <input type="checkbox"/> Ground Conditions (water / ice / mud) <input type="checkbox"/> Moving Equipment / Vehicles <input type="checkbox"/> Suspended Loads <input type="checkbox"/> Rotating Equipment <input type="checkbox"/> Working at Heights <input type="checkbox"/> Adverse Weather <input type="checkbox"/> Lighting <input type="checkbox"/> Electricity(overhead / buried/ arc / induced voltage) <input type="checkbox"/> Ignition Source <input type="checkbox"/> Energy Sources (hydraulic / gravity etc.) <input type="checkbox"/> Pinch Points <input type="checkbox"/> Line of Fire <input type="checkbox"/> Falling Objects <input type="checkbox"/> Working Alone (plan required) <input type="checkbox"/> Spill or Groundwater Contamination <input type="checkbox"/> Access/Egress <input type="checkbox"/> Noise <input type="checkbox"/> Wildlife <input type="checkbox"/> Radiation <input type="checkbox"/> Slips, Trips and Falls <input type="checkbox"/> Toxic Vapours <input type="checkbox"/> Dust/Mist/Fumes <input type="checkbox"/> Oxygen Deficiency <input type="checkbox"/> LEL's <input type="checkbox"/> Other Work Activities in the Area <input type="checkbox"/> Proximity to Existing Facilities(Enbridge/3 rd Parties)	PPE (In Addition to Basic PPE) <input type="checkbox"/> Fire Retardant Clothing <input type="checkbox"/> Chemical Resistant Clothing (suit / bib etc.) <input type="checkbox"/> Eye & Face Protection (goggles / shield) <input type="checkbox"/> Hearing Protection (single / double) <input type="checkbox"/> Gloves (leather / chemical / cut resistant) <input type="checkbox"/> Protective Boots (leather / rubber / other) <input type="checkbox"/> Respiratory Protection (refer to MSDS & JHA) <input type="checkbox"/> Full Body Harness (plan required) <input type="checkbox"/> ATV Helmet <input type="checkbox"/> Life Jackets <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____ Equipment <input type="checkbox"/> Gas Detector <input type="checkbox"/> LEL <input type="checkbox"/> 02 <input type="checkbox"/> H2S <input type="checkbox"/> Other <input type="checkbox"/> 2 Way Radio / Cell phone <input type="checkbox"/> Fire Extinguisher <input type="checkbox"/> First Aid Kit <input type="checkbox"/> Windsock <input type="checkbox"/> Taglines <input type="checkbox"/> Air Shut Offs <input type="checkbox"/> Trench Box or Shoring <input type="checkbox"/> Grounding, Bonding, GFCI <input type="checkbox"/> Ladders <input type="checkbox"/> Warning Signs <input type="checkbox"/> Fencing <input type="checkbox"/> Additional Lighting <input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____	Additional Controls <input type="checkbox"/> Traffic / Flag Person <input type="checkbox"/> Safety / Fire Watch <input type="checkbox"/> Spotters / Signalers <input type="checkbox"/> EMT / EMT-P / Onsite Medical <input type="checkbox"/> Other _____ Plans/ Permits (reviewed) <input type="checkbox"/> Fall Protection Plan <input type="checkbox"/> Working Alone Plan <input type="checkbox"/> Transportation Plan <input type="checkbox"/> Pre-Job Hazard Assessment <input type="checkbox"/> Daily Pre-Job Meeting <input type="checkbox"/> Ground Disturbance Permit <input type="checkbox"/> # _____ <input type="checkbox"/> # _____ <input type="checkbox"/> Environmental Protection <input type="checkbox"/> ERP / Fire Protection Plan <input type="checkbox"/> Critical Lift Plan <input type="checkbox"/> Steel Erection Plan (USA) Procedures (reviewed) <input type="checkbox"/> Confined Space Entry <input type="checkbox"/> Electrical Lockout/Tag out <input type="checkbox"/> Energy Isolation <input type="checkbox"/> Safe Approach Clearance <input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____

Other Specific Instructions: _____

Atmospheric Testing					
Testing Required: <input type="checkbox"/> Yes <input type="checkbox"/> No					
Testing Frequency: <input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (Frequency _____)					
Name of person taking readings: _____ (Print)					
Exposure Limits	Oxygen (19.5 – 23.5%)	LEL (>4%)	H ² S (>10 ppm)	Other:	Other:
Initial Test Time: _____	Initial Test	Initial Test	Initial Test	Initial Test	Initial Test

* All subsequent testing shall be recorded on a separate sheet and maintained by the safety watch and submitted with the permit.

Permit Authorization	
Permit Issuer: (Inspector or designate) _____ (Print)	_____ (Sign)
Permit Receiver: (Contractor) _____ (Print)	_____ (Sign)

By signing this permit, the Permit Receiver acknowledges that all safety requirements have been met, and reviewed with all those involved with the work. Contactor acknowledges that workers are competent and adequately prepared to proceed safely with the work.
(Note: Permit valid only for the date and times issued. All permits are suspended during emergencies and must be revalidated.)

Work Permit Sign Off	
Are all locks and isolations removed? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A (If no, explain): _____	Has housekeeping been completed? <input type="checkbox"/> Yes <input type="checkbox"/> No (If no, explain): _____
Has the work area been secured? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A (If no, explain): _____	Are any personnel remaining onsite? <input type="checkbox"/> Yes <input type="checkbox"/> No (If yes, describe): _____
Have there been any incidents? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A (If yes, describe): _____	

By signing this permit, the Permit Receiver acknowledges that all work to which this permit applies has been completed or suspended and all necessary personnel have been informed.

Permit Issuer: (Inspector or Designate) _____ (Print)	_____ (Sign)
Permit Receiver _____ (Print)	_____ (Sign)



Construction Work Permit

Permit # 000000

(Attach additional paper if more space is required to record permit information)

DESCRIPTION

Date: _____ Contractor: _____ Location: _____

Time Permit Issued: _____ Time Permit Expires: _____ Time Work Completed: _____

Nearest Medical facility: _____ Emergency Response Phone #: _____

Additional Contact#: _____

Scope of Work: _____

WORK TYPE & AREA

Cold
 Hot
 Electrical - line side of 480v main breaker (Clearance/isolation form required)

Hazardous
 Restricted
 Unclassified
 Risk Assessment Model Ranking (number) _____

JOB TASKS (Select all that apply)

Tank gauging/inspection
 Tank Cleaning
 Truck loading/unloading
 Welding
 Motor or pump maintenance

Vac truck operations
 Valve Inspect/maintenance
 Hydrotest
 Heavy Equipment Operation
 Prover/meter work

Line Repair
 N2 Purge
 Loading/Unloading Scrapers
 Electrical work
 ROW

Wind farm activities
 Hot tap/stopples work
 Excavating & trenching
 Line Locating
 Other: _____

KEY STEPS (related job tasks)

1. _____ 5. _____
 2. _____ 6. _____
 3. _____ 7. _____
 4. _____ 8. _____

HAZARDS CHECKLIST (Select all that apply)

CHEMICAL/ PRODUCTS/MATERIAL

Hydrogen Sulfide
 Benzene/Toluene etc.
 Coker Naphtha
 Asbestos

Acids/caustics
 Welding fumes
 Carbon Monoxide
 Abrasive blast dust

Cleaners/degreasers
 Gasoline or diesel
 Pipeline coating
 NGL

Herbicides/pesticides
 Natural Gas
 Mercaptan
 Other: _____

ENERGY

Electrical < 480v
 Electrical ≥ 480v

Pneumatic
 Hydraulic

Mechanical
 Pressure

Radiation
 Fluids & Gases

PHYSICAL

Walking/work surfaces
 Rotating equipment
 Suspended loads
 Weather
 Pinch points
 Falling objects
 Manual lifting

Fire/burns
 Vibration
 Working at heights
 Cuts/sharp edges
 Noise
 Moving equipment
 Cave ins

Drowning
 Ignition sources
 Heat stress
 Debris
 Body position
 Hot work
 Spills

Security
 Waste
 Grinding
 Congested area
 Hand/power tools
 Lighting
 Slopes & terrain

ERGONOMIC & BIOLOGICAL

Exposure to poisonous plants/animals/bugs

Fatigue
 Overexertion

Awkward position
 Repetitive motion

Trigger finger
 Tennis elbow

OTHER HAZARDS:

CONTROLS CHECKLIST (Select all that apply)

PPE

Appropriate respiratory protection & cartridge or filter
 Chemical goggles
 Fall protection
 Head protection

Blasting hood
 Chemical resistant clothing
 Safety/impact goggles
 Face shield
 Hearing protection

Life jackets
 Protective footwear
 Fire retardant clothing
 Personal H2S, LEL, O2, CO monitor
 High Visibility/Reflective Vest

FIRE PROTECTION

Wheeled fire extinguisher
 Spark arrestors

Explosion proof extension cords
 Fire watch

Explosion proof electrical
 Fire extinguisher

EQUIPMENT

Tag line for loads
 Barricades
 2-way radio
 Traffic control devices/signs
 Isolate lockout equipment
 Backup alarms

Wind sock
 Bonding/grounding equip.
 Air shutoffs
 Mechanical ventilation
 Control ignition sources
 Area PID or grab sample gas detector

Time	Initial				
H ₂ S 10ppm					
LEL 4%					
O ₂ 19.5-23.5%					
CO 35ppm					
Benzene 0.5ppm					

ELECTRICAL

High voltage probe/gloves on-site & available
 Arc hazard PPE as per NFPA 70E
 Safe limits of approach understood & maintained
 Voltmeter not used on conductors > 750v CAN. (600v U.S.)

Electrical workers qualified & experienced
 Test & confirm voltage on electrical conductors
 Grounding cables on-site
 GFI protection

EXCAVATION

Check for induced current
 Pre-excavation checklist complete
 Provide competent person (OSHA-US)
 Provide slope angle of: _____

Maintain min. clearance with mechanical excavation
 Classify soil type: _____
 Method to classify soil (U.S.) visual _____ mechanical _____
 Locate & identify underground piping & electrical lines

Provide shoring/trench box
 Provide rescue procedures
 Provide means of egress

OTHER CONTROLS:

SIGNATURES (Use tailgate meeting forms for)

1. _____ 2. _____ 3. _____ 4. _____
 5. _____ 6. _____ 7. _____ 8. _____
 9. _____ 10. _____ 11. _____ 12. _____

APPROVALS

Permit Approver: Local Operations Mgmt. Name: _____ Communication: _____

Permit Issuer: Print Name: _____ Signature: _____

Permit Receiver (person in charge): Print Name: _____ Signature: _____



“Ground Disturbance Work Permit” Information & Guidelines

Abbreviations:

GDWP – Ground Disturbance Checklist/Work Permit; **GDI** – Ground Disturbance Inspector;
ROW – New Pipeline Right-of-Way; **EWS** – Extra Work Space; **ELP** - Enbridge Liquid Pipelines
(m) Metres, **(cm)** centimetres, **(km)** Kilometres

Definitions:

“Ground Disturbance” means any work, operation or activity that results in a disturbance of the earth including, without limitation, excavating, digging, trenching, ploughing, drilling, tunnelling, auguring, boring, backfilling, blasting, topsoil stripping, land levelling, peat removing, quarrying, clearing, fencing, hydro-vac services and grading, etc.

“Hydrovac” Is the used of pressurized water to loosen and vacuum extracted soil. This includes all activities performed by a vacuum truck but not limited to: hydrovac, “shot gunning”, “day lighting”, “pot holes”, and “water washing.”

