Construction Safety Manual

Version Date: 2026-07-27
Version: 4.0

This material is protected by copyright and is the exclusive property of Enbridge. No external distribution or transmission of this material is permitted without the prior written consent of Enbridge. Applications for the copyright holder's written permission to reproduce any part of this publication should be addressed to the Manual Custodian.

Enbridge assumes no responsibility for errors or omissions in this document or for incidental or consequential damage that may result from the external use or duplication of this material.

This document is effective for Canada only. It is undergoing implementation and socialization for the Westcoast region.

Manual

Business Unit: Projects Safety - Gas Transmission and Midstream

Owned by: Safety, Environment & Land (SEL) Department

ENBRIDGE

Contents

Purpose 8

Scope 8

Expectations 8

Safety Principles 9

Company Lifesaving Rules 10

Purpose 10

Scope 10

Responsibilities 10

Lifesaving Rules 11

Requirements 15

1. Leadership and Governance 17

1.1. Supplier Management System 17

1.2. Leadership in Action 17

1.3. Stop Work, Imminent Hazard, and Right to Refuse Unsafe Work 17

2. Company Roles and Responsibilities 22

2.1. Gas Transmission & Midstream (GTM) Responsibilities 22

2.2. Project Manager 22

2.3. Construction Management 22

2.4. Projects Safety Senior Personnel 23

2.5. Project Safety Lead / Coordinator 24

2.6. Front Line Enbridge Representatives - Craft Inspectors / Safety Advisors/Inspectors 25

3. Supplier Responsibilities 26

3.1. Compliance with Applicable Legal Requirements, and GTM Policies and Procedures 26

3.2. Supplier Safety Precautions and Programs 26

3.3. Suppliers Project-Specific Health and Safety Plan 26

3.4. Supplier Training and Competency Requirements 26

3.5. Safety Inspections and Health and Safety Audits 26

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

3.6. Health and Safety Statistics 27
3.7. Reporting/Investigation 27
3.8. Stop Work/Suspension 27
3.9. Removal of Supplier Personnel 27
3.10. Supplier's Health and Safety Coordinator 27
3.11. Meeting Requirements 28
3.12. Hazard and Risk Assessments and Emergency Response 28
3.13. Other Responsibilities 28
4. Hazard and Risk Management 29
4.1. Hazard Identification, Assessment and Control 29
4.2. Job Hazard Analysis (JHA) 31
4.3. Safe Work Permitting 34
4.4. Field Level Hazard Assessment 36
4.5. Workplace Hazardous Materials Information System 37
5. Legal Requirements 39
5.1. Canadian Occupational Health and Safety Regulations 39
5.2. Occupational Injury and Illness Management and Recordkeeping 39
6. Administrative Controls Normal – H&S 40
6.1. Abrasive Blasting 40
6.2. Aerial Work Platforms 43
6.3. All-Terrain and Off-Road Vehicles 44
6.4. Aviation Safety 46
6.5. Boom Truck and Rigging 52
6.6. Bonding and Grounding 53
6.7. Brush Cutting, Clearing and Vegetation Management 56
6.8. Compressed Gas Cylinders 58
6.9. Confined Space Entry 61
6.10. Crane and Hoist Safety 78
6.11. Critical and Serious Lifts 85

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.12. Electrical Safety 88

6.13. Excavation and Trenching Safety 91

6.14. Fall Protection 97

6.15. Fatigue Management 103

6.16. Flammable and Combustible Materials 104

6.17. General Equipment Safety 107

6.18. General Office Safety 108

6.19. Hand and Portable Power Tools 110

6.20. Hazardous / Restricted Areas and Portable / Personal Gas Monitors 121

6.21. Hot Work 136

6.22. Housekeeping 141

6.23. Hydrostatic and Pneumatic Testing 142

6.24. Ignition Sources 144

6.25. Isolating Line Breaks and Equipment Opening 146

6.26. Journey Management 149

6.27. Ladder Safety 149

6.28. Lockout Tagout 152

6.29. Machinery and Equipment Guarding 153

6.30. Manual Handling of Materials and Back Safety 157

6.31. Marine and Offshore Operations Safety 158

6.32. Material Handling and Storage 161

6.33. Mechanical Heavy Equipment Safety 162

6.34. Personal Protective Equipment (PPE) 166

6.35. Pigging 181

6.36. Pipe Labelling Requirements 183

6.37. Powered Industrial Truck 184

6.38. Public Work Area Traffic Management Guide 186

6.39. Respiratory Protection 189

6.40. Safe Handling of Pipeline Liquids 195

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.41. Safeguards, Barricades and Warning Signs (Temporary) 195
6.42. Scaffolding 197
6.43. Severe Weather 203
6.44. Vehicle Safety 204
6.45. Working Alone 209
6.46. Working on Ice or Near Water 211
6.47. Walking and Working Surfaces 212
7. Administrative Controls – Industrial Hygiene 215
7.1. General Requirements 215
7.2. Asbestos Management 215
7.3. Benzene Management 215
7.4. Ergonomics 218
7.5. Exposure Assessment for Hazardous Substances 219
7.6. Hearing Loss Prevention 223
7.7. Hydrogen Sulfide 224
7.8. Lead Management 225
7.9. Naturally Occurring Radioactive Material (Norm) 226
7.10. Radiation Safety 227
7.11. Heat Stress or Cold Stress 228
8. Administrative Controls – Abnormal 231
8.1. Emergency Management 231
8.2. Emergency Eyewash and Shower Stations 231
8.3. First Aid Requirements 232
9. Contractor Safety Management 235
9.1. General 235
10. Management of Change 241
10.1. General 241
11. Training and Competency 241
11.1. Competency Assurance 241

11.2. Health and Safety Training 242

11.3. Health and Safety Orientations 242

11.4. Safety Observation Program 242

12. Documents and Records Management 243

12.1. Document Control 243

12.2. Records Management 243

13. Health and Safety Assurance 245

13.1. Event Reporting, Investigation and Learning 245

13.2. Internal Health and Safety Inspections 246

13.3. General Facility Safety Inspection 246

13.4. Management of Regulatory Inspections 247

13.5. Corrective and Preventive Actions 247

14. Stakeholder Engagement 248

14.1. Internal Communications 248

14.2. Post Event Leadership Review (PILR) 248

14.3. Regulated Workplace Committees 249

Appendix A – Acronyms 250

Appendix B – Terms and Definitions 253

Appendix C – Stop Work, Imminent Hazard, Right to Refuse Unsafe Work Process Flow Contractors 270

Version Number	Version/Approval Date <yyyy-mm-dd>	Approved By	Summary of Changes
3.0	2026-02-13	Julia McElroy	Updated Safety Principles Updated Benzene section
4.0	2026-07-27	Julia McElroy	Updated Benzene requirements

Construction Safety Manual

Purpose

This Construction Safety Manual documents the minimum safety requirements to which Contractors shall adhere while performing work on construction projects of Enbridge Gas Transmission and Midstream entities ("GTM" or "Company"). The Manual outlines the roles and responsibilities of all Suppliers and other persons retained by the Company to undertake work on construction projects. Its purpose is to ensure Suppliers and other persons working with or on behalf of the Company are aware of their responsibilities regarding construction safety.

A copy of this manual must be kept at each GTM sites where it is accessible to every person engaged in the construction, operation, maintenance, abandonment, or emergency situations.

The requirements set out in this Manual shall:

- Meet or exceed applicable occupational health and safety requirements for the jurisdictions where Company operates.
- Help establish safe work behaviors.

Specific terms are used to indicate whether an action is mandatory or recommended. The following words have specific meanings:

- "Shall" is used where an action is mandatory.
- "Should" is used where an action is recommended.
- "May" is used where alternatives are equally acceptable.

Acronyms and definitions are found at the end of this Manual (Appendices A and B). Definitions are bolded, italicized and in a darker font throughout this Manual.

The Construction Safety Manual had been developed pursuant to *Section 20* of the *Canadian Energy Regulator Onshore Pipeline Regulations*.

Scope

The Construction Safety Manual applies to all Suppliers engaged in design, construction, operation, gathering, processing, storage, maintenance, decommission, abandonment activities and emergency situations at Company facilities, as well as visitors to these worksites.

Project management identifies and communicates applicable Company H&S requirements and associated responsibilities from this manual within the Project Hazard Assessment and Control Process document.

Expectations

Suppliers and visitors must carry out their individual responsibilities to provide a safe and healthy work environment. Everyone must therefore become familiar with the Construction Safety Manual with respect to their work duties.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

Safety Principles

Safety Principles

Enbridge is committed to ensuring everyone returns home safely at the end of every day and that we operate our assets safely and reliably. We base our commitment to safety on our care for employees, contractors, the communities in which we operate and the environment.

Our values of Safety, Integrity, Respect, Inclusion and High Performance guide our decisions, actions and interactions, as individuals and as a company. Our Safety Principles support our values and highlight our belief that safety is the bedrock of our success and our first consideration as we plan and execute our work.

We strive to prevent all events that can harm our employees, contractors or members of the public, especially high-energy events that can cause life-altering or life-ending injuries.

Safety. It's a core value that makes us Enbridge. It's our way of life.

1 We can prevent each injury, safety event and occupational illness.

Enbridge commits to protecting the health and safety of our employees, our contractors and the public, with the goal that everyone goes home safe at the end of every day. We know outstanding safety performance is possible and that each safety event—particularly those involving high energy—involves hazards we can and must proactively identify and effectively manage. As a result, we refuse to accept that injuries, safety events and occupational illnesses are inevitable. We understand that diligent adherence to Enbridge's policies, procedures and Lifesaving Rules, reinforced by a strong and healthy safety culture, will help us to prevent safety events and protect people from harm.

2 We can control each operating exposure.

Enbridge believes that we can control, limit or prevent each operating exposure and release of energy that may result in injury, illness or environmental damage. By rigorously applying our process safety requirements, we strive to proactively identify the hazards in our work and our systems, and to eliminate them wherever possible. When it is not possible or practical to eliminate hazards, we implement engineered controls such as fail-safe systems, interlocks, physical barriers and guards, warning and detection devices and automatic safety devices to reduce the risk to a level that is as low as reasonably practicable. We prioritize eliminating hazards and implementing engineered controls in our work, and recognize that administrative controls and/or personal protective equipment serve as the last line of defense against the hazards we face.

3 Leaders are accountable for safety performance.

People leaders are accountable for safe operations and the safety and health of the workers under their care. This includes establishing and maintaining a safe work environment through the application of our Management System in combination with fostering a healthy safety culture within their team, focused on identifying, reporting and acting on hazards. People leaders establish, regularly review and update policies and procedures using disciplined change management and consistently reinforce the importance of identifying and taking effective action to address hazards. Leaders ensure their team has the proper equipment and resources, they assign their team members appropriate training based on the hazards of their work, they recognize positive safety mindsets, actions and performance, they correct deficiencies promptly and ensure workers follow approved procedures.

4 All employees/ contractors are responsible for safety.

Every member of the Enbridge team plays a critical role in enabling outstanding safety and reliability performance. Enbridge expects employees and contractors to work safely and take personal accountability for their safety, that of their co-workers and the public, and the safe operations of our assets. We reinforce the importance of proactively identifying, reporting, and managing hazards, and we train and equip employees to effectively manage the hazards they can encounter in their work. Further, workers have not only a right but a duty to stop and/or refuse work they feel is unsafe. Our success depends on all levels and all members of the organization focusing on safety, and Enbridge strives to create a healthy safety culture, with everyone committed to and accountable for consistently adhering to our company policies and procedures as well as all applicable regulations, codes and standards.

5 We assess, learn and improve.

Enbridge commits to continuously improving our safety performance through field and operational assessments and diligent application of quality and safety assurance practices and processes. Further, through high-quality event analysis we seek to understand the context and root causes for our safety events to better identify, learn from and respond to weaknesses in our safety systems. We promptly address deficiencies revealed through these activities and communicate what we learn across the organization to strengthen our systems and make Enbridge even safer.

6 We promote off-the-job health and safety for our employees 24/7.

Our concern for the safety and health of employees extends beyond the workplace. An off-the-job injury is as painful and impactful as one suffered on the job. We encourage our employees to demonstrate their leadership and excellence in safety practices for the benefit of their families, friends and community. An engaged workforce is a key building block of a healthy safety culture.

We strive to create a vigilant and resilient safety culture, in which all members of our team keep themselves and others safe, leaders care for the health and safety of their people, and we learn from safety failures to prevent future events. Our Safety Principles are foundational to our safety culture and our long-term success as an organization.

ENBRIDGE

07/25

Figure 1: Safety Principles

Company Lifesaving Rules

Purpose

The Company values the safety of our communities, customers, Suppliers and Company Employees, and believes that all injuries are preventable. Compliance with all applicable policies, procedures and regulations is a requirement. Lifesaving Rules are a key focus area designed to protect Suppliers and Company Employees and save lives. Lifesaving Rules apply to everyone and compliance is mandatory.

Each Lifesaving Rule consists of a simple icon and descriptive text, with additional detailed guidance to explain why the rule is important. Each Lifesaving Rule is linked to controls and barriers which, if used properly, can prevent significant events. Lifesaving Rules are intended to supplement and support existing management systems, programs, and policies. The rules focus on Contractor and Enbridge Representative behaviors in the workplace by raising awareness of potentially dangerous activities if hazards / risks are not controlled.

Scope

The Lifesaving Rules apply to everyone at Enbridge and compliance is mandatory. Employees or Suppliers who choose not to follow the Lifesaving Rules are choosing not to work for, or be assigned to, Enbridge.

Responsibilities

Suppliers shall:

- Follow the Lifesaving Rules
- Report potential Lifesaving Rule violations to Safety or a member of the GTM Lifesaving Rule Committee
- Participate in Lifesaving Rule violation investigations when requested
- Ensure Contractors know, understand, and comply with the Lifesaving Rules

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.