Note; A Ground Disturbance Work Permit is required for all ground disturbance activities completed for ELP Major Projects Execution.

Preparing Construction Work Permits (ensure all sections of the permit are completed):

*Contractor shall provide a written hazard assessment and permit request to the Site Inspector at a minimum of 24 hours prior to the permit being issued.

- Completed by Lead Inspector or Designated Safety Representative
- Check off all pertinent hazards and applicable controls
- Conduct initial Atmospheric Testing where applicable
- Complete one permit for each contractor work area (i.e. excavation location, fence installation, etc.)

* The intent is to avoid blanket permits covering all contractors and all tasks.

The Permit receiver (Contractor Foreman/Supervisor) must:

- Perform a hazard assessment specific to the work; review the hazards and controls with the Permit Issuer, then conduct a review of the permit with the involved workers.
- Ensure that all of the “Controls required” and “Hazards Identified” are clearly communicated to and understood by all workers involved.
- Monitor compliance to the permit requirements.
- Return and sign off the permit upon expiry or completion of the work.

Permit Validity:

- Permits are valid for a 12 hour period, and only for the date issued. *Exceptions may be applied for by contacting the Enbridge Safety Coordinator.
- All permits are suspended during any emergencies and must be revalidated.
- A new permit is needed when significant change to the work area has been done which would require a new assessment of the job hazards
- The permit is a permit to work, as such any company (Enbridge) representative, Inspector or Safety personnel can pull the work permit if he/she believes an unsafe condition exists that the permit or workers have not adequately controlled

Distribution:

White (Original) –Inspector (retain in book for Records)

Yellow – Contractor GDS or Foreman (hand in with Daily Inspection Report)

Pink – Contractor Equipment Operator (return to Foreman when done; then to Contractor Safety for filing)

DESCRIPTION	Date: _____ Contractor: _____ Location: _____		
	Project _____ Project No. _____ Station / Spread: _____		
	Facility Owner: _____ Facility Type: _____		
	Work Description: Hazards / Special Conditions:		
PLANNING & RECORD CONFIRMATION	YES	NO	N/A
	Do you have a copy of the Survey Drawing for the proposed ground disturbance area? If no, why? <input type="checkbox"/>		
	Do you a copy of the Surface Acquisition report? If no, why? <input type="checkbox"/>		
	Does the survey drawing Table of Crossing match with the Surface Acquisition Report Table of Crossings? If no, why? <input type="checkbox"/>		
	Do you have a copy of the Land Title Certificate or Public Land Standing Report? If no, why? <input type="checkbox"/>		
	Do you have a copy of the most recent Provincial / State / Company Pipeline baseline map? If no, why? <input type="checkbox"/>		
	Are copies of the construction drawings (e.g. alignment sheets) for the proposed work area available and reviewed? <input type="checkbox"/>		
	Did you notify the Land Agent (Crown Land) or Land Owner (Freehold Land) of your intentions and review any existing underground facilities? Name: _____ When: _____ <input type="checkbox"/>		
	Was the facility owner given proper notification as required by regulations or the Crossing Agreement? (Min 2-3 Working Days) <input type="checkbox"/>		
	Are Crossing agreements for all identified facilities within 30 meters or 100 feet of the work area available? <input type="checkbox"/>		
	In the absence of crossing agreements, have facility owner as-built and / or plan drawings been made available and reviewed? <input type="checkbox"/>		
	Did you contact the local facilities and review the scope of work and crossings? Name: _____ <input type="checkbox"/>		
	Has the local One Call Service been notified and confirmation received? Confirmation / Ticket #: _____ <input type="checkbox"/>		
	Have non members of the One Call Service been notified with a request to locate / stake their facilities? <input type="checkbox"/>		
	Has the foreign facility owner responded to the "locate request" and located / staked their facilities? <input type="checkbox"/>		
Has the proposed work area and a 30 meters or 100 foot radius been electronically swept / searched for unknown buried facilities? <input type="checkbox"/>			
Have all environmental permits and approvals been obtained and communicated with the contractor? <input type="checkbox"/>			
VISUAL INSPECTION	YES	NO	N/A
	Are all identified buried facilities within 30 meters or 100 feet of the proposed work area clearly located, staked and protected as required? <input type="checkbox"/>		
	Do the electronic locating / staking correspond to Crossing Agreements, Construction Drawings and observed site conditions? <input type="checkbox"/>		
	Have all buried facilities fully exposed and visible according to Company requirements, crossing agreements and regulations? <input type="checkbox"/>		
	Is the centre of the proposed or existing pipeline clearly marked? <input type="checkbox"/>		
	Are there any signs of recent construction in the area, which would indicate the possibility of other existing buried facilities? <input type="checkbox"/>		
	Are there overhead power lines in the work area and if so, are warning signs and guard poles in place? <input type="checkbox"/>		
Are the locate stakes or marks referenced to fixed features? <input type="checkbox"/>			
PRE-CONSTRUCTION	YES	NO	N/A
	Has a pre-job meeting been held including a "Walk around / site inspection", to review scope of work with all persons involved? Is it documented with a sign in sheet? <input type="checkbox"/>		
	Is everyone aware of all safe work procedures and requirements associated with the planned Ground Disturbance work? <input type="checkbox"/>		
	Is the contractor's supervisor directing the Ground Disturbance on site? <input type="checkbox"/>		
	Does the contractor's Supervisor possess valid industry accepted Ground Disturbance Training certification? Expiry Date: _____ <input type="checkbox"/>		
	Have the members of the work crew received a Ground Disturbance orientation? <input type="checkbox"/>		
	Has the facility owner been notified prior to the ground disturbance? (Min. 2-3 Working days) <input type="checkbox"/>		
	Is an owner representative of the buried facility affected by the Ground Disturbance on site? (Required for Mechanical ground disturbance within 5 meters or 16 Feet of any buried facility, including hydrovac of electrical and fiber optics cable) If no Why? _____ <input type="checkbox"/>		
	Are all conditions of the crossing agreement being met? <input type="checkbox"/>		
	Has a work permit & hazard assessment been issued, reviewed with all workers involved and documented with a sign off sheet? <input type="checkbox"/>		
	Does excavation equipment have a positive air shut-off installed and a Company approved excavation bucket? <input type="checkbox"/>		
	Is fencing and / or barricades required and is the material on site? <input type="checkbox"/>		
	Have the equipment operators been designated as competent and put on an "Operationally Qualified" list (OQ'ed)? <input type="checkbox"/>		
	Has the need for pipe / cable support, testing for induced current and air testing for toxic or combustible gases been assessed? <input type="checkbox"/>		
Has the ERP been reviewed and have adequate evacuation procedures and means of exit been determined? <input type="checkbox"/>			
Is there a Medical Assistance transportation plan in place and posted? <input type="checkbox"/>			
Have all underground facilities been identified and exposed as per the company requirement, crossing agreements and regulations? <input type="checkbox"/>			
If you are using mechanical equipment how close can the operator be to the identified facility ? _____ Meters or _____ Feet <input type="checkbox"/>			
BACKFILL	YES	NO	N/A
	Has the facility owner been notified prior to the proposed backfill work, in accordance with the Crossing Agreement? <input type="checkbox"/>		
	Did an authorized facility owner representative attend to inspect their facility prior to the proposed backfill work? Name: _____ <input type="checkbox"/>		
	Did the facility owner representative prepare a backfill inspection report? <input type="checkbox"/>		
	Is a facility owner representative on site to oversee the backfill work within 5 meters or 16 feet? <input type="checkbox"/>		
Owner "contact" declined / exempted to be on site. Name: _____ Phone Number: _____ <input type="checkbox"/>			
GDWP AUTHORIZATION	By signing this permit, all parties acknowledge that the safety requirements have been met, and understood by all those involved with the completion of the work. (Permit valid only for the date issued. All permits are void and subject to re-issue during emergency situations)		
	Permit Issuer (Inspector or designate): _____ (Print) _____ (Sign)		
	Contractor Foreman/Supervisor: _____ (Print) _____ (Sign)		
	Equipment Operator: _____ (Print) _____ (Sign)		
	Facility Owner (if available): _____ (Print) _____ (Sign)		
GROUND DISTURBANCE PERMIT SIGN OFF	By signing this permit, all parties acknowledge that all work to which this permit applies has been completed or suspended and all necessary personnel have been informed.		
	Permit Issuer (Inspector or designate): _____ (Print) _____ (Sign)		
	Contractor Foreman/Supervisor: _____ (Print) _____ (Sign)		
	Equipment Operator: _____ (Print) _____ (Sign)		
	Facility Owner: _____ (Print) _____ (Sign)		



Excavation Guidelines and Hazard Assessment Checklist

(To be completed by a "Competent Contractor Employee" for each excavation.)

Site location:	Company:	Date:
Describe purpose and intent of excavation:		
Soil classification:	Excavation depth:	Excavation width:

This checklist will be regarded as VOID and **must be** reissued if there is a change of the job description or scope changes, or if the Company Site Representative or the Contractor competent person is replaced by someone else.

GENERAL EXCAVATION RULES:		YES	NO	N/A
•	Existing excavations, adjacent areas, and protection systems for above grade facilities are inspected by a competent person daily before starting work.			
•	Employees are protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation.			
•	Spoils, materials, and equipment are set back at least 1 m (3 ft.) from the edge of the excavation.			
•	Slopes of cutback and height of vertical wall are determined as per Provincial OH&S Regulations.			
•	Cutting edge of excavation equipment must remain at least 0.6m (2 ft.) from an underground facility until it has been daylighted by hand digging or waterwashing.			
•	Once daylighted, excavation equipment must work no closer than 0.3m (1 ft.) to the underground facility.			
•	Probing should be used periodically while excavating to confirm the location of facilities and to ensure minimum clearances are maintained			
•	A means of egress is determined for every 7.6 m (25 ft.) in excavation (i.e. sloped walkways, stairs, ladders).			
•	Method of excavating soil is established (e.g. carefully, maximum of depth of six inch cuts at a time, predetermined probing pattern).			

EXISTING PIPELINES AND CABLES:		YES	NO	N/A
•	Available records are referenced (i.e. drawings, blueprints, as-builts, and site photos) and contacts have been made to determine the existence and location of underground pipelines and cables near the excavation area.			
•	A plan or drawing(s) indicating the location of all underground pipelines, cathodic, cables, or conduits is available at the worksite and provided to site personnel, including the operator and spotter.			
•	All underground pipelines, cathodic, cables, or conduits on the drawing(s) are surface located and staked within the proposed excavation and within 3 m (10 ft.) of the outer perimeter of the proposed excavation.			
•	As a minimum, existing pipelines, cathodic, cables, or conduits that enter or cross the proposed excavation have the top and sides daylighted at points 1 m (3 ft.) beyond each side of the excavation and at the midpoint of the excavation.			
•	All known or suspected appurtenances, changes in elevation, or alignment are daylighted.			
•	Additional probing, hand digging, or waterwashing is performed as specified by the Company Site Representative.			
•	Limits of the excavation are clearly established and marked for the operator and spotter.			
•	Existing underground facilities are protected from inadvertent contact, supported, or removed when excavation is in progress.			
•	Above ground facilities (e.g. Power lines, cable trays, pipe racks) are identified, signs are erected, and procedures established to prevent contact and to maintain a safe clearance.			
•	Will the adjacent pipeline or pipelines have to be depressurized or operated at a reduced pressure?			

CONTRACTOR'S COMPETENT PERSON:

Name (print) _____ Signature _____ Date _____

CONTRACTOR OPERATOR:

Name (print) _____ Signature _____ Date _____

DESCRIPTION

Date: _____ Contractor: _____ Location: _____

Time Permit Issued: _____ Time Permit Expires: _____ Time Work Completed: _____

Nearest Medical facility: _____ Emergency Response Phone #: _____

Scope of Work: _____

Confined Space to be Entered: _____

WORK TYPE & AREA

Cold Class 1 Reclassified to non-permit required confined space Hazardous

Hot Class 2 Restricted

Electrical - line side of 480v main breaker (Clearance/Isolation form required) Class 3 Unclassified

JOB TASKS (Select all that apply)

Tank gauging/inspection Vac truck operations Line Repair Hot tap/stopple work

Truck loading/unloading Valve Inspect/maintenance N₂ Purge Excavating & trenching

Welding Hydrotest Loading/Unloading Scrapers Wind farm activities

Motor or pump maintenance Heavy Equipment Operation Electrical work ROW

Tank Cleaning Prover/meter work Line Locating Other: _____

KEY STEPS (related job tasks)

1. _____ 5. _____

2. _____ 6. _____

3. _____ 7. _____

4. _____ 8. _____

HAZARDS CHECKLIST (Select all that apply)

CHEMICAL/ PRODUCTS/MATERIAL

Hydrogen Sulfide Acids/caustics Cleaners/degreasers Herbicides/pesticides

Benzene/Toluene etc. Welding fumes Gasoline or diesel Natural Gas

Coker Naphtha Carbon Monoxide Pipeline coating Mercaptan

Asbestos Abrasive blast dust NGL Other: _____

ENERGY

Electrical less than 480v Pneumatic Mechanical Radiation

Electrical greater than or = 480v Hydraulic Pressure Fluids & Gases

PHYSICAL

Walking/work surfaces Fire/burns Drowning Security

Rotating equipment Vibration Ignition sources Waste

Suspended loads Working at heights Heat stress Grinding

Weather Cuts/sharp edges Debris Congested area

Pinch points Noise Body position Hand/power tools

Falling objects Moving equipment Hot work Lighting

Manual lifting Cave ins Spills Slopes & terrain

ERGONOMIC & BIOLOGICAL

Exposure to poisonous plants/animals/bugs Fatigue Awkward position Vibration

Overexertion Repetitive motion Lifting

OTHER HAZARDS:

CONTROLS CHECKLIST (Select all that apply)

PPE

Appropriate respiratory protection & cartridge or filter Blasting hood Life jackets

Chemical goggles Chemical resistant clothing Protective footwear

Fall protection Safety/impact goggles Fire retardant clothing

Head protection Face shield Personal multi-gas monitor

Hearing protection High Visibility/Reflective Vest

FIRE PROTECTION

Wheeled fire extinguisher Explosion proof extension cords Explosion proof electrical

Portable fire extinguisher Safety watch Spark arrestors

EQUIPMENT

	Time	Initial			
<input type="checkbox"/> Tag line for loads	O ₂ 19.5-23.5%				
<input type="checkbox"/> Barricades	H ₂ S 10ppm				
<input type="checkbox"/> 2-way radio	LEL 4%				
<input type="checkbox"/> Traffic control devices/signs	Benzene 0.5 ppm				
<input type="checkbox"/> Adequate lighting	CO 35ppm				
<input type="checkbox"/> Rescue Equipment or team	Other				
<input type="checkbox"/> Control ignition sources	Location				
<input type="checkbox"/> Wind sock	Testers Name: _____				
<input type="checkbox"/> Bonding/grounding equip.	Testers Signature: _____				
<input type="checkbox"/> Air shutoffs					
<input type="checkbox"/> Mechanical ventilation (capacity) _____					
<input type="checkbox"/> Backup alarms					
<input type="checkbox"/> Isolate lockout equipment					
<input type="checkbox"/> Area PID or grab sample gas detector					

ELECTRICAL

High voltage probe/gloves on-site & available Electrical workers qualified & experienced

Arc hazard PPE as per NFPA 70E Test & confirm voltage on electrical conductors

Safe limits of approach understood & maintained Grounding cables on-site

Voltmeter not used on conductors greater than 750v CAN. (600v U.S.) GFI protection

EXCAVATION

Check for induced current Maintain min. clearance with mechanical excavation Provide shoring/trench box

Provide competent person (U.S.) Soil type: _____; Method used (U.S.) visual _____ mechanical _____ Provide rescue procedures

Provide slope angle of: _____ Locate & identify underground piping & electrical lines Provide means of egress

OTHER CONTROLS:

ENTRANTS (List Safety Watch first)

Safety watch	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

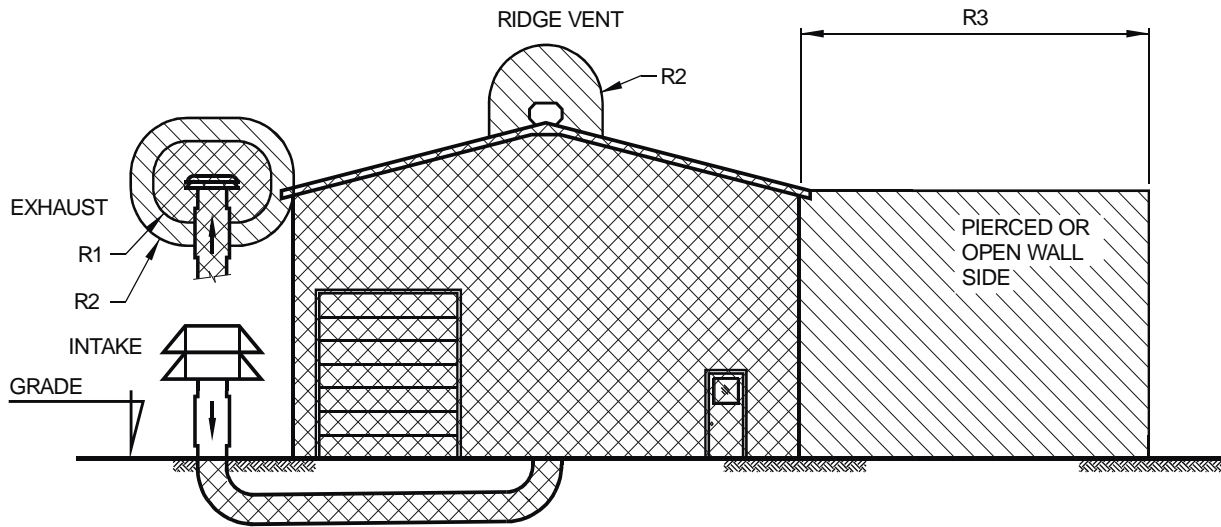
APPROVALS

Permit Approver: Local Operations Mgmt. Name: _____ Communication: _____




Permit Issuer: Print Name: _____ Signature: _____

Permit Receiver (person in charge): Print Name: _____ Signature: _____

HAZARDOUS AND RESTRICTED AREAS



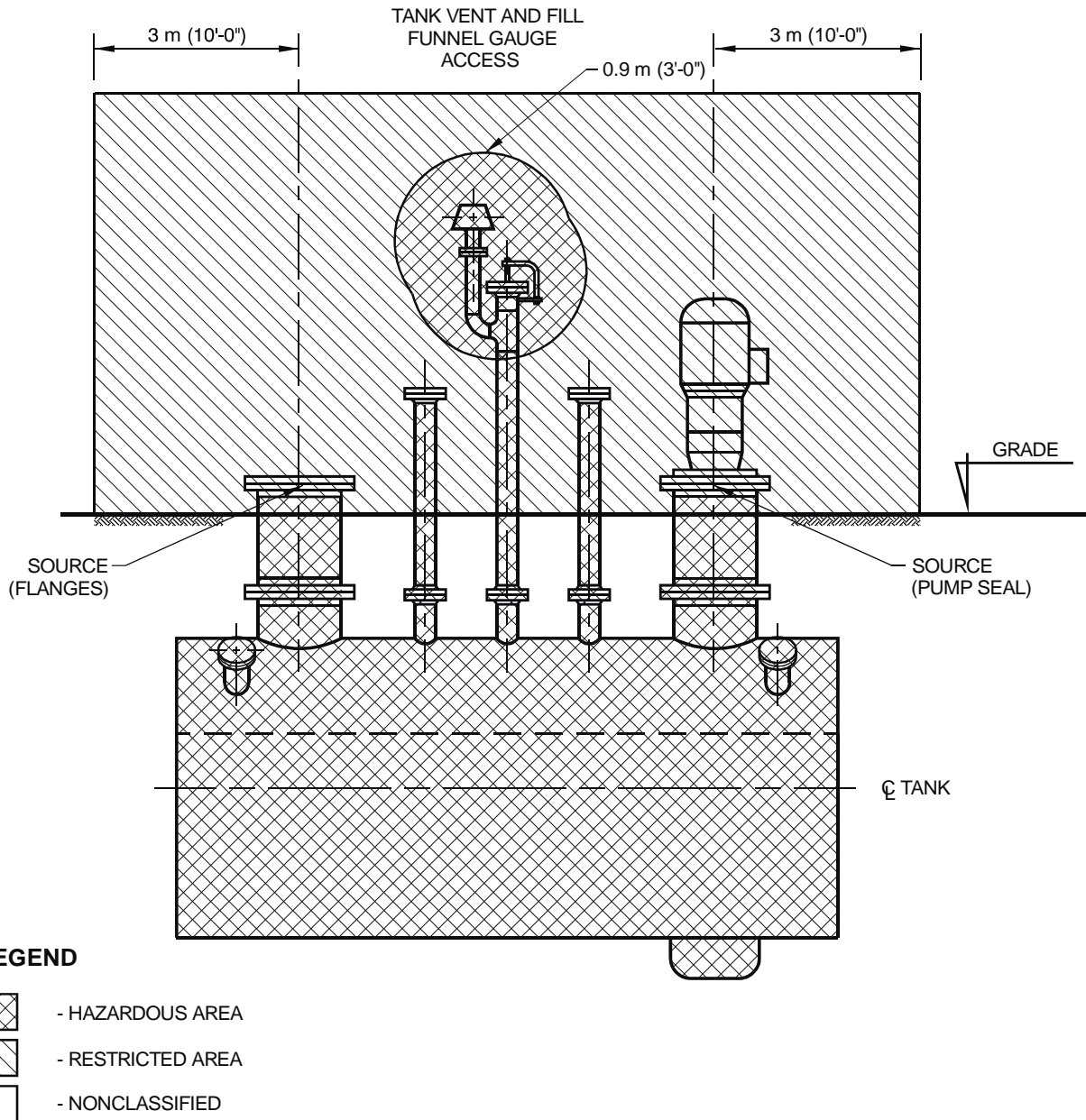
LEGEND

-  - HAZARDOUS AREA
-  - RESTRICTED AREA
-  - NONCLASSIFIED

COMMODITY	DISTANCE		
	R1	R2	R3
LIQUID PETROLEUM	0.9 m (3'-0")	1.5 m (5'-0")	15 m (50'-0")
NGL	1.5 m (5'-0")	4.5 m (15'-0")	30 m (100'-0")