Figure 2: Lifesaving Rules

Lifesaving Rules

1. ***Hazard Management*** - I will complete a hazard assessment prior to starting work and reassess if conditions change and new hazards are introduced.

A key component of keeping yourself and others safe is taking the time to identify and understand the hazards related to the tasks you are about to perform.

Examples of hazard management processes include, but are not limited to: Job

- Hazard Analysis (JHA)
- Field Level Hazard Assessment (FLHA)
- Site Specific Hazard Assessment (SSHA)
- Completion of safe work permits

Employees and Suppliers must complete a hazard assessment prior to starting work, follow the procedures as identified and be trained in the current version of the applicable policy. This LSR is

specific to conducting hazard assessment and identification, and reassessment of hazards when conditions change.

Hazard management is about executing and following the BU-prescribed hazard management processes. The work 'envelope' from a hazard management perspective is considered underway when tools and methods as noted below are commenced.

Examples of changing conditions that should trigger a reassessment of hazards include but are not limited to:

- Changing weather conditions
- Changing scope of work
- Changing operational conditions
- Shift change or change of personnel
- Uncertainty arising from the work/use of stop-work authority

Questions leadership may ask to determine if there is a potential LSR violation include:

- Did the Contractor(s) complete a hazard assessment prior to starting work?
- If conditions changed or new hazards were introduced after the initial hazard assessment, did Contractor reassess the hazards?

2. ***Driving Safety*** – I will only operate a motor vehicle or mobile equipment when free of adverse effects of alcohol or any substance that causes impairment.

Employees and Suppliers shall be in conformance with the applicable Alcohol & Drug Policy. This Lifesaving Rule, and any other Enbridge polices that apply to Employees and/or Suppliers, still apply if an Employee is outside of working hours and is driving a company vehicle or is driving a personal vehicle on company business.

Questions leadership may ask to determine if there is a potential LSR violation include:

- Did the Contractor operate a vehicle or equipment while under the influence of alcohol, drugs or any substance that causes impairment?
- Did the event involve a Supplier vehicle?
- Did the event occur while the Supplier was performing work on behalf of the Company?

3. ***Confined Space Entry*** - I will confirm the atmosphere has been tested, is monitored and a plan in place prior to entering a confined space.

This rule highlights three key actions we must take to manage the potentially deadly hazards present when working in confined spaces to protect Employees and Suppliers. These actions are testing, monitoring, and planning—conforming with the business unit-prescribed confined space entry process, which outlines specific testing, monitoring, and planning requirements.

Questions leadership may ask to determine if there is a potential LSR violation include:

- Did the Contractor(s) confirm that the atmosphere had been tested/monitored prior to entering a confined space?

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Did the Contractor(s) confirm that a confined space entry plan was in place prior to entering a confined space if applicable?

4. ***Ground Disturbance*** - I will verify the location of buried utilities through surface locating and positive identification prior to conducting a mechanical excavation.

This rule highlights the key actions we must take to manage the potentially deadly hazards associated with ground disturbance prior to conducting a mechanical excavation: verifying the location of buried utilities using surface locating and positive identification. It applies to mechanical excavation, e.g., backhoes, mini excavators, directional drilling, etc.

Questions leadership may ask to determine if there is a potential LSR violation include:

- Did the Contractor(s) surface locate buried utilities prior to conducting mechanical excavation?
- Did the Contractor(s) positively identify the buried utilities after surface location and prior to conducting mechanical excavation?

5. ***Isolation of Energized Systems*** – I will verify isolation before work begins on energized or pressurized systems (Lockout/Tagout).

This rule focuses our attention on the key actions of verifying isolation and zero energy before we work on energized or pressurized systems. The control of hazardous energy involves the specific practices and procedures used to safeguard Employees and Suppliers from unexpected energization or start-up of machinery and equipment or release of hazardous energy during service and/or maintenance activities.

Zero energy means that all hazardous energy has been dissipated from the part of the system or the equipment that we are working on or near, or that energy within the system has been dissipated to a level that presents no potential hazard to Contractors.

When lockout to a full zero energy state is not practicable, or prohibits the completion of specific tasks, other procedures and control methods must be implemented that are adequate to ensure a safe work environment and to prevent the inadvertent release of hazardous energy (e.g., isolation procedures, working in gas atmosphere, hot work, mechanical energy from cables/cranes, etc.).

Questions leadership may ask to determine if there is a potential LSR violation include:

- Did the Contractor(s) verify isolation prior to commencing work on an energized or pressurized system?
- Did the Contractor(s) verify zero energy prior to commencing work on an energized or pressurized system?

6. ***Reporting of Safety Events*** - I will immediately report significant safety-related events.

This rule focuses our attention on always reporting significant safety related events, including medical aids, lost time, motor vehicle events, line strikes and potential Lifesaving Rule violations.

Potential LSR violations even without loss or event are by their nature, high-potential events, and must be reported.

Event reporting is a vital part of Enbridge's safety culture. As such, each of us should understand what exactly an event is and how an event should be reported. An event is an unforeseen or

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

undesired occurrence, which may include harm or damage to one or more of the following: people, property, environment, process, or a release. Events are typically categorized based on their actual severity as well as potential severity and investigated to determine the root causes and effective preventative actions to avoid similar events in the future.

LSR #6 requires us to report significant safety-related events, however every event and near miss gives us a chance to investigate, to learn more about the health of our safety systems, processes and procedures and to enhance our safety performance and build our safety culture.

Remember that all events and near misses should be reported to the Enbridge representative immediately.

A question leadership may ask to determine if there is a potential LSR violation:

- Did the Contractor(s) immediately, or as soon a reasonably possible, notify the Enbridge representative of a significant safety-related event, e.g. line strike, medical aid, lost-time event, MVI, or potential LSR Violation?

7. ***Bypassing Safety Controls*** – I will obtain authorization before overriding or disabling safety-critical equipment or controls

This rule focuses our attention on the key action that helps to manage the critical safety hazards associated with bypassing, overriding, or disabling safety-critical equipment or controls: obtaining proper authorization first.

We define safety-critical equipment and controls as those physical devices or systems that if overridden, disabled or bypassed could result in serious injury, loss of life, and / or significant damage to property and / or the environment. Examples of safety-critical equipment and controls may include, but are not limited to:

- isolation devices
- emergency shut down valves
- lock out/tag out devices
- trip systems
- relief valves
- fire and gas alarm systems
- certain level controls
- alarms and detection devices
- crane limit switches
- in-vehicle monitoring systems
- markings/devices that define safe limits of approach (e.g., powerline crossing goalposts/barriers, etc.)

Bypassing Safety Critical Elements based on an approved and published procedure or standard does not need special authorization. However, required approvals and notifications within the procedure or standard shall be adhered to and will follow the relevant business process.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

In all other cases, authorization must be obtained before safety-critical equipment or controls are bypassed, and this authorization must come from the appropriate leadership level and applicable functional areas, in keeping with approved procedures for the work being planned and the safety-critical equipment or controls being bypassed.

Ultimately, identification of safety-critical equipment and controls will vary depending on the work being planned and the configuration of the systems and work sites where the work is taking place. This highlights the importance of effective and diligent hazard assessment and management and means that Contractors and management must actively seek to identify all safety-critical equipment and controls relevant to the work being planned, with reference to engineering design and the original equipment manufacturer's specifications.

Our energy infrastructure assets and other equipment have many built-in safety-critical controls designed to prevent or automatically respond to dangerous, escalating scenarios. In our operations there are times when we must disable a safety-critical system or control so that we can complete work such as maintenance or testing. When such a situation arises, overriding or disabling safety-critical controls or equipment must only be undertaken with all appropriate authorizations in place beforehand and in strict accordance with applicable procedures and policies to eliminate the potential for serious injury, loss of life, and/or significant damage to property and/or the environment. It is recommended that if bypassing a safety device is identified during the hazard assessment process that the approved procedures are referenced.

A question leadership may ask to determine if there is a potential LSR violation:

- Did the Contractor(s) obtain authorization or follow an approved procedure/standard before overriding or disabling safety-critical equipment or controls?

Requirements

The following general requirements apply to all Supplier personnel that this Construction Safety Manual applies to:

- Our first course of action whenever we believe that a Lifesaving Rule has been broken is the completion of a thorough investigation. This is in keeping with our values of Safety, Integrity, Respect, and Inclusion and with our desire to create a just safety culture at Enbridge in which we can learn from our mistakes.
- When we experience system-type failures they are not categorized as LSR violations, they are categorized as system-induced deficiencies and event investigators will identify appropriate corrective and preventative actions for the organization to implement to address the deficiencies.
- The Operations and Integrity Committee (OIC), reviews Lifesaving Rule violations determined by the BU LSR Review Committees. The purpose of these reviews is to provide senior leadership line of sight to LSR violations, ensure we are learning from events and addressing identified gaps to improve our safety performance and strengthen our safety culture. Supplier adherence to the Lifesaving Rules is critical. The rules help protect all members of our team from injury or worse. They are a key part of meeting Enbridge's commitment that everyone returns home safe at the end of every day and that our assets are operated safely.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Suppliers must know and comply with the Lifesaving Rules, exercise their authority and obligation to stop unsafe work, and ensure that they report unsafe practices and situations so that Enbridge can investigate them, identify the root causes, and learn.
- Enbridge Lifesaving Rules training for Suppliers is provided through project orientations as a part of project onboarding.

1. Leadership and Governance

1.1. Supplier Management System

Suppliers shall have a management system structure that provides all Supplier Contractors with the elements, expectations and performance measures to effectively implement their H&S Program supported by their Project Specific Safety Plan to meet the minimum requirements set out in this Construction Safety Manual.

Suppliers shall comply with Company H&S requirements set out in this manual. If a Supplier has a H&S standard or policy that is materially different from the Company's, the Supplier shall follow the most stringent requirement between the two programs. When a specific form is noted in this manual, Suppliers may utilize that form or an equivalent approved Supplier form where applicable.

Suppliers Safety Management System shall contain (at a minimum):

- Management Oversight
- Hazard Identification, Risk Assessment and Control
- Health and Safety Procedures
- Emergency Preparedness
- Event reporting, investigation, and learning
- Sub-Supplier safety management
- Supplier project site and equipment inspections
- Contractor competency assurance
- Contractor Health and Safety training
- Safety meetings
- Audits and assessments
- Program Review Cycle

1.2. Leadership in Action

Supplier and Subcontractor Leadership shall be engaged in the promotion of safety at worksites. It is expected that Supplier Management is actively involved by regularly visiting the site, conducting documented safety audits, participating in safety meetings, and attending Safety Stand-down events.

Measurement activities shall be developed and included in the Supplier documents for performance review between the Supplier and the Company.

1.3. Stop Work, Imminent Hazard, and Right to Refuse Unsafe Work

Suppliers shall have a policy that establishes the expectation that:

- All Contractors have the right to refuse work when they believe it is dangerous to the health and safety of themselves or to any person at an Enbridge Worksite.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- In addition, Contractors have the right and authority to stop any work that they believe presents an imminent hazard to the life or health of a Contractor or other person exposed to a hazardous condition or abnormal operating condition or event.
- If a Contractor believes work is unsafe, not in compliance or identifies an imminent hazard, the Contractor shall stop the work, evaluate the situation, and inform the Safe Work Permit Issuer of the concern as soon as reasonably practicable. This shall trigger the Stop Work process with the Safe Work Permit Issuer determining if a work stoppage and further investigation is required and the level of escalation required, including the possibility of the Person in Charge (PIC) stopping all work on a worksite. If unsafe work conditions, activities, or imminent hazards are identified during the investigation, corrective measures must be implemented to resolve the conditions, activities, or hazards before the work resumes. If a decision to restart work (with appropriate controls and mitigations in place) is made, and these are explained to the Contractor, but the Contractor still refuses on the belief that the work is unsafe, this must then be managed as a reportable Work Refusal.
- Contractors have the right to know about the hazards associated with their work and to participate in the mitigation of the hazards.
- Any form of retaliation against a Contractor who in good faith refuses unsafe work is prohibited.

Note that the Safe Work Permit Issuer and Person in Charge have formal Stop Work Authority. While any Contractor on a worksite may stop any work and initiate the Stop Work Process detailed below, at any point when a Safe Work Permit Issuer or Person in Charge identifies unsafe work conditions, work not in compliance with the Safe Work Permit or this Manual, or an imminent hazard, they must stop work, address the issues, and only thereafter reauthorize work to continue.

The Stop Work, Imminent Hazard, and Right to Refuse Unsafe Work Process is premised and relies on the hazard management and Safe Work Permit system set out in the Hazard Management Standard.

1.3.1. Responsibilities

Supplier shall:

- Ensure Contractors are informed about their right to refuse and/or stop unsafe work during safety orientations.
- Ensure Contractors are aware of how to trigger the Stop Work, Imminent Hazard, and Right to Refuse Unsafe Work Process
- Ensure Contractors receive appropriate training on safe work procedures.
- Investigate stop work events.
- Approve Contractors actions to implement hazard controls.
- When necessary conduct safety stand downs regarding stoppage of work.

Contractors shall:

- Refuse unsafe work.
- Stop work if unsafe or not in compliance with this Manual.