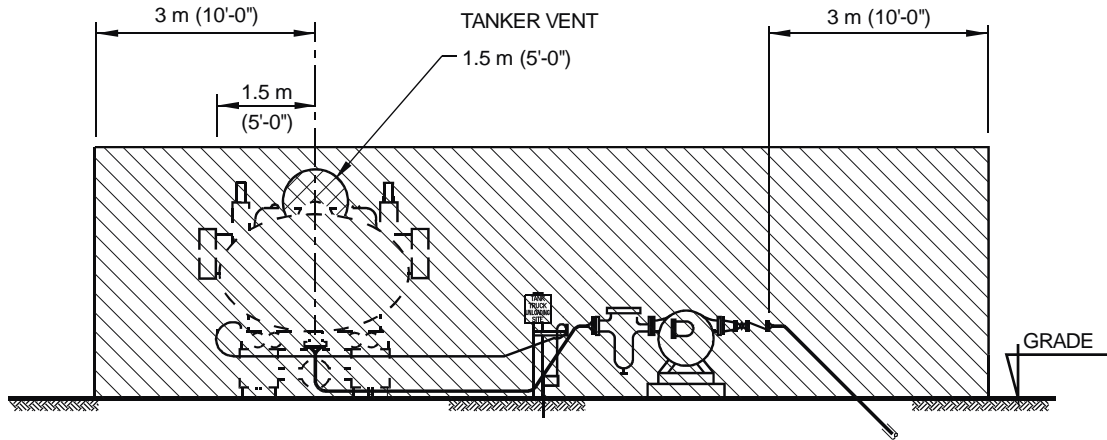
Mainline Pump/Booster Pump Shelters/Rooms (Includes Engine Rooms in ENB [NW1])

HAZARDOUS AND RESTRICTED AREAS






Sump Tank and Vents

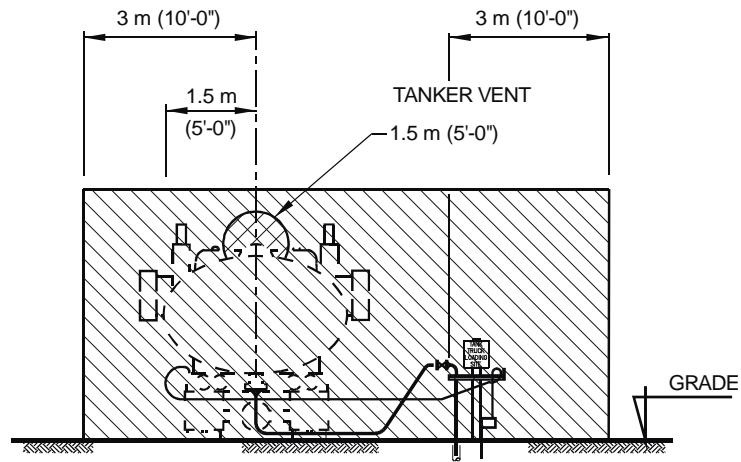
HAZARDOUS AND RESTRICTED AREAS



LEGEND

-  - HAZARDOUS AREA
-  - RESTRICTED AREA
-  - NONCLASSIFIED

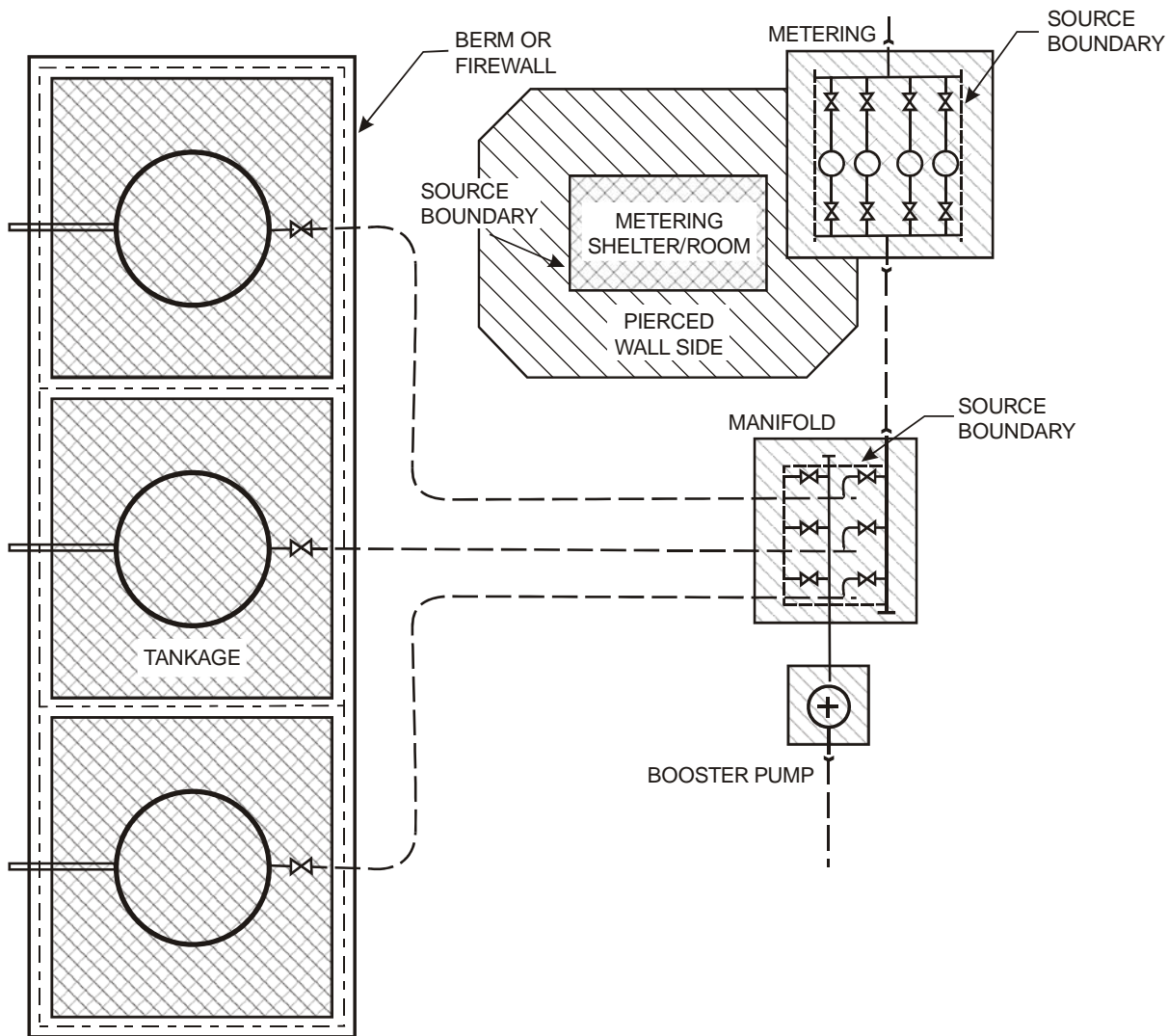
TYPICAL TANK TRUCK UNLOADING FACILITY






TYPICAL TANK TRUCK LOADING STATION

Tank Truck Facilities

HAZARDOUS AND RESTRICTED AREAS



LEGEND

-  - HAZARDOUS AREA
-  - RESTRICTED AREA
-  - NON-CLASSIFIED

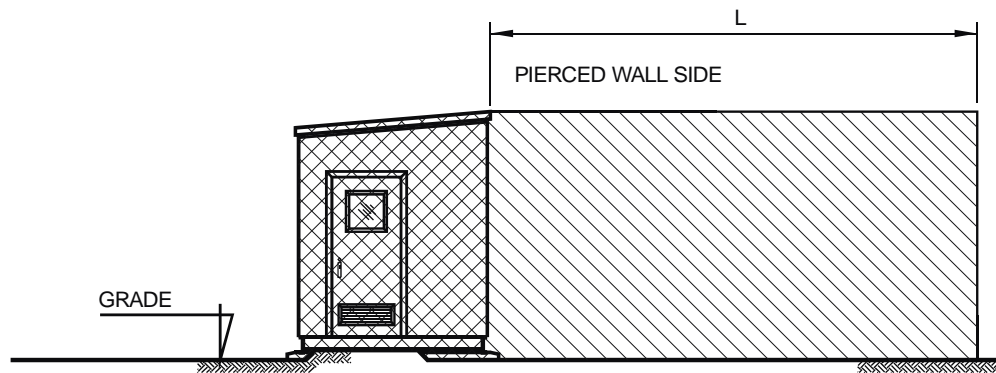
FACILITY	DISTANCE	
	LIQUID PETROLEUM	NGL
OUTDOOR MANIFOLD*	3 m (10'-0")	6 m (20'-0")
METERING SHELTER*	3 m (10'-0")	6 m (20'-0")
OUTDOOR METERING*	3 m (10'-0")	6 m (20'-0")
OUTDOOR BOOSTER PUMP**	15 m (50'-0")	30 m (100'-0")

* DISTANCE FROM SOURCE BOUNDARY




** DISTANCE FROM CENTER OF PUMP

Metering Shelters/Rooms and Areas, Manifold Areas, Booster Pumps and Tankage Areas

HAZARDOUS AND RESTRICTED AREAS



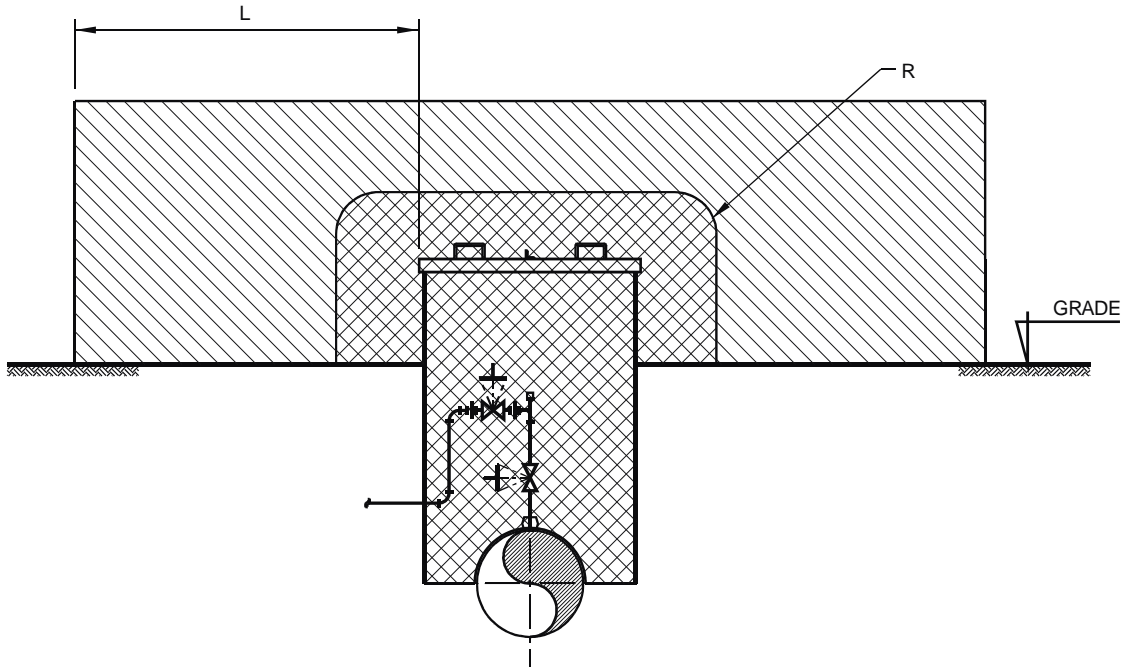
LEGEND

-  - HAZARDOUS AREA
-  - RESTRICTED AREA
-  - NONCLASSIFIED




COMMODITY	DISTANCE L
LIQUID PETROLEUM	3 m (10'-0")
NGL	6 m (20'-0")