- Identify and communicate imminent hazards resulting in unsafe work.
- Discuss, evaluate, and address unsafe work concerns, imminent hazards, or non-compliance issues with their immediate Supervisor
- Notify the SWP Issuer and/or PIC of unsafe work concern, imminent hazards, or non-compliance issues
- Review and acknowledge approved hazard controls applicable to work refusal concerns

Safe Work Permit Issuer:

- Have Stop Work Authority
- Complete required training related to Stop Work Authority
- Stop any permitted work in the event they identify unsafe work conditions, work not being completed in compliance with the SWP or this Manual, or imminent hazards arising in the course of work
- Suspend Safe Work Permit in the event of a Stop Work event
- Communicate suspended SWP to affected personnel if appropriate
- Escalate to the PIC) if imminent hazard potentially affects other work groups on the site or agreement to restart work cannot be reached.
- Authorize work once imminent hazard or unsafe work has been addressed

Person in Charge (PIC) / Authorized Enbridge Representative or Designate shall:

- Have Stop Work Authority when assigned or delegated
- Complete required training to assume the role of Stop Work Authority
- Stop some or all permitted work in the event they identify unsafe work conditions, work not being conducted in compliance with the SWP or this Manual, imminent hazard arising in the course of work, or work refusal is reported to them or they otherwise identify these conditions.
- Only restart work after a stop work event once they are satisfied that the unsafe work, noncompliance, or imminent hazard as been sufficiently addressed.
- Review concerns and potential mitigations
- Authorize Permit Issuer to restart work once imminent hazards or unsafe work has been addressed
- Investigate all unresolved work refusals.

1.3.2. Requirements

- All Contractors shall proactively stop work in the event of unsafe work conditions, work not being conducted in compliance with the SWP or this Manual, or imminent hazard arising in the course of work.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Safe Work Permit Issuers and PICs are authorized to stop any or all work on a worksite at any time and must stop work in the event of unsafe work conditions, work not being conducted in compliance with the SWP or this Manual, or imminent hazard arising in the course of work.
- All Contractors on a worksite, including both Contractor and Employee, must be made aware of how to trigger the Stop Work process.
    - In most cases, the trigger will be contacting and speaking to the Safe Work Permit Issuer on the concern or imminent hazard.
    - For work crews, the first point of contact may be the supervisor or team lead who is serving as Safe Work Permit receiver for the crew.
    - In the unusual event a Safe Work Permit Issuer cannot be contacted, Contractors should contact the Enbridge Person in Charge (PIC) or other Enbridge representative to trigger the Stop Work Process.
- Health and Safety Training As per the Stop Work, Imminent Hazard, Right to Refuse Unsafe Work Process, Contractors must stop work immediately when the Permit Issuer suspends or cancels their Safe Work Permit and may only restart work activities once authorized to do so by the Safe Work Permit Issuer and in accordance with any revised instructions or controls pertaining to the work.
- Once an Enbridge Person in Charge (PIC) has been engaged in the *Stop Work, Imminent Hazard, Right to Refuse Unsafe Work Process* and some or all of the work on a worksite brought to a stop, work may only be restarted once the PIC authorizes the Safe Work Permit Issuer(s) to proceed to do so.
- Safe Work Permit Issuers must be trained on their Stop Work Authority duties as a component of their Safe Work Permit training.
    - See the HS training selection tool in 11.2 Health and Safety Training
- Enbridge PIC functions require appropriate training and experience applicable to the hazards and controls associated to the scope of work being executed.
    - Stop Work Authority competency may be addressed in a combination of training contexts including, but not limited to hazard management courses assigned based on the HS training selection tool (see further 11.2 Health and Safety Training).
    - The PIC must have experience and/or training directly related to the Hazard Management Standard.

Table 1: Stop Work, Imminent Hazards, and Right to Refuse Unsafe Work Process Steps

STEP	PROCESS STEP	ACCOUNTABLE ROLE
1	**Concerned Contractor/Individual Identifies and communicates concern, imminent hazard, or non-compliance with SWP or this Manual to their Immediate Supervisor.**	Concerned Contractor and/or Immediate Supervisor Or SWP Issuer and PIC

STEP	PROCESS STEP	ACCOUNTABLE ROLE
	*If active work underway, this would typically be the individual immediately directing the actual work. If a condition (apart from active work) or concerned individual cannot determine or contact/engage the individual directing the work, this would be the concerned individual's supervisor or another supervisor on site. OR **SWP Issuer or PIC notices or has unsafe conditions, non-compliance with SWP or this Manual, or imminent hazard brought to their attention.** In this case the SWP Issuer or PIC exercises their immediate Stop Work Authority to stop work in all affected areas (with the cooperation and assistance of applicable SWP Issuers) and work would only resume once issues were resolved to the satisfaction of the SWP Issuer and/or PIC as applicable.	
2	**Concerned Contractor identifies and communicates unsafe work concern to the Permit Issuer** • Ensures the Permit Issuer and /or the Permit receiver are aware of unsafe work or hazards condition. • Work stopped/halted until safe resolution agreed upon by all applicable personnel.	Concerned Contractor and Permit Issuer
3	**Permit Issuer stops/suspends all applicable Work** • Ensure all affected work on the site is halted and communicated to applicable personnel. • Work to stopped/halted until safe resolution agreed upon by all applicable personnel.	Permit Issuer / Permit receiver / Applicable Contractor(s)
4a	**Clarification of concern raised and provide decision/mitigations.** • Assess the need for additional hazard controls, engineering, Administrative or PPE • Approve additional hazard controls / mitigations • Mutually acceptable mitigation determined to continue work safely.	Permit Issuer / Concerned Contractor / Individual
4b	**Elevate concerns to Person in Charge if not satisfied with decision.** • Change procedure to include risk mitigation methods • Concerned individual satisfied with changes	Permit Issuer and PIC and Concerned Contractor / Individual
4c	**Decision Confirmation – Continue Work** • Confirmation of mitigations applicable to unsafe work concern • Record keeping of Stop Work Event and Resolution on SWP and JHA/FLHA with agreement/signature • Communicate to affected Contractors • Continue Work	Permit Issuer, PIC, Permit receiver, and Concerned Contractor / Individual
5	Other Processes Potentially Invoked: Work Refusal (Individual Contractor[s]) – managed by respective Employer Parties disagree -Company to Company negotiation to resolve	Person in Charger / Authorized Representative or Designate

***Note**: for workflow diagram, see Appendix C – Stop Work, Imminent Hazard, Right to Refuse Unsafe Work Process Flow*

2. Company Roles and Responsibilities

The following sections outline the roles and responsibilities of company personnel involved in construction projects.

2.1. Gas Transmission & Midstream (GTM) Responsibilities

All persons working on a construction project will receive a GTM site orientation that will set out health and safety requirements and expectations, including:

- A description of all conditions and safety precautions specific to the location.
- The direction to comply with this manual.
- Circumstances where work can be halted.
- A description of the project management structure.

2.2. Project Manager

The Project Manager is accountable for the following responsibilities that are executed by the project management team:

- Planning and executing applicable Risk Management Activities within the *Project Lifecycle Governing Control (PGLC) process*
- Ensuring the completion of applicable Supplier safety management activities:
    - Communication of hazards on Enbridge project site(s) and any required controls applicable to the site or scope of work to the Supplier.
    - Vetting of potential Suppliers based on safety criteria and match between Supplier competency and scope of work.
    - Review and acceptance of the selected Suppliers' project safety plan.
    - Ongoing safety performance management, including involvement in event investigation and learning.

2.3. Construction Management

Construction Management includes senior-most construction management representative on worksite.

Construction management (beginning with the Construction Manager and on through to the senior-most construction management representative on the worksite) are accountable for the following responsibilities:

- Ensuring the Suppliers' project safety plan is executed as intended.
- Engages with GTM operations management during brownfield construction to ensure communication of hazards or risks arising from each other's work activities are fully communicated and any necessary mitigations applied.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Ensuring any unforeseen hazards arising during the course of Project execution are identified, assessed, and appropriately controlled.
- Ensures all applicable documents and information is posted as required at Projects worksites, including but not limited to:
    - Enbridge business unit safety manual, standards, or specifications.
    - Emergency Response and associated contact information
    - Stop work instructions
    - Other postings as per applicable occupational health and safety regulations of the local jurisdictions.
- Holds stop and restart work authority as Enbridge PIC whenever on active duty on site.
- Promotes worksite event reporting and supports and executes event management activities as per Project Manager expectations.
- Ensures events with regulatory implications or impacting operations are communicated and managed as per Project Communication Plan.

2.4. Projects Safety Senior Personnel

Projects Safety Senior Personnel are responsible for the following:

- Providing subject matter expertise on safety management generally and the Projects Safety requirements and services specifically.
- Developing and managing the standards, programs, and systems to ensure effective delivery of Projects Safety services.
- Providing the systems, tools, and reports to enable senior projects management to monitor and manage their accountabilities with respect to Projects safety performance.
- Ensuring the Project team has expert safety assistance in executing Supplier Safety Management activities such as:
    - Communication of hazards on Enbridge project site(s) and any required controls applicable to the site or scope of work to the Supplier.
    - Vetting of potential Suppliers based on safety criteria and match between Supplier competency and scope of work.
    - Review and acceptance of the selected Suppliers' project safety plan.
    - Ongoing safety performance management.
- Direct and support the efforts of Project Safety Leads/Coordinators in their project-specific roles.
- Assists Project and Construction Management with event management and investigation duties as required.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

2.5. Project Safety Lead / Coordinator

- Provides subject matter expertise on safety management generally and on the specific requirements of governing documents within Projects Safety systems.
- As applicable and as assigned by Projects Safety senior personnel, may support the Project team in in executing Supplier Safety Management activities such as:
    - Communication of hazards on Enbridge project site(s) and any required controls applicable to the site or scope of work to the Supplier.
    - Vetting of potential Suppliers based on safety criteria and match between Supplier competency and scope of work.
    - Review and acceptance of the selected Suppliers' project safety plan.
    - Ongoing oversight and assurance of the Suppliers' safety performance and execution of required safety controls.
    - Revision of safety requirements in light of change of scope or new hazards arising during Supplier activities.
    - Ongoing safety performance management.
- Assists Construction Management to fulfill their field safety oversight roles, including but not limited to:
    - Consistent safety orientation delivery
    - Assurance processes with respect to the Supplier's competency and training program
    - Assuring the Supplier adheres to their project safety plan.
    - Consistent hazard and control communication process using standardized tools
        - These tools would include (as applicable) Work Authorization, JHAs, Safe Work Permits, FLHAs, or other hazard management processes
    - Ensuring inspections or other assurance tools are understood and applied as required by Enbridge representative inspection staff
- Assists Project and Construction Management with event management and investigation duties as required,
- Directs and supports the efforts of Project Safety representatives on worksites (e.g., Safety Inspectors, Field Safety Specialists, etc.) in their project-specific roles.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

2.6. Front Line Enbridge Representatives - Craft Inspectors / Safety Advisors/Inspectors

Front Line Enbridge Representatives, which includes Craft Inspectors and front-line Safety Advisors, are responsible for executing the following safety-specific responsibilities:

- When functioning as a Safe Work Permit Issuer:
    - Uses work authorization and safe work permit tools and processes as intending, including ensuring Suppliers' hazard management roles are fulfilled (e.g., JHA, FLHA completed).
    - Communicates known hazards and required controls for worksite and scope of work being permitted.
    - Verifies competencies/certifications as applicable (as per project plan).
    - Authorizes when Supplier may begin work.
- Exercise authority to stop permitted work on being informed of unsafe work conditions, imminent hazards, noncompliance with the SWP or this Manual, or Construction Management gives a stop work order.
- Escalates hazards or issues arising to site Construction Management in the event of hazards or issues impact larger worksite, controls need further consideration, or any disagreements on the nature of the hazards or controls.

  Engages in ongoing safety performance management activities including, but not limited to participating in safety observation and safety inspection programs.

3. Supplier Responsibilities

Suppliers and their Contractors have the following responsibilities.

3.1. Compliance with Applicable Legal Requirements, and GTM Policies and Procedures

Suppliers must establish and implement a process for identifying and monitoring compliance with all legal requirements applicable to the construction project in matters of safety, security, and the protection of the environment. Construction must be conducted in compliance with all applicable provincial and federal legal requirements, as well as any GTM procedures and practices, as outlined within the GTM Construction Safety Manual that may be required by GTM.

3.2. Supplier Safety Precautions and Programs

Suppliers must develop, maintain, amend, and adhere to such safety precautions and programs as are required to ensure:

- Compliance with the obligations of Section 3.1.
- Prevention of injury to persons or damage to property or the environment.

3.3. Suppliers Project-Specific Health and Safety Plan

In addition to the requirements of Section 3.2, Suppliers must develop, maintain, and adhere to a project-specific health and safety plan for construction. Such plan shall be subject to review and acceptance by GTM.

3.4. Supplier Training and Competency Requirements

Suppliers must establish and implement a process for developing competency requirements and training programs that provide employees and other persons working with or on behalf of the company with the training that will enable them to perform their duties in a manner that is safe, ensures the security of the construction site and company assets, and protects the environment.

Suppliers must establish and implement a process for verifying that employees and other persons working with or on behalf of the Supplier are trained and competent and for supervising them to ensure that they perform their duties in a manner that is safe, ensures the security of the construction site and company assets, and protects the environment.

3.5. Safety Inspections and Health and Safety Audits

Suppliers must complete weekly safety inspections of the construction site. Suppliers must allow GTM personnel access to all portions of the construction site in order to inspect or audit the Suppliers' compliance with applicable health and safety legislation and all GTM procedures and practices as outlined within the GTM Construction Safety Manual.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

3.6. Health and Safety Statistics

Suppliers must provide GTM with construction-related health and safety statistics every four weeks or as agreed to during construction and upon completion of construction and must provide this information to the project as well as within the ISNetworld reporting tool.

3.7. Reporting/Investigation

Suppliers must establish and implement a process for the internal reporting of hazards, potential hazards, events and near misses and for taking corrective and preventive actions, including the steps to manage imminent hazards.

In addition to the reporting requirements under applicable law, Suppliers must immediately report to GTM, any accident or event with or without loss involving Supplier personnel, the public, or property arising during construction, operations, maintenance, abandonment or emergency situations. Suppliers must provide a written initial report to GTM of its investigation of the accident or event within 24 hours of the occurrence. The report must provide a schedule for completion of the investigation, including preparation of a final written report. Suppliers must provide to GTM a final written report presenting the root cause of the event and the corrective and preventive action taken to address the causes of the event.

3.8. Stop Work/Suspension

Whenever a Contractor or Subcontractor has not complied with its responsibilities described in this manual or creates a circumstance requiring immediate action to ensure the health and safety of persons present at any construction, operations, maintenance, abandonment site or emergency situation, GTM may take or direct the Supplier to take such reasonable precautions, including halting construction, required to remedy such circumstance. The taking of such action or actions by GTM (or its failure to do so) shall not limit the Supplier's liability or its obligations. The Supplier shall reimburse GTM for all reasonable costs incurred by GTM in taking such precautions and any costs incurred by the Supplier for such precautionary action and any subsequent remedial action shall be borne by the Supplier.

3.9. Removal of Supplier Personnel

At the request of GTM, the Supplier will remove from any construction site any personnel not properly observing or complying with the health and safety responsibilities described in this manual.

3.10. Supplier’s Health and Safety Coordinator

If required by GTM or by applicable law, Suppliers shall provide a dedicated and qualified health and safety coordinator to monitor performance of the construction.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

3.11. Meeting Requirements

Unless GTM otherwise directs, Suppliers and all subcontractor must attend the following health and safety meetings:

- Pre-job kick-off
- A general safety orientation prior to entering any construction site
- Daily tailgate briefings
- Regularly scheduled safety meetings
- Such other meetings required by GTM from time-to-time to review the status of the construction and the Supplier's compliance with this manual

3.12. Hazard and Risk Assessments and Emergency Response

Suppliers are responsible for:

- Informing employees and Contractors of current hazards and hazards being created.
- Ensuring hazards are addressed throughout the duration of all work activities.
- Conducting, documenting, and reviewing daily hazard/risk assessments (by individuals or groups of Contractors).
- Scheduling and coordinating daily tailgate meetings (where hazards are identified).
- Posting a site drawing that identifies the project site layout including identifying the location of First Aid, emergency transportation provisions, and muster points.
- Completing the GTM Emergency Response Plan form and posting the form at the worksite each day.

3.13. Other Responsibilities

Other responsibilities of Suppliers include:

- Ensuring that the activities relating to occupational health and safety are coordinated for employees, Contractors and other persons at the workplace.
- Ensuring that everything is done that is reasonably practicable to establish and maintain a health and safety system or process.
- Ensuring Contractors are aware of the Person in Charge (PIC) / Authorized Enbridge Representative and how to contact the PIC.
- Ensuring that an alcohol and drug policy and program is in place that meets or exceeds the intent of the Company Workplace Alcohol and Drug Policy.

Suppliers must acknowledge that any information regarding construction-specific risks provided by GTM to the Supplier, whether contained in the Supplier’s contract with GTM or otherwise, is not intended to be exhaustive and shall not diminish the Supplier's overarching obligations.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

4. Hazard and Risk Management

4.1. Hazard Identification, Assessment and Control

Supplier shall have hazard identification procedures used to systematically identify, control, mitigate or eliminate hazards, potential or imminent hazards. Hazard identification and control activities will follow the hierarchy of controls to eliminate and/or control hazards:

- ***Elimination***: e.g., choose a different process, change steps in process, additional steps like LOTO.
- ***Substitution***: e.g., using a less hazardous chemical product.
- ***Engineering***: e.g., fixed barriers, enclosures or guards that physically prevent or minimize accidental contact with the hazard, automated devices that shut down potential hazards, etc.
- ***Administrative***: e.g., signage, flagging, or other warning devices, or otherwise reducing the number of opportunities for exposure.
- ***PPE***: The last resort for controlling a hazard and must be appropriate to the hazard faced when completing the job.

There are multiple processes used by the Company to conduct hazard identification, assessment, and control activities. At the worksite, the best-known processes for hazard identification, assessment and control are:

- Job Hazard Analysis (JHA)
- Safe Work Permitting (SWP)
- Field Level Hazard Assessments (FLHA)

4.1.1. Responsibilities

Suppliers shall ensure that:

- Contractors are trained:
  - To identify, assess, mitigate, eliminate and control known, foreseeable, potential or imminent hazards.
  - To document the hazards and describe the controls used to prevent the hazard from causing harm.
- Hazard assessments of work activities and worksites are completed as required.
  - Imminent hazards shall be reported to the Person in Charge (PIC) / Authorized Enbridge Representative or Designate prior to proceeding.
- Everyone involved in a work activity participates at some stage in the hazard assessment for that work.
- The results of the assessment shall be communicated to all other Contractors who may be affected by the work.
- The training provided on hazard assessment is effective and sufficient.
- Documented hazard assessments are retained.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Through periodic review, all Contractors are adequately trained in the hazard assessment and control processes.
- Hazard assessments shall be documented for all work activities other than:
  - Office related work (e.g. computer use, training, meetings)
  - Travel between work locations
  - Housekeeping duties
- Assess work-in-progress to ensure that the processes are adequate to assess the hazards, and the controls implemented have reduced the risk associated with the work to As Low As Reasonably Achievable (ALARA) levels.

Energy-Based Hazard Recognition

Enbridge's hazard recognition methodology used is the Energy Wheel. This wheel is representative of the various forms of energy that pose potential to cause harm to people, property, or assets. The energy wheel is used as a hazard recognition aid when conducting hazard assessments. The program has identified ten energy-based hazard sources.

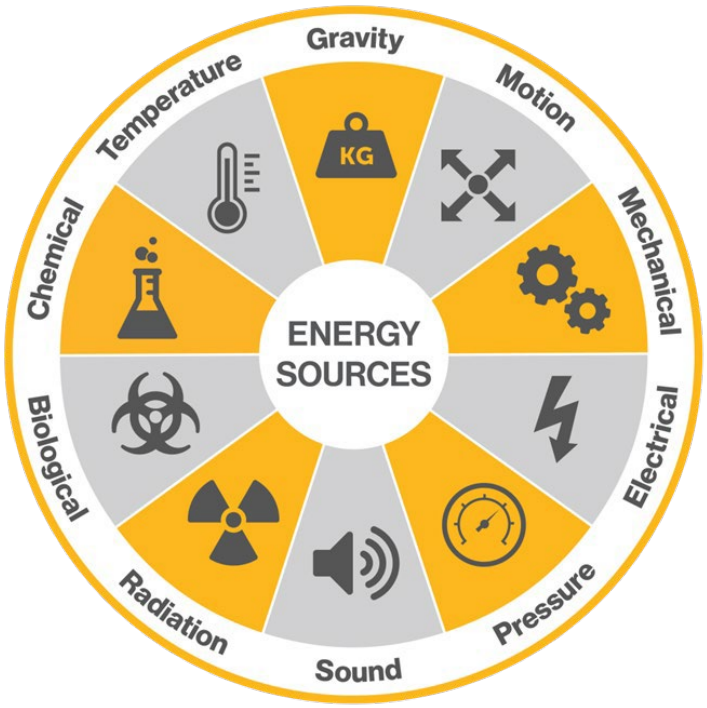


Figure 3: Energy-Based Hazard Recognition Graphic

Communication of Hazards

The most effective way for communication of all hazards to the frontline is directly engaging with the Contractors who will be performing the work. Outside of this hazard and risk management process,

there are additional methods which support communicating all hazards to frontline personal. This includes but not limited to:

- **Site Safety Orientations** – Shall be used to communicate site specific hazards to Suppliers and visitors to a site
- **Tailgate Meetings** shall be held to review and discuss the identified hazards and controls on the Hazard Assessment tools
- **Pre-job Meetings** shall be held to review and discuss the identified hazards and controls on the Hazard Assessment tools
- **Supply Chain Management** – GTM Construction Safety Manual, JHAs/Procedure(s) associated with the SOW

4.2. Job Hazard Analysis (JHA)

Supplier shall have an equivalent job hazard analysis (JHA) process to systematically identify, control, or eliminate identified hazards, potential or imminent hazards associated with a scope of work.

A JHA may be used at any time to assess the hazards of any job. The jobs which benefit most from this systematic hazard identification and control process include:

- Jobs where an event, hazardous condition, or exposure to harmful substances could cause serious injury, environmental and/or property damage.
- Jobs where the potential exists for serious injuries or illnesses (consequences of an event, hazardous condition, or exposure to harmful substances are potentially severe).

The JHA process is mandatory prior to certain types of work and must be used when planning work, communicating hazards and associated controls.

4.2.1. Suppliers

Suppliers shall complete and document a JHA prior to work. The Job Hazard Assessment Form utilized by Suppliers can be either a Company documented or an equivalent approved Supplier form.

Suppliers shall:

- Ensure the JHA process is followed by monitoring the following:
  - Confirm Contractors training and competency on completing a JHA.
  - Ensure the JHA is completed by it's Contractors when required.
  - Review the quality of Contractors completed JHAs when required.
  - Ensure correct filing of JHAs following completion of work.
  - Ensure JHAs are reviewed by the SWP Issuer and/or the Person in Charge (PIC) sign off on completed JHAs to ensure forms are complete.
- Ensure Contractors are trained and understand their Roles and Responsibilities regarding the completion and review of JHAs.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Ensure Contractors engage in completing and reviewing JHAs to maximize the overall effectiveness of identifying related hazards and controls for the identified hazards.
- Ensure Contractors adjust active JHAs when conditions change, or controls require updating.
- Return JHAs to appropriate Person in Charge (PIC) / Enbridge Authorized Representative or Designate or administrator for filing.
- Ensure JHAs are approved by the Permit Issuer and/or Person in Charge (PIC) / Enbridge Authorized Representative or Designate
- The JHA form utilized by Contractors can be either a company document or an equivalent approved Supplier form.
- Ensure all Contractors review and sign the JHA form as “Attendees” as well as initial any subsequent changes if they are present on the job site when the changes are made.

For high number attendees the Attendance Record may be attached. *(*Form 7T-009 or equivalent*)*

The Person in Charge (PIC) / Authorized Enbridge Representative or Designate must also be listed with contact information.

4.2.2. Requirements

The following requirements apply when completing a JHA:

- As a minimum, a JHA must be completed prior to performing the following types of work activities:
    - Excavations
    - Energized electrical work
    - Gas handling
    - lockout/tagout
    - Shut down
    - Hot Work
    - Serious or Critical lift
    - Confined Space Entry
    - Hot tap
    - Flaring
    - Use of explosive devices
    - Stopple jobs
    - Line Breaking and Equipment Opening
- A JHA must identify any imminent hazards or elevated risk exposures (including those that exist even after the application of mitigative controls). This requirement applies to construction, operations, maintenance, abandonment, and emergency situations conducting the following types of work:

- Any non-routine jobs that pose elevated hazards or risk of injury such as, but not limited to, changing out mole sieve, changing out large equipment, hot work in a hazardous area, etc.
- Large jobs that involve multi-work teams and/or multi-Suppliers such as, but not limited to, turn arounds, shutdowns, construction in an operating facility, etc.
- Routine, non-routine jobs, and abnormal operating conditions that pose elevated hazards or risk of:
  - Fire due to the opening of equipment or release of gas or vapor into the immediate work area.
  - Electric shock or arc flash due to the opening of energized electrical equipment.

- High Risk work may require additional levels of approval before proceeding.
  - This determination may be capture in the Scope of Work, the JHA, or by the Enbridge PIC.
- Where it is determined that despite the hazard and risk mitigation strategies captured on the JHA and any other work instructions, an unacceptable residual risk of an Abnormal Event remains, a documented Contingency Plan must be created and approved as per the Contingency Plan Development Process.

4.3. Safe Work Permitting

The purpose of a Safe Work Permit (SWP) is to ensure clear communication between the Permit Issuer and those performing hands-on work in Company Facilities and Right-of-Way (ROWs), including:

- The type of work being authorized.
- The hazards that the site, equipment, or operations presents to the Contractors.
- The hazard the Contractors present to the site, equipment, or operations.
- The mandatory controls that must be applied to manage these hazards.
- Any conditions or restrictions related to the work.

The items listed below provide additional details regarding SWP:

- Supplier will be issued a Safe Work Permit (SWP) by the Company prior to work starting.
- Prior to being issued a SWP, the Supplier will be required to have reviewed the detailed procedure or Job Hazard Analysis for the work and to have completed a Field Level Hazard Assessment (aligned with Energy Based Hazard Recognition).
- A Safe Work Permit is only valid for the time stated on the permit.
- Permit issuer is to confirm with the Permit receiver any deviations on required mitigations and confirm with the Permit receiver whether or not that deviation needs to be reported to a regulator prior to starting work (example: Lockout Tag out deviations must be reported by the Supplier to WorkSafe BC prior to entering a Confined Space)."
- Supplier Individuals authorized to work alone are not subject to the Safe Work Permit process while working alone.
- Mobile Supplier Crews hired to perform specific jobs over a span of ROWs or at multiple facilities without oversight by a Person in Charge (PIC) / Authorized Enbridge Representative may be "permitted" in accordance with Asset Area practices to manage this type of work. (e.g., pig trackers, cathodic protection survey crews, vegetation control crews, etc.)
- Suppliers that work in administrative areas or areas designated as non-operational areas by area management are not subject to the Safe Work Permit processes.
- Safe Work Permits are not required for light housekeeping unless additional hazards are present that would normally require permitting.

4.3.1. Supplier

Supplier shall ensure Contractors:

- Provide the Permit Issuer with the information they require related to scope of work, the nature of the work and any potential hazards introduced to the work location by the work itself.
    - In certain cases, the Permit receiver may be required to provide work planning for hazard assessment documents, like a JHA as a precondition to permitting.
- Review and agree to the conditions of the Safe Work Permit (as indicated by a signature on the permit).