Densitometer, Sampler and Instrument Shelters

HAZARDOUS AND RESTRICTED AREAS



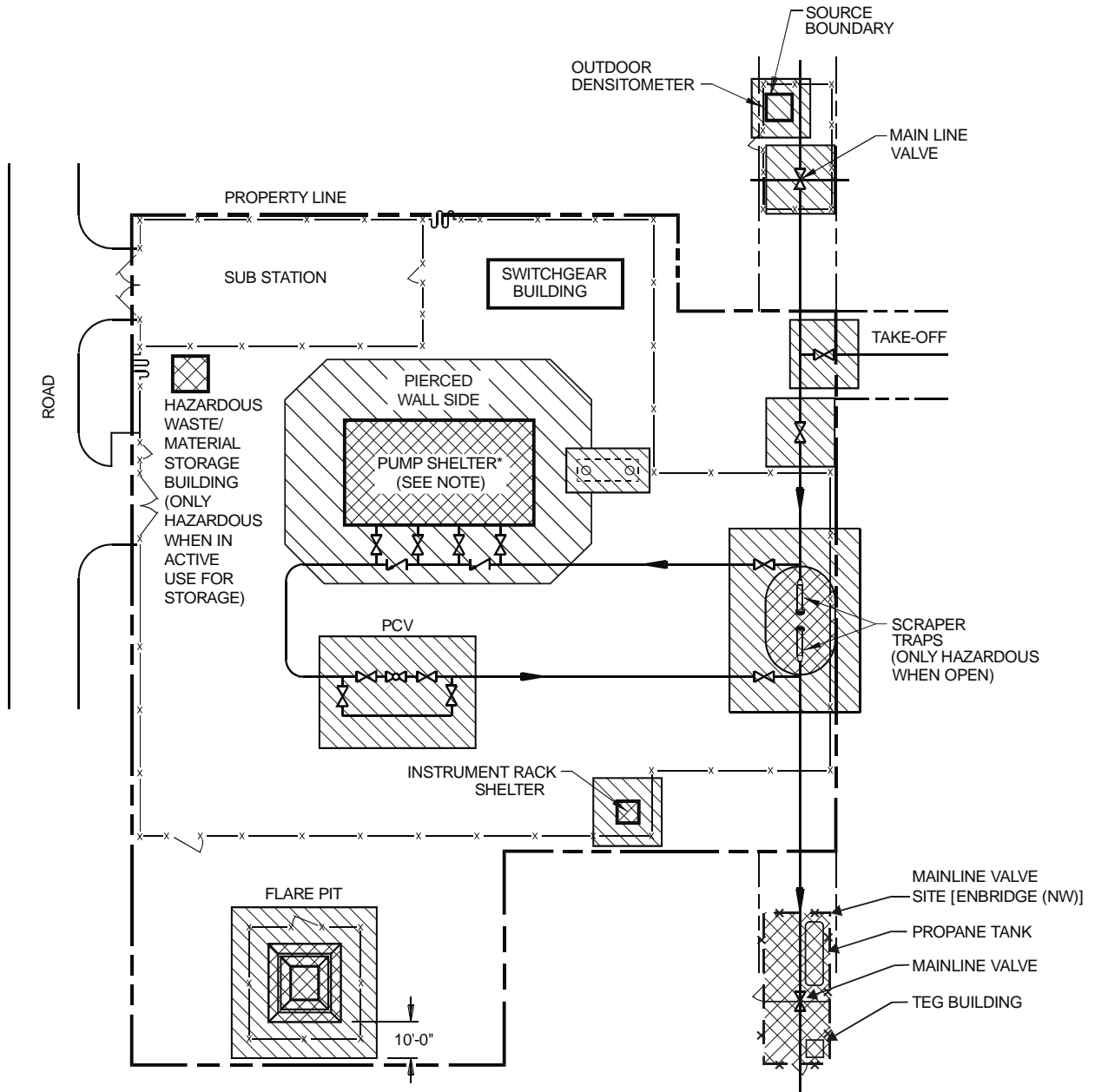
LEGEND

-  - HAZARDOUS AREA
-  - RESTRICTED AREA
-  - NONCLASSIFIED




COMMODITY	DISTANCE	
	L	R
LIQUID PETROLEUM	3 m (10'-0")	1.5 m (5'-0")
NGL	6 m (20'-0")	1.5 m (5'-0")

Below-Grade Access Culverts

HAZARDOUS AND RESTRICTED AREAS



LEGEND

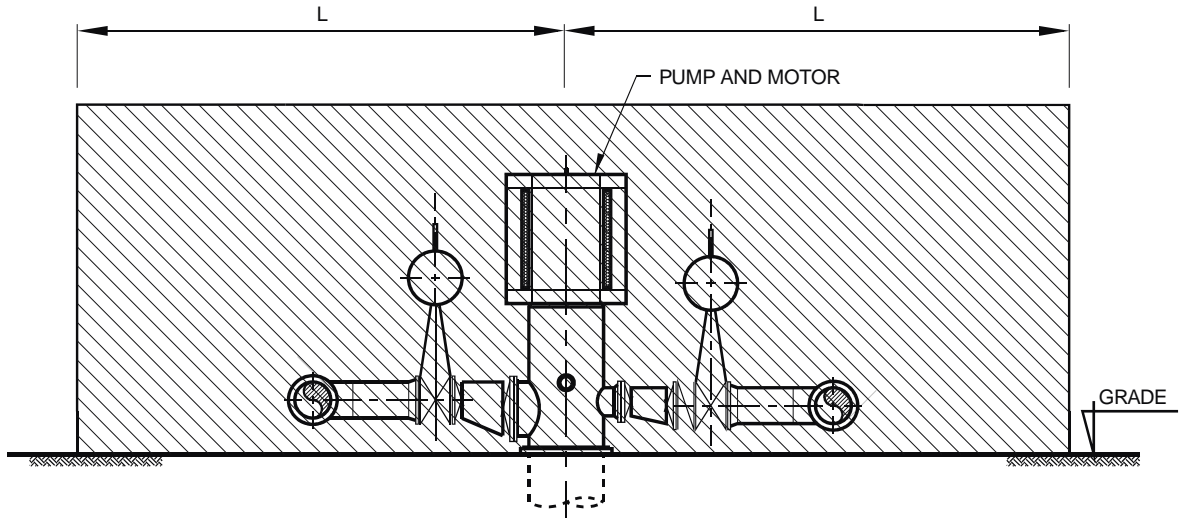
-  - HAZARDOUS AREA
-  - RESTRICTED AREA
-  - NONCLASSIFIED

FACILITY	DISTANCE	
	LIQUID PETROLEUM	NGL
OUTDOOR DENSITOMETER	3 m (10'-0")	6 m (20'-0")
VALVES	3 m (10'-0")	6 m (20'-0")




* NOTE: INCLUDES PUMP & ENGINE ROOMS IN ENBRIDGE (NW)

Typical Stations and Mainline Area Classification

HAZARDOUS AND RESTRICTED AREAS



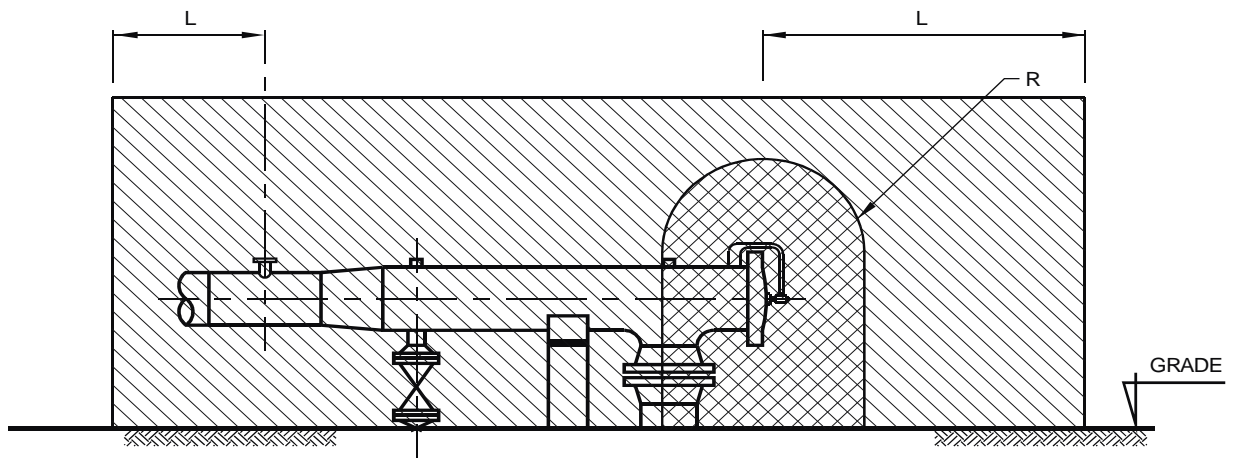
LEGEND

-  - HAZARDOUS AREA
-  - RESTRICTED AREA
-  - NONCLASSIFIED




COMMODITY	DISTANCE FROM CENTRE OF PUMP L
LIQUID PETROLEUM	15 m (50'-0")
NGL	30 m (100'-0")

Outdoor Pumps

HAZARDOUS AND RESTRICTED AREAS



LEGEND

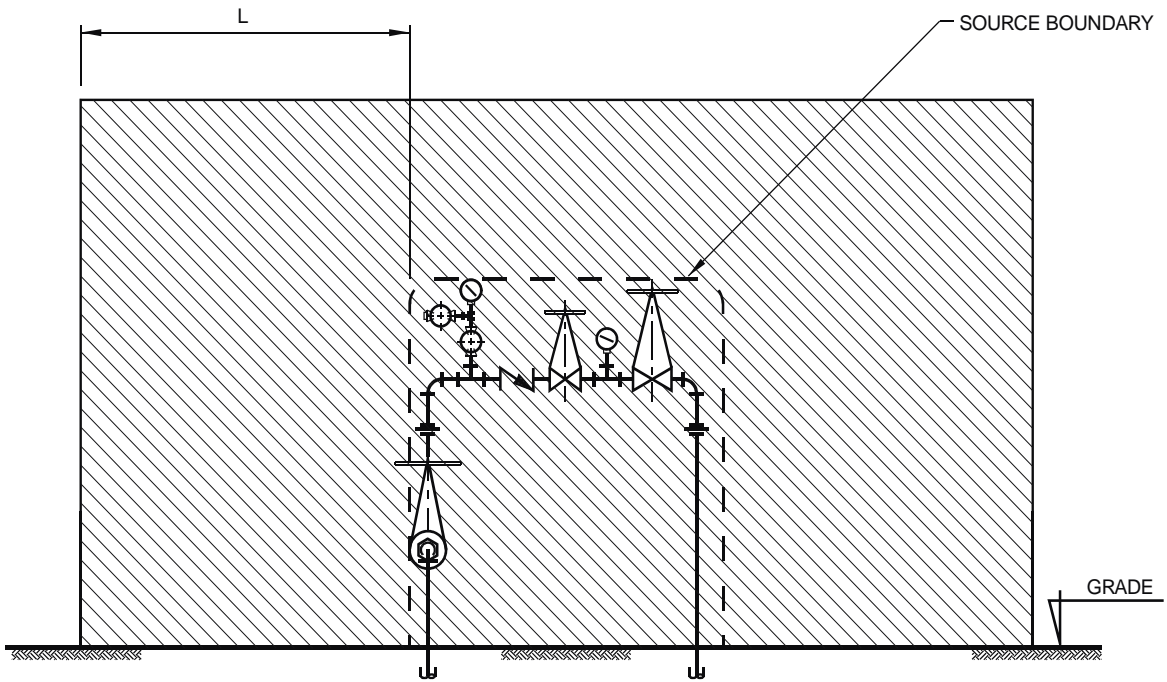
-  - HAZARDOUS AREA (ONLY WHEN OPEN)
-  - RESTRICTED AREA
-  - NONCLASSIFIED

COMMODITY	DISTANCE FROM TRAPS / PROVERS*	
	L	R - (ONLY WHEN OPEN)
LIQUID PETROLEUM	3 m (10'-0")	1.5 m (5'-0")
NGL	6 m (20'-0")	1.5 m (5'-0")




* FOR PROVERS, L IS MEASURED FROM PERIMETER OF PROVER AND R IS FROM PROVER OPENINGS.

Provers and Scraper Traps

HAZARDOUS AND RESTRICTED AREAS



LEGEND

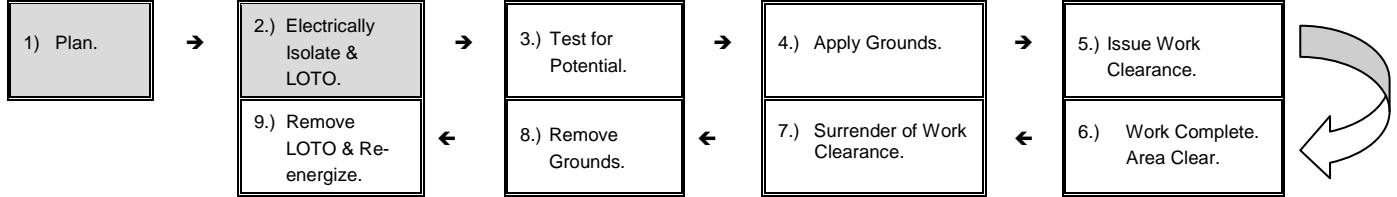
-  - HAZARDOUS AREA
-  - RESTRICTED AREA
-  - NONCLASSIFIED

COMMODITY	DISTANCE L
LIQUID PETROLEUM	3 m (10'-0")
NGL	6 m (20'-0")

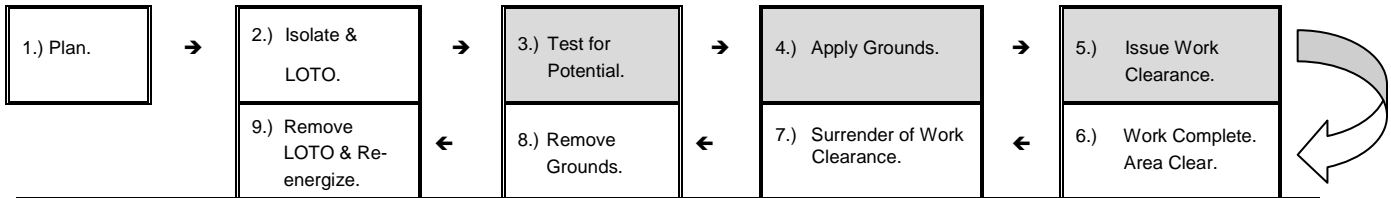
Valves and Instrumentation

ELECTRICAL EQUIPMENT ISOLATION & WORK CLEARANCE

Must complete SWP and Steps 1 to 5 Prior to Commencing Work



1) PLAN								GENERAL INFORMATION								
Station / Terminal:				Date:				Maximo WO#:				SWP #:				
This clearance is in effect from				Hours				TO				Hours				
Description of Equipment Out-of-Service/ Electrically Isolated:																
Scope of Work and Reason: (If scope of work changes, a new Electrical Isolation & Work Clearance form is required)																
Remarks:																
Where are the instructions to operate the control device for isolation of electrical equipment? (Control device means the device that will safely disconnect electrical equipment from its source of energy):																
2) Isolate & Lockout	ISOLATION PROCEDURE STEPS				Initials of Person In Charge	One Lock, One Key & Tag (X)	Interlock. Key System? (X)	Time LOTO Completed	Time LOTO Removed (Completed During Step #9)							



3) Test for Potential	Test meter - list location Test de-energized circuit - list location Recheck meter – list location	Initials of Person In Charge	Time Completed
1)			
2)			
3)			
4) Apply Ground Set(s)	LOCATION OF GROUND SET(S)	Initials of Person in charge	Time Grounds Installed
1)			
2)			

In addition to identifying Hazards and Controls on the Safe Work Permit (Hazard Assessment) form, identify specific High Voltage Hazards located near the work area:

- energized bus _____
 tie lines _____
 feeders _____
 backfeed sources (i.e. UPS's or generators) **OR**
 others _____
 connections _____
 switches _____

5) ISSUE OF WORK CLEARANCE

***Clearance Issued By:**

Name	Signature	Time
------	-----------	------

Clearance Issued To:

Name	Signature	Time
------	-----------	------

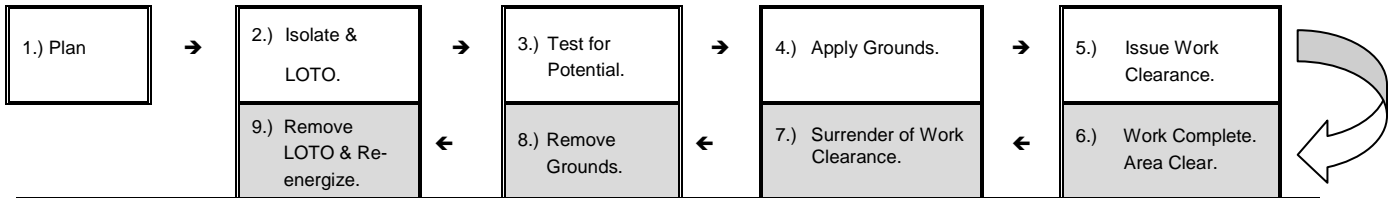
Person In Charge of Work:

Name	Signature	Time
------	-----------	------

WORKERS (signatures verify receipt of instruction and explanation of the work)

Person(s) working on Equipment	Signature	Time	Person(s) working on Equipment	Signature	Time

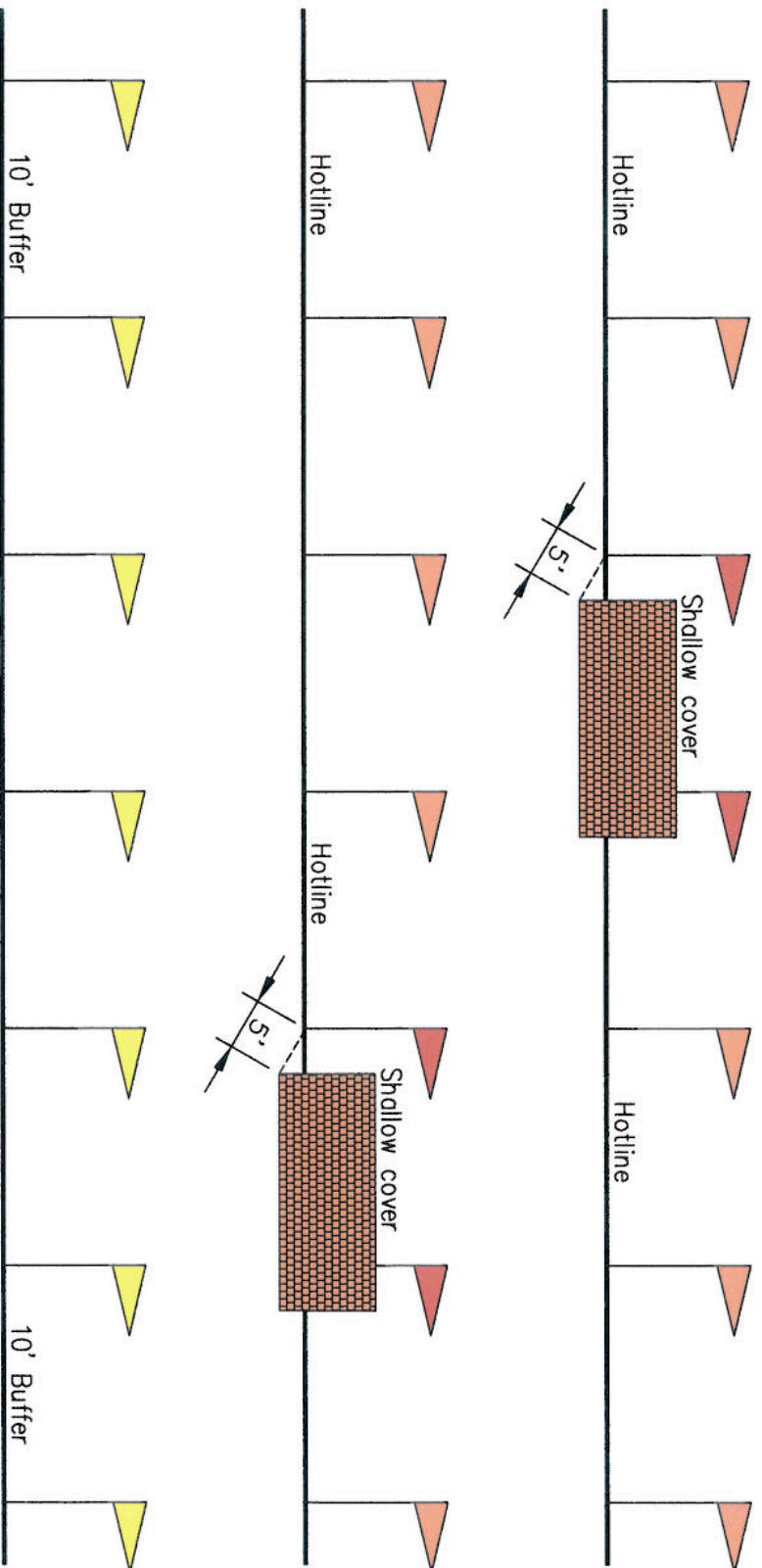
- * Onsite person that verifies clearance.
If working alone, this will be the same person signing all three.
When more than one person is working, a single person must be designated as being in charge.