- Confirm understanding of deviations on mitigations and whether or not this requires reporting to a regulator prior to starting work (example: Lockout Tag out deviations must be reported by the Supplier to WorkSafe BC prior to entering a Confined Space)
- Communicate the requirements of the permit to all Contractors involved in the work.
- Conduct any type of hazard assessment exercise stipulated by the Permit Issuer.
- The permit requirements are fulfilled.
- Keep a copy of the permit available at the work location.
- Follow the requirements identified on the appropriate Safe Work Permit.
- Contractor shall close-out the SWP with applicable signatures and retain a copy (or copies when work is stopped either due to a change in conditions or scope that demands a new permit, the shift ends, or work is otherwise complete.
- Suspend work and communicates immediately with the Permit Issuer if the scope of work or conditions change, or any other stipulation set out by the Permit Issuer for suspending work.
- Leave the work location in a safe condition prior to closing the Permit.
- Close out the permit with the Permit Issuer.
- **Eastern Canada** issues general safe work permits. Specific permits are also issued for the following types of work:
- Energized Electrical Work
- Hot Work
- Confined Space
- **Western Canada** issues safe work permits for the following types of work:
- Cold Work
- Confined Space Entry
- Serious or Critical Lift
- Energized Electrical Work
- Excavation and Trenching
- Hot Work Category 1
- Hot Work Category 2
- Hot Tap
- Radiography
- Sour Gas Work
- Vehicle Entry into a Hazardous Area

4.4. Field Level Hazard Assessment

4.4.1. Supplier

Suppliers shall ensure that:

- All Contractors involved in the hands-on work or may be affected by the work for a given job must complete and/or review FLHAs for a given job and acknowledge they understand the hazards and controls.
- Ensure all applicable sections have been completed adequately i.e. Muster Point, Person in Charge etc.
- Approved FLHA forms are utilized which can include:
    - FLHA forms or cards provided by Company, or
    - Supplier's forms, if:
        - It provides a pre-job "stop and think" and triggers situation awareness prior to work beginning,
        - There is a means of documenting that all Contractors involved participated in the FLHA prior to engaging in the work, or
        - It is completed at the worksite itself where potential hazards can be visually spotted.

Suppliers shall ensure that Contractors:

- Actively participate in the FLHA process.
- Complete all sections on the FLHA
- Ensure the Person in Charge has been identified on the FLHA
- Ask questions about any concerns related to work or hazards as part of the FLHA process.
- Do not begin work or stop work if:
    - A hazard is identified, or a condition arises that requires further input from the Person in Charge / Enbridge Authorized Representative or Designate r to assess and/or remedy.
    - Controls identified in the pre-job planning documents, safe work permit or FLHA are not implemented.
- Follow any requirements documented on the FLHA.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

4.5. Workplace Hazardous Materials Information System

4.5.1. Supplier

Supplier shall ensure that:

- Have a written hazard communication program that meets the Workplace Hazardous Materials Information System (WHMIS) regulations.
- Educate and train Contractors on the hazards and safe use of products.
- Hazardous materials are properly labelled.
- Materials are available to produce workplace labels as necessary.
- Provide Contractors with access to up-to-date SDSs for any hazardous products found in the workplace and that the appropriate control measures are in place to protect the Contractors
- Maintain an inventory of chemicals used in the workplace.
- Chemical product labels must contain the following 6 elements:
    - Product identifier
    - Hazard symbol/diamond pictogram
    - Signal word (danger or warning)
    - Hazard statements
    - Precautionary statements
    - Supplier identifier
- All chemical containers – both primary and secondary – must have labels.

Suppliers shall ensure that Contractors:

- Follow safe work procedures and guidelines set out by WHMIS to ensure that hazardous products are used, stored, labeled, and disposed of properly.
- Review the SDSs prior to handling any chemical or hazardous product.
- If a Variance to safe work procedures is required, follow Suppliers procedure for approval of the Variance.
- Use the information provided on an SDS to protect from product hazards, to ensure safe handling and product use, and to ensure appropriate emergency response measures.
- When using, storing, or transporting chemical products, Contractors must ensure the product container (primary) is correctly labelled. In cases where the label has become damaged or illegible, a replacement label may only be installed on the container when the contents can be absolutely assured.
- In cases of product decanting, all containers (secondary) still containing the decanted product are to be correctly labelled.
- The label elements will depend on the hazard class and the hazard category within that class.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Product labels must be easy to read and durable. They must be in a language that is understood. If a label is damaged, lost, or no longer legible, then the product must be relabeled.
- If an incorrectly labelled chemical or a chemical container with missing label is encountered, the Supervisor must be notified.
- Do not use a chemical until a replacement label is provided.

5. Legal Requirements

5.1. Canadian Occupational Health and Safety Regulations

Supplier shall comply with the following as applicable:

- Applicable provincial occupational health and safety legislation
- *Canada Labor Code* and *Canada Occupational Health and Safety Regulations*
- *Canadian Energy Regulator Act:*
  - *Canadian Energy Regulator Onshore Pipeline Regulations – Authorizations*
  - *Canadian Energy Regulator Pipeline Damage Prevention Regulations – Obligations of Pipeline Companies*

5.2. Occupational Injury and Illness Management and Recordkeeping

Supplier shall establish process for the management, tracking and recording of occupational injuries and illnesses.

Supplier policy shall require that:

- Prompt and proper first aid or medical treatment must be administered to all work-related injuries and illnesses.
- All work-related injuries/illnesses are reported to Company.
- Appropriate Supplier Representative shall accompany an injured Contractor to the physician to determine the extent of the injury and whether time off will be necessary.
- Ensure all events, and near misses (event without loss-Near miss) are investigated.

Supplier policy shall establish:

- Late reporting requirements when a Contractor becomes aware of an injury (e.g., foreign body in eye) after the workday has been completed.
- Procedure when Contractors return to work from loss workdays.
- Procedure if a fatality occurs to include reporting to applicable occupational health and safety authority and the Company.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6. Administrative Controls Normal – H&S

6.1. Abrasive Blasting

6.1.1. Suppliers

Suppliers shall ensure that:

- The site is prepared, and controls are in place to prevent injury, illness, or damage from the abrasive blasting.
- Site Preparation and Work Control shall include:
    - post warning signs within 15m (50 ft.) of the work area
    - where the abrasive blasting will affect other Contractors, erect barricades, or rope off area to warn Contractors and prevent access to work area
    - only Contractors equipped with the required PPE shall enter the work area
    - Contractors not directly involved in the abrasive blasting operation shall stay up-wind whenever possible
    - conduct initial and continuous Atmospheric Monitoring in Hazardous and Restricted areas
    - equipment and vehicles should be protected from debris projected from the work area
    - do not allow abrasive blasting within 3 m (10 ft.) of any tank vent whether the vents are open, unless the tank has been cleaned and declared gas free by a Qualified Contractor; if a tank has not been cleaned and declared gas free, clean areas within 3 m (10 ft.) of tank vents with hand tools such as scrapers, wire brushes and similar equipment
- Contractors are trained and qualified to perform their assigned tasks, duties, and responsibilities. This includes but is not limited to the Operator, the Attendant, and the Safety Watch.
- Inspect equipment daily before use, including testing of safety shutdown and control (deadman) switches. Inspection details shall be documented. Safety shutdown and control (deadman) switches shall not be disabled for any reason.
- Contractors wear additional PPE as required by the Hazard Assessment to protect against exposure to high velocity abrasive matter, airborne respirable particulates (potentially contaminated) and noise.
- The blast nozzle control (deadman) switch is located near the nozzle in a position where the operator's hands will be when using the device. When released, the control switch shall immediately stop the flow of material.
- Abrasive blast cleaning nozzles shall be equipped with a valve which must be held open manually during operations.
- The blast nozzle shall be bonded and grounded to prevent the build-up of static charges.
- Utilize intrinsically safe switches when applicable, or as determined by the Hazard Assessment.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Utilize whip checks and clips/wires to prevent accidental decoupling on hoses.
- Provide a designated area for the removal of PPE separate from the lunch/office space to eliminate cross contamination; establish and practice personal hygiene standards (e.g. wash before you eat).
- Contractors do not use compressed air for cleaning themselves or their clothing.
- Only Company-approved abrasive blast media is used. Recycled glass-based media is recommended. Abrasive blast media containing crystalline silica shall not be used.
- Supplier shall contact the Company Environment Department for assistance in obtaining the approved disposal methods, record retention requirements and approvals.
- Supplier shall use reasonable efforts to collect spent abrasive blast media and is responsible for collecting, storing, testing, and disposing of spent abrasive blast media in accordance with the *Waste Management Plan*. Do not re-use abrasive blast media.
- The records shall contain the type and volume of abrasive blast media, laboratory results and disposal location.
- Implement dust control/collection measures:
    - line the bottom of the work area with 4 mm (mil) polyethylene sheeting (contact the Environmental Department for alternatives to this requirement based on blasting media and project scope)
    - erect a shroud (e.g. tarpaulin) in densely populated areas, or if migrating dusts are problematic and/or as required by applicable regulations
    - consider using a portable air filtration system with High-Efficiency Particulate Air (HEPA) filter when using a shroud or in a Confined Space
    - consider using a negative pressure HEPA filter exhaust system when blasting within a tank
    - stop work and collect spent abrasive blast media, as required
- Abrasive blasting equipment used to clean tanks has the blasting hose nozzle bonded electrically to the tank shell or the tank roof.
- Consult with Company Operations Representative when abrasive blasting of external floating tank roofs (work to be performed in accordance with *API RP 2027*).
- When abrasive blasting for extended periods, a Contractor rotation plan shall be implemented to reduce exposure time.

The Abrasive Blasting Operator shall:

- Not place hoses and lines on main roadways or walkways, whenever possible.
- Verify that the control switch is guarded, to prevent inadvertent activation.
- Have the nozzle under control before the air is turned on.
- Have control of the nozzle's control (deadman) switch.
- Not reposition from the immediate work area (e.g., lateral, or vertical body movement) while discharging blasting media.
- Ensure the abrasive blast pot is shut off and depressurized before being filled.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- When reasonably practicable, before leaving the worksite at the end of each day, remove and dispose of coveralls and shower where practical.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.2. Aerial Work Platforms

6.2.1. Suppliers

Suppliers shall ensure that:

- Aerial lift equipment is utilized as designed to lift personnel and limited work tools to elevated locations and is not designed to hoist pipe, conduit, sheeting, or other construction material.
- Pre-job planning includes expected loading of the lift platform, overhead obstructions, high voltage conductors and weather conditions.
- Aerial lift operators are trained and certified by a competent instructor. AWPs are not to be used as elevators for accessing fixed elevated work areas. If this is required, then approval must be obtained from Company and the JSA or JHA must review, in detail, how 100% fall protection is maintained.
- Aerial lifts lifting capacity and operating specifications shall not be exceeded.
- All aerial lifting equipment shall operate on stable ground in a level position.
- No aerial work platform (AWP) shall be used if any safety device is inoperative.
- AWPs shall only be moved with the basket at slight elevation from ground level and with the help of a Spotter.
- Aerial work platforms shall be securely fastened in place, braced if necessary, to ensure their stability and provided with cleats or surfaced in a manner that provides a safe footing for Contractors.
- No person shall use an AWP that does not have proper inspection and maintenance records. Records shall indicate that the AWP provider has maintained the AWP according to the manufacturer requirements. Records shall be available for no less than two years.
- The maintenance record shall be signed and dated by a qualified inspector.
- :
    - Every AWP shall meet the standards set out in the applicable *CSA Standard* and be inspected, used, operated, and maintained in accordance with *CSA Standards B354.1, B354.2, B354.4, B354.5* as appropriate.
    - AWPs that are operated in Canada, are not operated within 7 m (21 ft.) of energized overhead powerlines without a safe work permit.
- All platforms must have a toe board that extends from the floor of the aerial work platform to a height of not less than 12.5 cm (5 in).
- If the tools or other objects are piled to such a height that a toe board would not prevent the tools or other objects from falling, a solid or mesh panel shall be installed from the floor to a height of not less than 45 cm (17.7 in).
- Temporary work platforms are used where it is reasonably practical to use a permanent structure.

Suppliers shall ensure that Contractors:

- Contractors know and follow the safe techniques for operating the aerial equipment.

- Wear required PPE (refer to Section 6.34). For fall protection refer to Section 6.14.
- Document pre-use inspections of all aerial lift equipment before use to ensure proper operating condition and mechanical condition.
- Ensure that access to the work area under the elevated work platform shall be controlled using barricades, barrier tape and/or a Spotter.
- Remove keys from the aerial equipment when not in use.