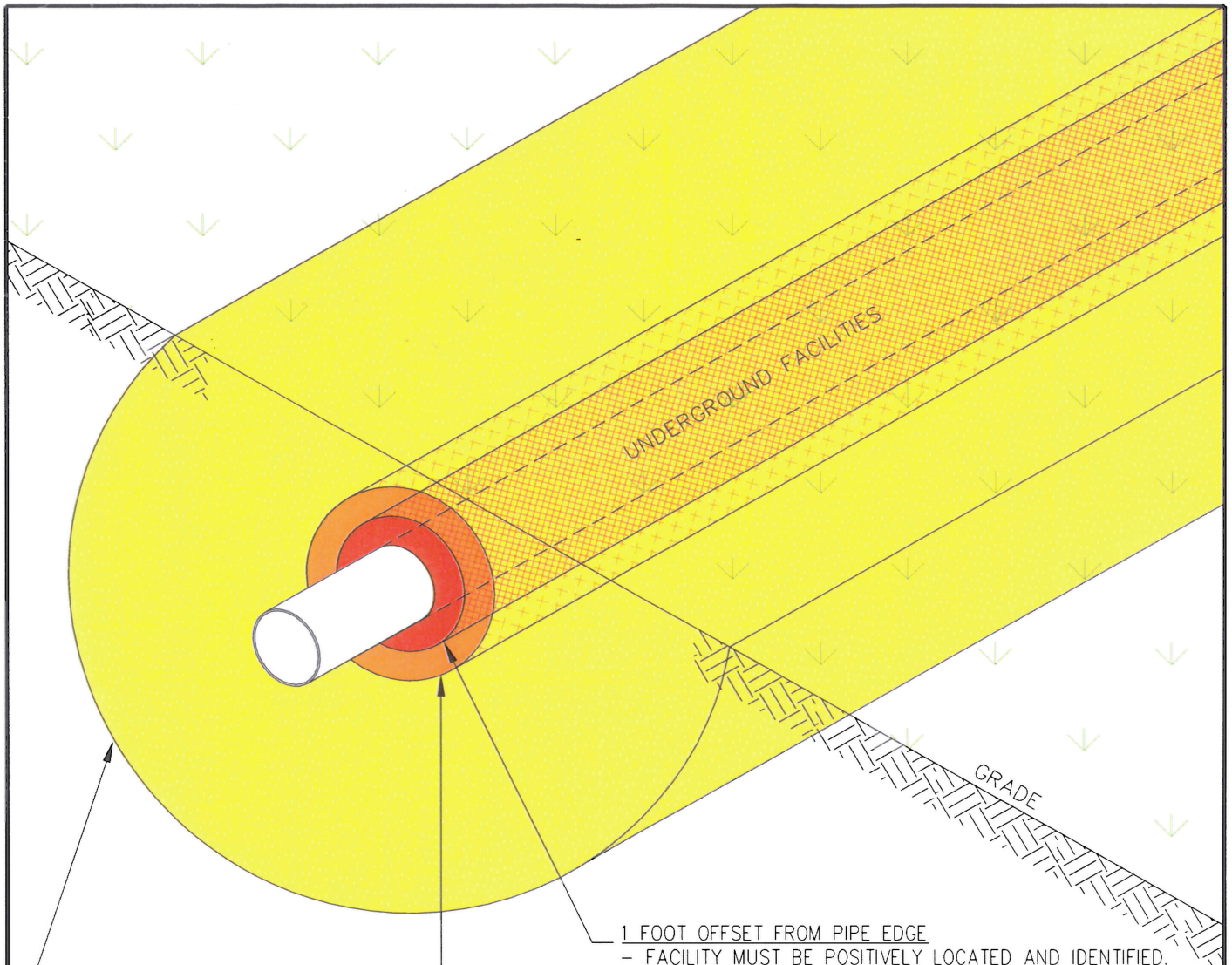
6) WORK COMPLETE. PEOPLE & TOOLS CLEAR.		
All work on equipment has ceased and communicated to all workers?	<input type="checkbox"/> YES	
All personnel have been advised account for tools?	<input type="checkbox"/> YES	
All proper personnel have been advised to consider equipment energized?	<input type="checkbox"/> YES	
Assigned Person in Charge of Work:		
Name:	Signature:	Time:
7) SURRENDER OF WORK CLEARANCE		
**Work Clearance Surrendered By:	Signature	Time
**Work Clearance Surrendered To:	Signature	Time
**Work Clearance Surrendered To:	Signature	Time
8) REMOVE GROUND SET(S)		
Remove Grounds as Listed in Step 4, "Apply Grounds".		
Return to Step 4, "Apply Grounds" to remove ground set(s), and record time.	<input type="checkbox"/> YES	
9) REMOVE LOTO AND RE-ENERGIZE		
Are all safety grounds removed?	<input type="checkbox"/> YES	Number of Sets
Signed:		
Restore & Reenergize all Equipment.	<input type="checkbox"/> YES	
<i>Person responsible for location (or designate)</i>		
Signature:	Date:	Time:

****** If working alone this will be the same person signing all entries.
 'Work Clearance Surrendered To' includes both the person in charge of work and the person clearance was issued to, to perform the work.

ROW Flagging Legend




- Orange Flags Hotline marker required on each hotline every 200 feet with depth of cover written in permanent marker on the flag.
- Red Flag Shallow cover marker at beginning and end of shallow cover with depth of cover written in permanent marker on the flag.
- Orange Fencing Shallow cover
- Yellow Flag 10' buffer zone marker every 200'



10 FOOT OFFSET FROM PIPE EDGE
 - NO MECHANICAL EXCAVATION PRIOR TO POSITIVELY LOCATING AND IDENTIFYING ALL UNDERGROUND FACILITIES.
 - NO TEETH OR SIDE CUTTERS ON EQUIPMENT.

1 FOOT OFFSET FROM PIPE EDGE
 - FACILITY MUST BE POSITIVELY LOCATED AND IDENTIFIED.
 - POSITIVELY NO MECHANICAL EXCAVATION.
 - HAND DIGGING OR WATER WASH ONLY.

2 FOOT OFFSET FROM PIPE EDGE
 - NO MECHANICAL EXCAVATION WHETHER DIRECTLY ON TOP OR TO ANY SIDE OF THE FACILITY WITHOUT POSITIVELY LOCATING AND IDENTIFYING.
 - PROBING WILL BE CONTINUOUSLY CONDUCTED TO CONFIRM MAINTENANCE OF 2 FOOT OFFSET PRIOR TO EXCAVATION.
 - NO TEETH OR SIDE CUTTERS ON EQUIPMENT.

	DATE: 1/19/10	BY: BHP
	SCALE: NONE	
GROUND DISTURBANCE REQUIREMENTS	CHECKED: PJB	
	APPROVED: LAMAR	
	A-1.02-11450-0-000	

A-1.02-11528-4-000

GROUND DISTURBANCE REQUIREMENTS



APPROVED: LAMAR

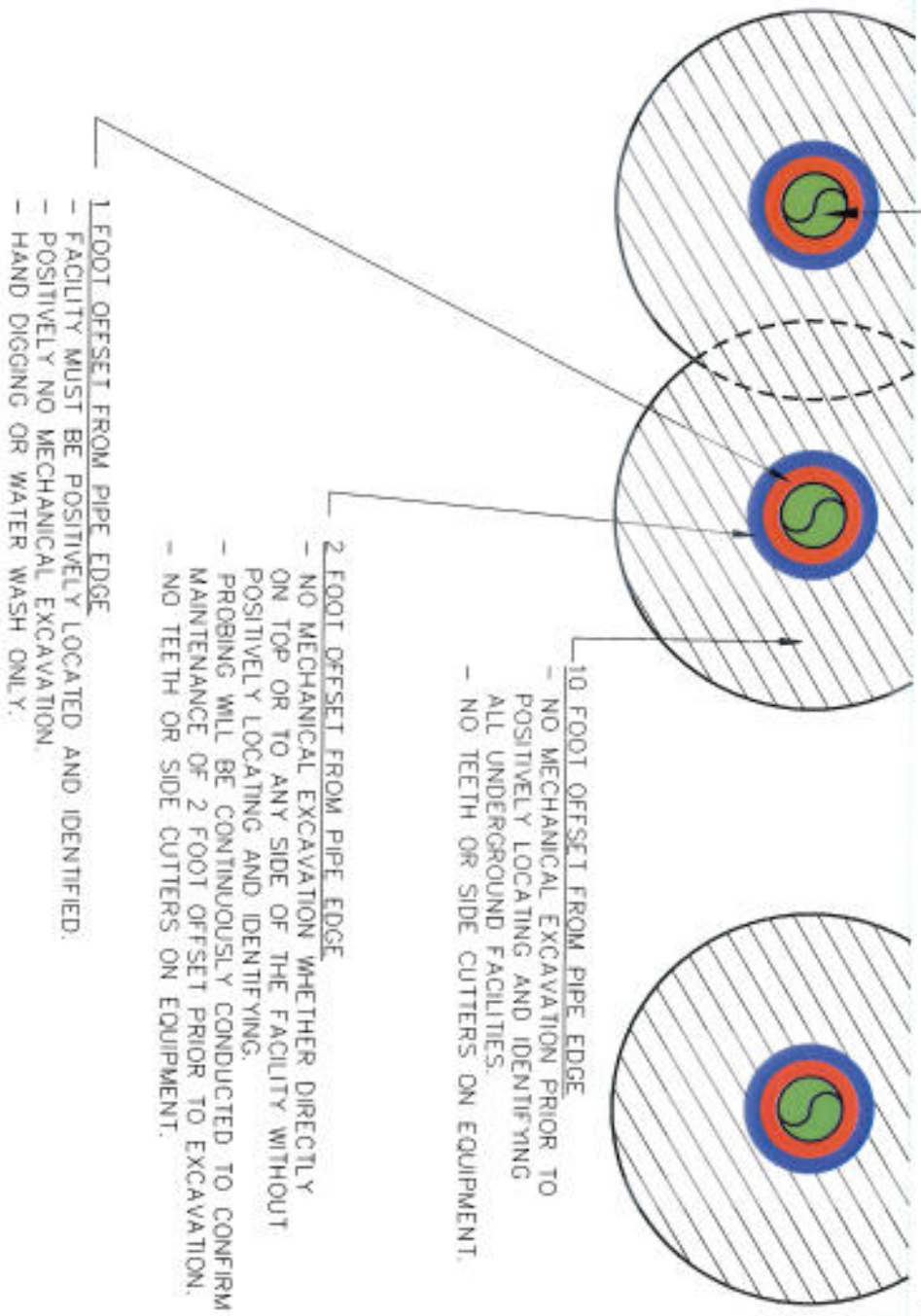
CHECKED: PJB

SCALE: NONE

DATE: 1/18/10 BY: BHP

UNDERGROUND FACILITIES

GRADE








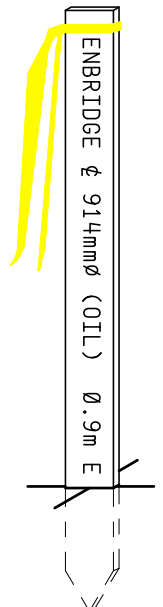
- 10 FOOT OFFSET FROM PIPE EDGE**
- NO MECHANICAL EXCAVATION PRIOR TO POSITIVELY LOCATING AND IDENTIFYING ALL UNDERGROUND FACILITIES.
 - NO TEETH OR SIDE CUTTERS ON EQUIPMENT.

- 2 FOOT OFFSET FROM PIPE EDGE**
- NO MECHANICAL EXCAVATION WHETHER DIRECTLY ON TOP OR TO ANY SIDE OF THE FACILITY WITHOUT POSITIVELY LOCATING AND IDENTIFYING.
 - PROBING WILL BE CONTINUOUSLY CONDUCTED TO CONFIRM MAINTENANCE OF 2 FOOT OFFSET PRIOR TO EXCAVATION.
 - NO TEETH OR SIDE CUTTERS ON EQUIPMENT.

- 1 FOOT OFFSET FROM PIPE EDGE**
- FACILITY MUST BE POSITIVELY LOCATED AND IDENTIFIED.
 - POSITIVELY NO MECHANICAL EXCAVATION
 - HAND DIGGING OR WATER WASH ONLY.