6.3. All-Terrain and Off-Road Vehicles

6.3.1. Suppliers

Suppliers shall ensure that:

- ATV use is restricted. “Trike” use is strictly prohibited.
- Due to use of Utility Terrain Vehicle (UTV) on steep, uneven terrain, and all types of conditions, a certified ROP is required.
- Off road equipment may only be used when the potential of tipping or rollover have been properly assessed and risks mitigated.
- All off-road vehicles shall carry no more than the number of people that the vehicle is designed to carry.
- The manufacturer’s rated vehicle capacity for loads when carrying or towing a trailer is followed.
- All off-road vehicles shall be provided with:
    - adequate front and rear lights
    - adequate tire and braking systems for expected terrain
    - a winch that is adequately rated for emergency towing
    - a screen, shield, grill, deflector, guard, or other adequate protection for the operator where the operator may be exposed to the hazard of flying objects
    - where required, have license plates security attached in a visible location
    - be equipped with an aerial whip and flag, First Aid kit (if deemed necessary by hazard assessment), 5 lb. ABC fire extinguisher, plus portable communication equipment as required (e.g. hand-held radio, cellular or satellite phone)
    - be equipped with spark arrestors as required by Applicable Legislation
    - have an emergency kit depending on the conditions and use as required by the Hazard Assessment
- Operators are protected from falling, flying, or intruding objects by means of suitable guards or structures (independently certified or manufacturer’s side doors and undercarriage skid plates).
- Maintenance records must be kept and made available to the Operator.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Proper servicing and maintenance appropriate to conditions of use includes restricting modifications to the structural supports of the drive train of these units.
- Trailers are required to be used to transport UTVs. When transporting off-road equipment on a trailer, the trailer must have the appropriate rating, ensuring that the load does not exceed combined gross vehicle weight and trailer rated capacity.
- Off-road transports must be well secured to the transport vehicle, with the transmission in gear and the parking brake set. The transporting vehicle must be of adequately rated capacity and have the capability to haul the equipment without exceeding the vehicle's gross vehicle weight rating (GVWR).
- The off-road equipment shall be secured using a commercially manufactured restraining device or four tie-downs, two in front and two in back, to prevent forward, backward, and sideways movement. All tie-down straps must be in good condition, free of frays/splices.
- Any materials, equipment, or gear in the pick-up bed must always be secured from movement.
- Loading ramps must meet the following criteria:
    - Fabricated of aluminum or steel and of welded construction. Driving surface must have closely spaced crossed members or mesh construction with high traction surface.
    - May be of one or two-piece design, rigid or folding. Hinges must be factory installed.
    - Adequately rated to support the combined weight of the equipment, the rider, and any cargo that cannot be removed from the machine for loading.
- When Loading / Unloading, loading ramps must be secured to transport vehicle with two tie-down straps, chains, steel cables, or mechanical fasteners, and capable of supporting the equipment and associated equipment.

Suppliers shall ensure that Contractors:

- Carry appropriate license and registration.
- Demonstrate operating competency to a qualified Supervisor or Instructor.
- Assess the risk of tipping or rollover prior to use. Risks including terrain (smoothness/roughness), traction, grade, and space to maneuver must be considered by the Operator.
- Plan routes to avoid severe slopes and unstable ground conditions.
- Inform others of departure and return times prior to leaving.
- Receive property owner's permission prior to operating on private land.
- Do not operate at excessive speeds or engage in horseplay.
- Do not operate on highways (crossing a highway is permitted).
- Remain on approved routes and operate within legal requirements.
- Document pre-use inspections on equipment. Inspect equipment at periodic intervals during the day, to ensure good condition.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Wear seatbelts whenever the equipment is in motion or could become unstable.
- Wear required PPE (refer to Section 6.34).
- Remove keys when not in use.
- Operators shall wear the PPE recommended by the manufacturer while loading / unloading off-road equipment.
- Verify that portable or detachable containers with hazardous materials contents, such as pesticide, flammable solids or flammable liquids shall:
    - Be secured separately from the equipment inside the bed of the truck to prevent movement. Tanks that are specifically manufactured to be solidly attached to the equipment for repeated use are not portable containers and do not have to be removed prior to transport. Such tanks may only contain small quantities of residual contents prior to loading or transport.
    - Be in good condition, free of leaks and residue on their exteriors, properly labeled, and meet *DOT* specifications for over the road transportation requirements.

6.4. Aviation Safety

6.4.1. Suppliers

Suppliers shall ensure that:

- Prior to each day's operation involving the use of a helicopter, a briefing shall be conducted which should include all passengers and the pilot's plan of operation.
- Good housekeeping shall be maintained in all helicopter loading and unloading areas.
- Loose fitting clothing shall not be worn around helicopter operations.
- Ground personnel shall be instructed of all issues regarding visibility and if necessary special precautions shall be taken to eliminate hazards.
- Passenger entry and exit will only be completed when the aircraft rotor system is either stopped or is running at 100 percent. No passenger movement will be allowed while the aircraft rotor system is starting or stopping.
    - Before approaching aircraft, secure any loose articles worn.
    - Do not carry long items vertically while approaching aircraft. If carrying an object of 2 m (4 ft.) in length or longer, there must be a person on both ends of that object.
    - Approach only the front of the aircraft, at a 45° (degree) angle, so the pilot will see you. Keep eye contact with the pilot as you approach the aircraft.
    - Walk in a crouched position when the rotor blades are turning with the power off. The pilot will indicate when it is safe to approach the helicopter.
    - At offshore locations, always walk within the boundaries of the helideck.
    - Contractors will wear safety glasses and earplugs when approaching a helicopter.
- After landing, if the aircraft is to be shut down, passengers are to remain on board and are not allowed to be boarded until the rotors have come to complete stop.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

    - During air medical operations, Air Medical crews, and other crew members, are exempt from this requirement.
- There shall be reliable communications established between the pilot, passengers, and ground personnel.
- Contractors shall maintain a safe distance of at least 61 m (200 ft.) from a helicopter while it is lifting or landing a load.
- When approaching and departing from a fixed wing aircraft stay in the pilot's field of view at all times. Approach only when the pilot indicates that it is safe to do so.
    - The pilot is responsible for correct weight and balance of the aircraft. Only assist with loading heavy or bulky equipment or materials under the pilot's supervision.

Suppliers shall ensure that Contractors:

- Follow the established flight procedures and instructions from the pilot.
- Participate in helicopter activities only after receiving the proper training.
- Demonstrate a complete understanding of the safe work practices to be followed while moving around helicopters.
- Follow the pilot's instructions regarding the aircraft.
- Refer to Section 6.34. Personal Protective Equipment for PPE requirements.

6.4.2. Pre-Trip Guidelines

- Accurately report the weights of extra equipment and personnel being carried on board the aircraft.
- Load gear into the aircraft only with the pilot's approval to ensure proper weight distribution.
- Never bring bear spray into a helicopter. If you must carry it for work purposes, notify the pilot and ensure that it is stored properly for transport as per the pilot's directions.
- Never walk within the vicinity of the tail rotor. Do not go beyond the baggage compartment.
- Do not duck under the tail boom to get to the other side of the aircraft. Walk around the front of the helicopter.

Rigger shall:

- Be trained for rigging helicopter loads and for overhead crane loading including load preparations, securement, and procedures as per local/applicable legislation and/or carrier requirements,
- Inspect the safety devices of all rigging equipment or installed rigging devices on equipment to be lifted. Only the pilot in command or flight crew members shall test the lifting equipment and ensure it meets legislative and engineering requirements,
- Have experience consistent with the requirements of the lift to be made,
- Be physically and mentally able to accomplish required rigging tasks,
- Perform visual equipment inspections of rigging equipment to ensure cleanliness and that it is in good condition; remove all equipment from service that does not meet visual inspection

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

until it can be verified to be in safe working condition in accordance with the manufacturer specifications, and

- Maintain a written record or logbook of these inspections when applicable.

Spotter/Signal Person shall:

- Will be familiar with helicopter lift hand signals and consult with the pilot in command on his/her preference for hand signal use,
- Complete any specific training required by applicable legislation and/or as required by the company in charge of the lift. Consult with the pilot in command to ensure operations are understood and that requirements are clear,
- Wear appropriate PPE to distinguish themselves from other Contractors,
- Supervise the landing/loading area(s) to ensure personnel do not enter the area while lifts are happening and halt operations if an unauthorized entry is made,
- Observe and communicate on the movement of the load or communicate any other information the pilot in command may need to know by either hand signals or radio, and
- Ensure no personnel are stationed in the flight path of a suspended load taking-off and/or being landed.

6.4.3. Unmanned Aircraft Systems

- The use of Unmanned Aerial Vehicles (UAV) also known as “drones” in the vicinity of Company Locations requires approval from Aviation Services.
- UAS Project Approvals Process must be completed prior to their use.
- Do not approach a UAV unless the pilot advises that the controls are secure and that it is safe to approach. The landing/take off area for the UAV will be clearly delineated with cones and appropriate signage.
- Do not stand beneath a hovering UAV.

6.4.4. Planning for UAS Operations

- In planning the layout of a work site, the following minimum information must be considered when developing the pre-job or project plan:
    - Planned take off/landing areas and approach/departure paths with consideration of prevailing wind patterns, mechanical turbulence, built up areas, and obstacles if applicable (i.e., departure or approach near homes or farms with livestock),
    - Location of work areas for the various elements of the operation,
    - Location of emergency landing areas,
    - Location of landing areas,
    - Location of any travelled roadway,
    - Location of any potential hazards such as power lines, buildings, structures, or tall trees,
    - Known sources of potential radio interference (EMI/RFI).

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Contractors must be informed of the work plan as well as the helicopter flight path to and from the helipad and/or landing zones. Flight paths and operational areas must be kept clear of equipment, or personnel other than flight personnel necessary to assist in landing and take-off.
- Contractors must not be placed in an area where there are overhead hazards.
- Before UAS operations begin, the visual observer, supervisor and Contractors involved in the operation must meet with the pilot in command to establish:
    - Plans and procedures to be used,
    - Corrective measures required to minimize risks of injury to Contractors,
    - Limitations and risks associated to the UAS,
    - Communication between the pilot and ground crew should be established by implementing the following minimum requirements:
        - Establish an effective system of voice communication signals between the pilot and the visual observers/ground crew (noise and distance may prevent verbal communication),
        - If available, two-way radio communication equipment shall be tested and the channels to be used established before operations begin. This is essential for UAS operations where direct verbal communications are not possible,
        - Established exact voice or hand signal commands to avoid any possibility of misunderstanding: all communication should be pertinent and brief,
        - Clearly marked location of cables and all known hazards in the way of anticipated flight paths on the plans and make the pilot aware of them.

Visual Observer (UAS):

- Review the Visual Observer Briefing document and communicate any concerns directly with the pilot verbally,
- Follow the instructions of the pilot in command at all times and assist the pilot with keeping the landing/take-off area clear when not required to be observing the UAV or during emergencies.
- Remain within direct voice contact with the pilot at all times (by radio if remaining in close proximity to the pilot is not possible while performing their duties),
- Maintain visual contact with the UAV at all times with no exception, and
- Not perform any other duties other than those detailed in the Visual Observer briefing.

UAS Pilot shall:

- Ensure that you have reviewed the Visual Observer Briefing with your visual observer and that they clearly understand their role
- Ensure that you have established a communication protocol with the visual observer

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.4.5. In-Transit Guidelines for Helicopters

- Seat belts, shoulder harness, and hearing protection shall always be worn while the aircraft is in motion. Ensure that the buckle of the seat belt is facing outward.
- If the flight will be over water, a PFD will be worn while the aircraft is in motion.
- All flights are designated “NO SMOKING”.
- Before take-off ensure all doors are closed and nothing is hanging out of the doors, windows, or baggage compartment.
- Always read the emergency briefing card before each flight.
- To ensure helicopter doors are not damaged, passengers must not:
    - Lean against or use force on doors or windows
    - Slam the doors or use force on door handles or latches
    - Touch any moving parts or fragile protruding parts that are attached to the doors, such as antennas or lights

6.4.6. Helicopter – Slinging Operations

- Helicopters (including those involved in slinging operations) shall be operated with a five (5) percent power reserve. Pilots may reduce the five (5) percent power reserve only in ideal flight conditions; if a lesser reserve is used, it shall guarantee adequate power for an abort in the event of changing flight conditions. However, the pilot shall maintain some power reserve.
- Contractors working around helicopters during slinging operations shall:
    - keep the area free of loose articles
    - watch for Hazards, such as obstacles or hanging trees that may fall when dislodged by the helicopter rotors or by gusty wind conditions
    - stay alert and be aware of the positioning of loads
    - maintain visual contact with the load (and cargo hooks) until it clears the location
    - keep a safe distance from the loads
    - remain clear of incoming loads (and cargo hooks) until they are placed on the ground
    - determine an escape route that leads away from the load, and ensure it remains clear of objects or potential blockages
    - always stand uphill from the load, as it may roll when released
    - maneuver the load only when necessary and only by pushing it into position; do not reach for a load or cargo hook
- For slinging (long-line) operations, follow these requirements:
    - use only multi-stranded steel core long lines, cables, or lanyards
    - use long lines and lanyards swaged with steel; do not use cable clamps
    - attach only properly sized clevises to the helicopter hook (either the belly hook or the extended hook) and keep all screw-type clevis pins tight and lock-wired

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- use only the proper type of clevis pins (not bolts) and check clevises before and after each lift
- complete record of inspection and logbooks
- secure loads of loose articles in cargo nets
- advise the pilot of the presence of any Hazardous Materials
- do not conduct long line operations overpopulated areas
- do not conduct long line operations within 100 m (110 yd.) of high-voltage power lines
- cease operations during electrical storms
- ground all loads to prevent a buildup of static electricity (static prevention is meant to prevent possible electrical injury to Spotters)

- Before commencing slinging operations, designate one person as Spotter and ensure that radio frequencies are established.
- The Spotter is the only person permitted to stand beneath the helicopter during slinging operations unless another person is required to help position the load.
- The Spotter is the only person permitted to use hand signals.
- The Spotter shall:
  - use standard hand signals when the helicopter is operating directly overhead and when it is impossible to use radio communication
  - confirm that the pilot has visual contact of the Spotter by radio prior to using hand signals
  - ensure standard helicopter hand signals are practiced prior to the start of operations; this ensures signals are agreed upon and understood by both the pilot and Spotter
  - use large movements when using hand signals, especially when using long lines this is necessary because the pilot may be as high as 45 m (150 ft.) above the Spotter)
  - In addition to wearing basic PPE, the Spotter shall always wear the following PPE during slinging operations:
    - head protection with chin strap
    - protection from static (e.g., high-voltage gloves) during cold weather/low humidity
    - High Visibility Vest

6.4.7. Emergency Equipment

- During the pre-flight briefing, the pilot must:
  - Identify the location of the emergency locator transmitter (ELT), survival equipment and first aid supplies
  - Explain the proper operation of the ELT
- The pilot must provide a life jacket for every passenger when operating from water.
- For long flights over water, Passengers must note the location of oxygen masks (if applicable) and know how to start the flow of oxygen.

6.5. Boom Truck and Rigging

6.5.1. Suppliers

Suppliers shall ensure that:

- Operator has current proper certifications for boom truck operation.
- Operator knows and follows the operating procedures for boom trucks.
- All boom truck lifting equipment shall be visually inspected at the start of any lifting task.
- All boom trucks shall be equipped with a load chart showing the rated load capacity at all boom angles and boom radiuses.
- All Serious or Critical Lifts must be performed in accordance with the *Serious and Critical Lifts section.*
- All boom trucks shall be equipped with an effective back up alarm system.
- Unless the equipment operator has an unobstructed and clear view of the lift operation, a designed signal person must be used to communicate with the equipment Operator. This applies to all types of lifts.
- The equipment must not be used unless Ground Conditions are firm, drained and graded to a sufficient extent so that in conjunction (if necessary) with the use of Supporting Materials, the equipment manufacturer's specifications for adequate support and degree of level of the equipment are met.
- Rated load capacities for the boom shall be posted and visible to the Operator while at the control station.
- Do not exceed the lift capacity of the lifting equipment on the truck.
- A clear lift and operating zone which includes barricades if needed and clearances from hazardous equipment and electrical power lines are established.
- Remove keys when not in use.
- Rigger must know and follow proper rigging principles for a lift.
- All rigging equipment shall be inspected before each use.
- Basic rigging and load handling principles and minimal guidelines are listed as follows:
    - All lift rigging assemblies and spreader bars shall have a Working Load Limit (WLL)/Safe Working Load (SWL) that shall not be exceeded.
    - Alignment of the rigging slings shall be checked as the load is pulled tight on the rigging or sling before the actual load is lifted clear of any support.
    - Tag lines shall be used to control load swing, rotation and/or balance, when necessary, to prevent a hazard to Contractors. When the bottom of the load is waist high or lower, tag lines are not required, but can be used if additional stability is desired.
    - All wire rope and synthetic slings, lifting hooks, shackles, alloy chains and lifting eyes shall be visually inspected prior to any lift.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

    - Damaged or suspect rigging equipment shall not be used and will be removed from service.
- Follow the practice of level load lifting to ensure the rated capacity of the slings or chains is not exceeded.
- Boom trucks will not be operated where the any part of the crane, jib, hoist, load, tag line or rigging will come within the minimum clearance distance of overhead power lines (see tables in Section 6.10 Crane and Hoist Safety).
- All boom truck / lifting equipment is regularly inspected.
- Follow the following sections contained in Section 6.10 Crane and Hoist Safety
    - Inspections and Maintenance
    - Hoisting and Mechanical Lifting
    - Slings – Safe Operating
    - Alloy Steel Chain Slings
    - Wire Rope
    - Synthetic Web Slings
    - Hooks

6.6. Bonding and Grounding

6.6.1. Suppliers

Suppliers shall ensure that:

- Suppliers shall develop a safe work plan for controlling induced voltage. This plan shall include, but is not limited to, the following:
    - specialized PPE
    - measuring/testing
    - grounding requirements for planned work
    - work stoppage for adverse weather conditions
- Suppliers plan shall also consider these additional factors:
    - The voltage level depends on the current in the transmission lines, the geometric configuration of the pipeline with respect to the transmission lines, and the length of pipeline paralleling the transmission line.
    - Induced voltage caused by proximity to overhead transmission lines may continue to affect pipelines, even when the pipeline no longer parallels the transmission cables. Induced voltage can be a hazard for up to 16 km (10 mi) beyond the point of departure.
    - Once a Below Grade Facility is exposed, it shall be checked for induced voltage prior to commencing work on the Facility. The Facility shall be continually checked for induced voltage as required or monitored based on the Hazard Assessment.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - The industry-accepted safe limit for induced voltage limit on pipelines, Appurtenances and other below grade facilities is 15V. Bonding and Grounding is therefore required to bleed off any charge more than 15V.
  - If further aid is required to reduce the induced voltage to below 15V, contact Company Operations Engineering to determine the need to install a grounding grid for Bonding and grounding Below Grade Facilities, vehicles, and equipment. If a grounding grid is installed, before starting work, ensure induced voltages on the bonded pipe, vehicles and equipment have been reduced to an acceptable level
  - Potential induction sites/areas shall be tested by a Qualified Contractor.
  - Only Qualified Contractors are to mitigate induced voltage hazards.
  - When the potential for induced voltage exists, a Hazard Assessment shall be completed and reviewed, with the involvement of the Contractors doing the work.
- Prior to use and during use, all portable equipment used in Bonding and Grounding work (e.g., welding units, generators, portable light plants, air compressors, etc.) shall be properly grounded, in accordance with manufacturers' specifications and Worksite requirements.
- Bonding cables shall meet Company requirements set out in this Manual, industry standards and Applicable Legislation.
- Use an uncovered braided copper wire with an alligator clip brazed/clamped to each end (or use other suitable Bonding cable) when drawing oil or product samples from the line, or when loading or off-loading at sump tank locations.

Suppliers shall ensure that Contractors:

- Attach one end of the Bonding cable to a ground consisting of a copper ground rod. Type and depth of copper rod to be used shall be based on job planning requirements.
- Avoid breaking, cutting, or detaching Bonding cables once they are in place, for as long as a fire hazard exists.
- Ground or electrically bond containers to each other when transferring liquids.
- Only fill portable fuel containers when they are on the ground (never do so in truck beds, on tailgates or in the trunks of vehicles).
- Immediately contact Qualified Contractors if there are any concerns about induced high voltage and work equipment.
- Ensure each Bonding or grounding point is clean and free of paint, with a positive connection.
- Never use chains for Bonding or grounding purposes.
- Perform visual inspection of the cables and connection as required to ensure positive connection is maintained.
- Bond and/or ground when completing the following tasks:
  - cutting and separating a pipeline
  - separating flanges
  - loading or off-loading at sump tank locations
  - dispensing flammable liquids from bulk drums into a secondary container

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- removing an accessory attachment from a fixed Facility (e.g., a mixer from a tank)
- using abrasive blasting equipment to clean tanks
- hydrovacing
- spray painting
- when using compressors, pumps, and generators
- drawing samples from a pipeline
- drawing liquids from a pipeline into a pan
- when AC voltage is present

See table below for installation requirements for bonding cables.

Table 2: Installing Bonding Cables

TASK	BOND FROM	BOND TO	NOTES
Abrasive Blasting Equipment for Tank Cleaning	Blasting Hose Nozzle	Tank Shell or Tank Roof	N/A
Cutting, Installing and Separating of a Pipeline	Grounding Clamp on one side of separation Second cable from grounding clamp on one side of separation	Grounding Clamp on other side of separation Grounding clamp on pipe section to be removed or installed	Ensure clamps contact clean, bare metal. First cable shall be long enough to span the work area. Second cable shall be long enough to clear the hazardous area when removing or installing pipe section.
Drawing Samples from Pipeline	Attach alligator clip on one end of Bonding cable (unbraided copper) to sample point on pipeline (i.e., pipe, valve)	Other end of Bonding cable to alligator clip on metal sample container	N/A
Draining Oil from Pipeline to Pan	Pipeline	Metal Drain Tray	For plastic drain trays, second end of Bonding cable shall always remain in contact with liquid being drained into tray.
Loading or Off-loading at Sump Tank Locations	Object being loaded/off-loaded	Sump tank or piping connection at loading / off-loading Facility	For fiberglass sump tanks, attach second end to a specified bonding point.
Dispensing from Bulk Drums to Secondary Container	Bulk Drum	Secondary Container	One container shall be grounded, and the other container bonded to the grounded container.
Removing accessory attachments from fixed facilities	Clean, bare metal on accessory attachment. Flange	Fixed Facility Flange	Bonding cable shall be long enough to clear the hazardous area when removing attachments or span of work area when separating flanges.

TASK	BOND FROM	BOND TO	NOTES
Hydrovacing Near Underground Electrical Wires	Wand/Gun Dig Tube Mat # 1 Mat #1	Grounding Mat # 1 Grounding Mat # 2 Mat # 2 Hydrovac Truck	For distances greater than (>) 1.8 m (6 ft.) from the Hydrovac truck, it may not be necessary to bond the mat to the truck (Step 4).

***NOTE**: Some tasks require more than one Bonding cable. The numbers listed in this table represent steps to be taken for proper Bonding (i.e., bond 1 to 1, and 2 to 2, etc.).*

6.7. Brush Cutting, Clearing and Vegetation Management

6.7.1. Suppliers

Suppliers shall ensure that:

- The terrain is surveyed (in advance of initiating work) for hazards prior to operations.
- All applicable precautions are implemented when overhead clearing of vegetation.
- If clearing is required within limits of approach boundary to overhead powerlines a certified and / or licensed professional arborist will be utilized to perform the work. (Refer to the Electrical Safety section.)
- Reference all owners' manuals for equipment being utilized. (Mowers, tractors, weed eaters, etc.)
- Emergency plans should be developed before beginning work to include location of nearest medical facilities, directions or GPS coordinates for EMS if working in remote location, and a check-in system for lone operators.
- Equipment Protective Guards and Systems includes:
    - Keeping all guards in place when the machine is in operation
    - Contractors shall be protected from moving machinery parts
    - Contractors are prohibited from altering/removing equipment guards and controls unless specified by manufacturer (e.g. temporary removal of ROPS).
    - Only hitch to the drawbar and hitch points recommended by tractor manufacturers.

Suppliers shall ensure that Contractors:

- Using motorized equipment for cutting or clearing brush**:**
    - check the cutting area for any metal, large stones or other hard material that could damage the blades or cutter disc
    - regularly clean accumulated debris from the top of the cutter's fuel tank and from the engine, pumps, and axle protection plates on a regular basis
    - ensure other Contractors do not approach the brush cutter's articulating joint when the brush cutter is operating
    - operate brush cutters with protective guards installed

  - wear additional PPE as required by the Hazard Assessment
  - ensure each brush cutter has protective guards and only operate brush cutters with the guards installed
  - dispose of brush and slash by mulching and spreading on an area designated by the regional/project manager or a Company ROW agent or landowner
- Do not operate a brush cutter when other Contractors are within 91 m (300 ft.) of the front or sides of the brush cutter (refer to manufacturer's instructions for additional equipment-specific hazards).
- Do not operate equipment on slopes that exceed the angle limits specified by the manufacturer. If the manufacturer limits are unavailable, evaluate the terrain and slope conditions to ensure the equipment is operated in a safe manner. Avoid operating on slopes with an angle over 15 degrees when operating a riding mower or 20 degrees when operating a tractor if there is no other information available.
- When possible, back uphill and drive downhill. When driving downhill keep the equipment in low gear. Avoid mowing slopes you cannot back up unless you have equipment specifically designed and configured for crosscutting (i.e. slope mower).
- When stopping the mower / tractor:
  - Park on even ground, disengage the PTO (e.g. Bush hog) and lower all implements.
  - Place all control levers in neutral position, apply the parking brake, turn off engine and remove the keys.
  - Ensure the tractor has come to a complete stop before dismounting.
- Equipment should only be left unattended when it is on level ground with the brake set and the key removed.
- Do not operate equipment within 1.5 m (5 ft.) of the unprotected edges of retaining walls, embankments, levees, ditches, culverts, excavations, or similar locations that present an overturn or roll-over hazard.
- Do not mow wet grass on sloped surfaces. Reduced traction could cause sliding.

6.7.2. Riding Mower and Tractor

- Roll Over Protection System (ROPS) are in good condition and raised into active position. Never operate equipment if it is intended to be equipped with ROPS but ROPS is not in place.
- Seat belt assemblies are on all equipment on which a ROPS has been installed and require the usage of seat belts.
- Where vertical clearance does not allow for ROPS to be raised, seatbelts shall not be worn. The ROPS shall be raised back to active position and seatbelt reconnected as soon as clearance allows.
- Riding mowers should be equipped with operator presence control system that shuts off the blades when the Operator dismounts or rises out of the seat.

- Riding mowers should be equipped with interlocks that ensure the engine cannot start while the mower is in gear or if the blade is engaged.
- Tractors should be weighted correctly for the work activities planned.
- Inspect the equipment before use and perform maintenance as per manufactures recommendation.
- Utilize insect repellents (fleas, ticks, mosquitos, etc.).
- Take measures to protect from thermal stresses. (See *Heat Stress or Cold Stress section*).

6.7.3. Chainsaw

- Utilizing chainsaws, review manufacturer's instructions on the safe use, care, and maintenance of the chainsaw prior to use. Below are a few key items to remember:
    - Use correct techniques to start chainsaw (on the ground or standing). Do not drop start or throw start the chainsaw.
    - Wear proper apparel, especially chaps or leggings (to help avoid the most common cause of injuries related to chainsaws).
    - Do not operate chainsaws from a ladder or above shoulder height (utilize saws with extended reach capabilities).