BURIED FACILITIES

-  YELLOW - GAS, OIL, STEAM, PETROLEUM & GASEOUS MATERIALS
-  ORANGE - TELEPHONE, CABLE TV, COMMUNICATION, ALARM & SIGNAL LINES
-  BLUE - POTABLE & RECLAIMED WATER, IRRIGATION & SLURRY LINES
-  RED - ELECTRICAL POWER LINES, CABLE CONDUIT, LIGHTING & CATHODIC PROTECTION
-  GREEN - SANITARY SEWERS, STORM SEWERS & DRAIN LINES





STAKE MARKING
DETAIL

RIGHT-OF-WAY STAKING

-  WHITE - PROPOSED ϕ OF EXCAVATION AND/OR CONSTRUCTION INFO.
-  PINK - RIGHT-OF-WAY LIMIT, TEMPORARY WORKROOM & SLASHING LIMIT

NOTE: THE TWO FLAGGING COLOUR SCHEMES INDICATED BELOW ARE UNIQUE TO ENBRIDGE

-  PINK WITH BLACK - SAFETY BUFFER ADJACENT TO EXISTING PARALLEL PIPELINE(S)
-  RED WITH WHITE - SURVEY MONUMENTS, LEGAL SURVEY PINS, BENCH MARKS, REFERENCE BARS

NOTES:

1. ALL BURIED FACILITIES AND RIGHT-OF-WAY INFORMATION SHALL BE MARKED IN ACCORDANCE WITH THIS COLOUR SCHEME.
2. STAKES USED TO LOCATE AND IDENTIFY BURIED FACILITIES SHALL BE CLEARLY MARKED WITH THE FOLLOWING INFORMATION:
 - PIPELINE/FACILITY OWNER'S NAME
 - PIPELINE/FACILITY IDENTIFICATION AND SIZE IF KNOWN (EX. 150mmØ GAS, 50mmØ WATER, ETC.)
 - APPROXIMATE DEPTH OF COVER AND **LOCATION METHOD USED**, EX. 1.2m **E** (ELECTRONIC) OR 1.2m **P** (HAND PROBED)
3. FACILITIES SHALL BE LOCATED AND STAKED:
 - ACROSS THE ENTIRE CONSTRUCTION AREA AND EXTEND A MINIMUM OF ONE (1) STAKES BEYOND BOTH CONSTRUCTION LIMIT BOUNDARIES (INCLUDING EXTRA WORKSPACE AREAS), AND
 - STAKES ARE NOT TO EXCEED 10.0m INTERVALS.



Enbridge Pipelines Inc.
10201 Jasper Avenue
Edmonton Alberta Canada

TYPICAL SURVEY
COLOUR CODES

3	REVISED AS PER MARKUP	01/26/2001 SE	DRB	DRAWN	FJB	CHECK	FB/JPF	APPR	DLawson/TSIeno
	NO	REVISION	DATE/BY	APPROVE	DATE	SCALE	NTS	APPR	GB/TB

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A-0.1-2410-3-0

2008 Common Ground Alliance / "One Call" Directory

Canada

Alberta	1-800-242-3447
British Columbia	1-800-474-6886
Ontario	1-800-400-2255
Quebec	1-800-663-9228
Saskatchewan	1-800-828-4888

United States ***811**

Alabama	1-800-292-8525
Alaska	1-800-478-3121
Arizona	1-800-782-5348
Arkansas	1-800-482-8998
California	1-800-227-2600
Colorado	1-800-922-1987
Connecticut	1-800-922-4455
Delaware	1-800-282-8555
Florida	1-800-432-4770
Georgia	1-800-282-7411
Hawaii	1-866-423-7287
Idaho	1-800-342-1585
Illinois	1-312-744-7000
Indiana	1-800-292-8989
Kansas	1-800-344-7233
Kentucky	1-800-752-6007
Louisiana	1-800-272-3020
Maine	1-888-344-7233
Maryland	1-800-257-7777
Massachusetts	1-888-344-7233
Michigan	1-800-482-7171
Minnesota	1-800-252-1166
Mississippi	1-800-227-6477
Missouri	1-866-344-7483
Montana	1-800-424-5555
Nebraska	1-800-331-5666
Nevada	1-800-227-2600
New Hampshire	1-888-344-7233
New Jersey	1-800-272-1000
New Mexico	1-800-321-2537
New York	1-800-962-7962
North Carolina	1-800-632-4949
North Dakota	1-800-795-0555
Ohio	1-800-362-2764
Oklahoma	1-800-522-6543
Oregon	1-800-332-2344
Pennsylvania	1-800-248-1786
Rhode Island	1-888-344-7233
South Carolina	1-888-721-7877
South Dakota	1-605-339-0529
Tennessee	1-800-351-1111
Texas	1-800-344-8377
Utah	1-800-662-4111
Vermont	1-888-344-7233
Verginia	1-800-552-7001
Washington	1-800-424-5555
Washington D.C.	1-800-257-7777
West Verginia	1-800-245-4848
Wisconsin	1-800-242-8511
Wyoming	1-800-849-2476



EMERGENCY CONTACTS

AMBULANCE: _____

FIRE — RESCUE: _____

HOSPITAL: _____

POLICE: _____

Site Address: _____

City, State, ZIP _____

GPS: _____

Site Safety: _____

Construction Manager: _____

Local Operations Contact #: _____

**24 Hour Non-Medical Emergency Contact:
1-800-858-5253**

Supervisor Safety Training Programs

INTRODUCTION

The following is a list of Enbridge's supervisory safety training programs that are recognized as being approved and are considered as minimum training requirements for a Safety Officer as required under the General and Special Conditions in the Contract Documents. Other training programs offered by outside agencies may also be acceptable; however, details of programs (description, detailed outline etc.) must be submitted to Enbridge for review and approval prior to commencement of work.

Topics covered in such programs may include employee orientation and training, safe work behaviors, hazard identification and workplace inspections, conducting effective safety meetings, safe work permits, safety regulations and supervisory responsibilities, accident causes, injury/incident investigation and reporting.

BRITISH COLUMBIA	
Workers Compensation Board of British Columbia 6951 Westminster Highway Richmond, B.C. V6B 5L5 Telephone (604) 273-2266 Course Part 1 Supervisor Safety Management Duration 1 Day Course Part 2 Hazard Recognition and Control Duration 1 Day	
British Columbia Safety Council #2225 - 21331 Gordon Way Richmond, B.C. V6W 1J9 Telephone (604) 214-7433 Course Trades Safety Co-coordinator Certification Course ~OR~ Construction Safety Officer Certification Course ~OR~ Supervisory Skills Training Program Duration 4 days each	
ALBERTA	
Alberta Construction Safety Association #101, 13025 St. Albert Trail Edmonton, Alberta T5L 5G2 Telephone (780) 453-3311 Toll Free (Alberta) 1-800-661-2272 Course Leadership for Safety Excellence Duration 2 Days	
Alberta Construction Safety Association 201 – 12 Street N.E. Calgary, Alberta T2E 7J2 Telephone (403) 291-3710 Toll Free (Alberta) 1-800-661-6090 Course Leadership for Safety Excellence	

Duration	2 Days
Hazard Alert Training Inc. 4940 87 Street Edmonton, Alberta T6E 5W3 Telephone (780) 466-6960 Toll Free 1-800-561-2319 Course Supervisor Safety Duration 2 days	
International Training Services 3200 - 13 Mission Avenue St. Albert, Alberta T8N 1H6 Telephone (780) 458-8717 Course Safety for Supervisors Duration 2 days	

ALBERTA (continued)	
Canada Training Group Inc. #240, 3015 – 5 th . Avenue N.E. Calgary, Alberta T2A 6T8 Telephone (403) 248-2437 Toll free 1-800-661-1663 Course Accident Control for Supervisors Duration 2 or 3 days	
Moduspec Risk Management Services Canada Ltd. #325, 525 - 28 Street S.E. Calgary, Alberta T2A 6W9 Telephone (403) 235-4007 Course Practical Safety for Site Inspectors Duration 1 Day ~OR~ Practical Safety Management for Line Supervisors Duration 2 Days	
Petroleum Industry Training Service (PITS) 1538 – 25 Avenue N.E. Calgary, Alberta T2E 8Y3 Telephone (403) 250-9606 Course Safety Training for Jobsite Supervisors Duration 2 days	

SASKATCHEWAN	
Armor Consulting and Training Ltd. P.O. Box 192 White City, Saskatchewan S0G 5B0 Telephone (306) 352-8805 Course Supervision & Safety/Legislation Overview, Workplace Inspections/Hazard Identification and Accident/Hazard Investigation Duration 3 days	
Heavy Construction Safety Association of Saskatchewan Inc. 445 Hoffer Drive Regina, Saskatchewan S4N 6E2 Telephone (306) 729-3060	

Course	Safety Excellence Leadership
Duration	2 Days
Saskatchewan Construction Association Inc.	
1939 Elphinstone Street Regina, Saskatchewan S4T 3N3	
Telephone	(306) 525-0171
Course	Leadership for Safety Excellence
Duration	2 days
Saskatchewan Occupational Health and Safety	
Saskatchewan Place 1870 Albert Street Regina, Saskatchewan S4P 3V7	
Telephone	(306) 797-4496
Course	Supervision and Safety
Duration	1 Day
~OR~	Level 1 and Level 2 Safety Training
Duration	4 Days

MANITOBA	
Manitoba Construction Safety Association	
290 Burrell Street Winnipeg, Manitoba, R3G 2A7	
Telephone	(204) 775-3171
Course	Leadership for Excellence
Duration	2 days
Manitoba Heavy Construction Association	
1236 Ellice Avenue Winnipeg, Manitoba R3G OE7	
Telephone	(204) 947-1379
Course	Accident Investigation Due Diligence and Prime Contractor Excavations and Trenching Fall Protection Awareness Hazard Assessment
Duration	2 ½ Days (total)
Manitoba Safety Council	
Room 202 #3, 1680 Notre Dame Avenue Winnipeg, Manitoba R3H 1H6	
Telephone	(204) 949-1085
Course	Modern Safety Management & Training
Duration	2 days

ONTARIO	
Construction Safety Association of Ontario	
21 Voyager Court South Etobicoke, Ontario M9W 5M7	
Telephone	(416) 674-2726
Toll-Free	1-800-781-2726
Course	Basics of Supervising
Duration	3 Days
~OR~	Construction Health and Safety Representative
Duration	5 days
Industrial Accident Prevention Association of Ontario	

Toronto, Burlington, Ottawa, Rexdale, Thunder Bay, Peterborough, Kingston,
Barrie, Cambridge, Scarborough, London, Sudbury, Ontario

Toll-Free 1-800-406-4272

Course **Practical Loss Control Management**

Duration 7 Half-Days

~OR~ **Hazard Identification for Workplace Inspection
Health and Safety Representatives**

Duration 1 Day (per course)

QUEBEC

**Commission de la Santé et
de la Sécurité du Travail au Québec (CSST)**

#1 Complexe Desjardins

Tour du Sud 3^e étage

Case Postal 3,

Succursale, Desjardins

Montreal, Quebec H5B 1H1

Telephone (514) 873-3990

Course **Health and Safety on Construction Sites**

Duration 30 Hours

NORTH AMERICAN

Pipeline Contractors Association of Canada (PLCAC)

Suite 201, 1075 North Service Road West

Oakville, ON L6M 2G2

Telephone (905) 847-9383

Fax (905) 847-7824

e-mail plcac@pipeline.ca

Course **Professional Leadership Development Program**

Duration 2 Days

DNV Loss Control Management

International Loss Control Institute, Inc.

4546 Atlanta Hiway

Loganville, Georgia 30249

Telephone (404) 466-2208

Course **Loss Control Management**

Duration 4 Days