6.8. Compressed Gas Cylinders

6.8.1. Suppliers

Suppliers shall ensure that:

- Gas cylinders are handled, maintained and stored according to these specification requirements.
- Contractors are properly trained prior to using and handling of compressed gas cylinders.
- Compressed gas cylinders, portable tanks, and cargo tanks shall have pressure relief devices installed.
- Oil or grease shall not be used on threaded portions of oxygen or acetylene cylinders or gauges.
- Cylinders equipped with gauges which will not be used for substantial periods of time, such as overnight, shall have the cylinder valves closed and cap secured.
- Cylinders 'in service' on welding trucks are not required to have protective caps in place if they do not protrude above the headache rack. Also, gauges need not be removed if an approved cart is used for cylinder movement.
- Pressure cylinders are in "storage" if they are not in use or connected for use.
- Store cylinders out of direct sunlight, when possible.
- Keep all empty cylinders for the same kind of gas together.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Separate full cylinders from empty ones. Empty cylinders shall be marked “Empty” or “MT” with chalk.
- Never store cylinder where the temperature may rise above 130°F.
- Never store cylinders near elevators, stairs, gangways, foot bridges, evacuation routes, operating cranes or where something might drop on them, hit them or knock them over.
- Compressed gas cylinders shall be secured in an upright position with the protective cap in place when the cylinder is not in use (e.g., cylinder storage rack) except, if necessary, for short periods of time while cylinders are being:
    - hoisted or carried,
    - transported (provided they are adequately secured against movement and any TDG/DOT requirements are met)
- Acetylene and CO_2 compressed gas as well as cylinders containing pressurized liquid Oxygen, Nitrogen, or Argon must be kept in an upright position at all times.
- Post conspicuous “NO SMOKING” signs around the flammable gas storage area.
- When stored, flammable gas cylinders and compressed oxygen cylinders shall be separated by at least 6 m (20 ft.) or by a non-combustible barrier 1.5 m (5 ft.) high with a fire-resistant rating of at least one-half hour.
- Adequate precautions shall be taken to prevent the ignition of flammable vapors.
- Inspect cylinders for corrosion, dents, and gouges and, if necessary, notify the supplier to remove the cylinder from the worksite.

Suppliers shall ensure that Contractors:

- Review SDS of flammable or combustible product to determine the correct class prior to product use.
- Conduct a visual inspection to determine if compressed gas cylinders are in a safe condition prior to each use.
- Always wear the appropriate protective gloves when handling cylinders.
- Handle cylinders with great care, even when empty.
- Use a mechanical lifting device, carts, mag-carts, or dollies to move and load cylinders, where possible.
- Use a cradle, boat, or suitable platform when using a crane or derrick to move a cylinder. Slings or electric magnets shall not be used for this purpose.
- Take care to never drop cylinders or submit them to shock.
- Avoid dragging or sliding cylinders.
- Never lift cylinders by their cap.
- Cap cylinder valves before moving and loading.
- Close cylinder valves and release all pressure from the regulators, before removing a regulator from a cylinder.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Never try to refill cylinders to mix gases in a cylinder or transfer gas from one cylinder to another unless transferring breathing air.
- Smoking is strictly forbidden when moving, loading, transporting, or unloading any cylinder, whether it contains flammable gas or not.

6.8.2. Oxygen Cylinders

- Oxygen cylinders shall be separated from flammable gas (fuel-gas) cylinders or combustible materials (especially oil or grease), a minimum distance of 6 m (20 ft.) or by a non-combustible barrier at least 1.5 m (5 ft.) high having a fire-resistance rating of at least one-half hour.
- Post conspicuous “NO SMOKING – OXYGEN” signs around the oxygen cylinder storage area.
- Gauges used for oxygen service must be marked: “USE NO OIL”
- Oxygen shall not be used as a substitute for compressed air.

6.8.3. Aerosols

- Aerosols shall be stored under cover, protected from exposure to the weather and direct sunlight, and kept at least 3 m (10 ft.) from any source of heat or ignition.
- Aerosol cans are stored at the correct temperature as recommended by the manufacturer.
- Where aerosols are kept in distribution centers, they shall be stored within strong mesh enclosures (i.e. caged).

6.8.4. General Regulator Operation

- Use approved regulators or reducing valves only for the gas and pressures for which they are intended.
- Inspect the regulator, union nuts and connections before each use to detect faulty seals that may cause leaks.
- Replace damaged nuts or connections; do not use leaking regulators.
- Return regulators to the supplier for repair, calibration, or adjustment.
- Fully release the regulator pressure-adjusting screw before attaching a regulator to a cylinder and before opening the cylinder.
- Always stand to the side when adjusting regulators.
- Follow work procedures when working with a flammable material or in a potentially explosive atmosphere.
- Do not use oil or grease as a lubricant for regulators or fittings on Oxygen Cylinder Regulators.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.8.5. Propane Bottles and Accessories

- When a propane bottle is in use, fully open the valve, when not in use, fully close the valve. Do not use the valve to regulate the flow of propane.
- Store propane compressed gas Cylinders as follows:
    - outdoors on concrete or other non-combustible platforms
    - in an area that provides protection from tampering
    - in an area free of vehicle or mobile equipment travel; if propane Cylinders are required to be temporarily stored in areas vehicle traffic is expected then they shall be protected by barriers
    - away from a fire escape, stairs or building egress
    - at least 7.5 m (23 ft.) away from buildings, unless in an approved storage cabinet; if using an approved storage cabinet, then store 1 m (3 ft.) away from buildings and 3 m (9ft.) away from air intakes
    - at least 1 m (3 ft.) from other flammable compressed gas containers (e.g., acetylene)
    - at least 6m (20 ft.) from containers or dispensers for Flammable Liquids and Combustible Liquids (e.g., gasoline and diesel fuel), or Cylinders of compressed oxygen
- Propane fueled, hand-held torches shall be used for their intended purpose, which is to be hand-held, and under constant supervision.
    - These torches shall only be used for pre-heating of piping and other specific intended purposes prior to welding.
    - They shall not be used for temporary heating and shall never be unattended.

6.9. Confined Space Entry

6.9.1. Suppliers

Suppliers shall ensure that:

- Hazard assessment and controls for any work inside a confined space meet OHS regulations.
- In British Columbia, Suppliers on worksites fall under provincial OHS regulations. The *BC OHS Regulations, Part 9* definition have been adopted for **Western Canada**. Part 9 also meets (or exceeds) the definition for a confined space in federal *COHS Regulations*, Part 11.
- **Eastern Canada** follows the federal *COHS Regulations*, *Part 11* definition for a confined space.
    - In NS and NB, Suppliers on worksites would fall under provincial *OHS* regulations

BC OHS Regulations, Part 9 definition:

- A ***confined space*** is a workspace that:
    - is enclosed or partially enclosed,

- is not designed or intended for continuous human occupancy,
- has limited or restricted means for entry or exit that may complicate the provision of first aid, evacuation, rescue, or other emergency response service, and
- Is large enough and so configured that a Contractor could enter to perform assigned work.

***NOTE**: All four criteria must be met for a workspace to be designated a Confined Space.*

COHS Regulation, Part 11 definition:

- A ***confined space*** means an enclosed or partially enclosed space that:
  - is not designed or intended for human occupancy except for the purpose of performing work,
  - has restricted means of access and egress, and
  - may become hazardous to any person entering it owing to
    - its design, construction, location, or atmosphere
    - the materials or substances in it, or
    - any other conditions relating to it

  ***NOTE**: All criteria must be met for a workspace to be designated a Confined Space.*

Suppliers shall ensure that:

- Assessment and planning documents for a planned Confined Space Entry have been completed and assembled as required.
- Isolation, Lock Out / Tag Out requirements, and any other preparation activities set out in the Confined Space Hazard Assessment Report and referenced documents have been completed prior to Entry.
- Any rescue equipment required by a Confined Space Hazard Assessment Report is provided or made available.
- Participants in the Entry have met minimum training requirements prior to entry.
- Conduct a pre-Entry meeting with all participants as per requirements below.
- Pre-Entry atmosphere testing is conducted and meets the criteria set out in the Confined Space Hazard Assessment report.
- Manage and sign off the Safe Work Permit to authorize Entry.
- Rescue Personnel are alerted to the Entry activity as per requirements below.
- Manage any issues arising during Entry (e.g., change of atmosphere or conditions requiring Entrant evacuation, additional mitigation efforts, re-permitting, etc.).
- Safe conclusion to Entry and proper Confined Space closure or signage following Entry.

6.9.2. Confined Space Hazard Assessment Report

The Confined Space Hazard Assessment Report must include:

- Conditions that may exist prior to entry due to the confined space's design, location, or use,
- Conditions that may develop during work activity inside the space,
- The potential for hazardous atmospheres including oxygen deficiency or enrichment, toxic or flammable gases, vapors, mists, or dust,
- Any hazardous energy requiring isolation and lockout,
- Any potential for engulfment or entrapment, and
- Any other hazardous conditions.

A Confined Space Hazard Assessment Report should include:

- The location and technical identification of the space and, as applicable, a description of its role in any process (e.g., processing vessel).
- Photos and diagrams of the space as available.
- The hazards listed above (required by *OHS* regulation).
- The preparation processes required prior to any human entry into the space. This includes:
  - Any purging or cleaning activities.
  - Any isolation and lock out / tag out plans or requirements.
- Atmospheric testing requirements prior to entry.
- The atmosphere hazard level (low, moderate, high) and corresponding safety watch and rescue requirements as a result.
- Controls for initial entry and for specified tasks that may take place beyond initial entry, including:
  - Ventilation calculations and requirements.
  - PPE requirements.

A Confined Space Hazard Assessment Report remains valid for a period of three years after the date of signature on the report.

- The assessment must be reviewed and revised as appropriate if the space is physically altered, isolation requirements change, or previous hazards no longer exist, or new hazards have been introduced (e.g., a change in product flowed through a vessel).
- While efforts should be made to systematically update all confined space assessments on a three-year cycle, a review and revision of an outdated assessment is only mandatory when a space will be subject to entry again.

6.9.3. Qualifications to prepare a Confined Space Hazard Assessment Report

The Confined Space Hazard Assessment report must be prepared by a qualified person.

- In British Columbia the assessment must be prepared in consultation with the person assigned overall responsibility for administration of the confined space entry program and with the workplace *OHSE* committee.

To qualify to sign off on a Confined Space Hazard Assessment Report, a person must:

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Have taken training on the Confined Space Hazard Assessment Report, and are either:
- A certified industrial hygienist (CIH), registered occupational hygienist (ROH), certified safety professional (CSP), Canadian Registered Safety Professional (CRSP) or professional engineer (P. Eng.); or
- A Western Canadian Contractor that is acceptable to WorkSafeBC through a combination of education, training, and experience and has completed the Confined Space Hazard Assessment training course and competency exam.

6.9.4. Qualified Confined Space Hazard Assessor shall:

- Meet the qualifications to sign off on a Confined Space Hazard Assessment Report.
- Complete assessments of potential Confined Spaces on a worksite to ensure:
    - The Confined Space Inventory is completed correctly.
    - A Confined Space Hazard Assessment Report is completed for any workspace deemed a Confined Space prior to Entry into that space.
- A Confined Space Hazard Assessment Report is required to make a final judgment on whether a space fits the technical criteria for a confined space.
    - See below for further criteria on preparing a Confined Space Hazard Assessment Report.
- In the event a space as normally configured is a Confined Space, it should be tracked as a Confined Space within the inventory and must be treated as such during initial preparation (follow isolation and lock out / tag out requirements set out below) and any entry prior to mitigation that may move it into a non-confined space category. However, once alterations or mitigations are made that remove it from the Confined Space category, it can be treated as a non-confined space for subsequent work. If the space will be returned to its normal configuration after work, it should remain in the inventory as a Confined Space throughout the work.

6.9.5. Confined Space Package

All relevant documentation should be compiled and available prior to entry into a confined space. This Confined Space Package should include (as applicable):

- Confined Space Hazard Assessment (which will reference the following “attachments” to be included in the package):
    - Piping and Instrumentation Diagrams (P&IDs)
    - Isolation drawings (identify isolation points, line breaks and blind locations)
    - LOTO form(s)
    - Blind Tag Log
    - Confined Space Entry Procedure and/or procedures for tasks to be conducted in Confined Space
    - Confined Space Rescue Plan
    - Safety Data Sheets (SDS)

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Industrial Hygiene Reports, including but not limited to:
  - Benzene Survey Form
  - NORMs Survey Form
  - Amine Survey Form
  - Mercury Survey Form
- Atmosphere Testing Log
- Entry Log

6.9.6. Entry Procedure Requirements

Every confined space needs a documented entry procedure prior to anyone entering the space.

***NOTE**: A single procedure for initial or task specific entries may be applicable to several confined spaces that share similar characteristics and hazards.*

This entry procedure depends on the outcome of the Confined Space Hazard Assessment Report. This report specifies the preparation processes required prior to human entry, including:

- Purging, cleaning, and/or ventilation
- Isolation and lock out / tag out requirements
- Atmospheric testing requirements prior to human entry
- Controls that must be applied for initial entry and any specified tasks beyond initial entry, including:
  - Ventilation during entry
  - Contractor PPE
- Either of the following may meet the requirement for a “documented entry procedure”:
  - A fully completed **Western Canada** Confined Space Entry Hazard Assessment with a Supplier’s procedure attached (if entrants are the Supplier’s Contractor)
    - The documented procedure provided by the Supplier must meet or exceed the requirements set out in the **Western Canada** Confined Space Entry Procedure

6.9.7. Isolation and Lock Out / Tag Out Requirements

- Isolation and Lock Out / Tag Out requirements should be captured as part of the Confined Space Hazard Assessment.
- Any piping flowing into or out of the confined space that contains a harmful substance, must be controlled by either:
  - Disconnecting the piping, or
  - Using blinds or blanks, or
  - A double block and bleed system
- Any piping inside the confined space must be assessed to determine if it presents a hazard to a Contractor within that confined space. Control measures must be applied to ensure Contractors are protected from these hazards.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Blanks and blinds, unless certified by a professional engineer, must be ANSI rated for the anticipated pressure, temperature, and service requirements.
- If disconnecting pipe to isolate the confined space, either:
    - The space between the separated pipe ends must be 10 times the diameter of the pipe, or
    - The disconnected pipe moved out of line so that leaks will not bypass the disconnection and continue into the confined space, or
    - If neither of these is possible, an engineered device designed for isolation purposes, suitable for anticipated pressure, temperature and service may be used to achieve isolation between the pipe ends.
- If a double block and bleed system is used, the following apply:
    - The diameter of the bleed line must be no less than the diameter of the line being isolated (unless certified by a professional engineer)
    - The bleed on a liquid carrying pipe must be at a lower elevation than the block valves,
    - All valves must be locked out in their proper open or closed position, and
    - The bleed must remain clear of obstruction.
- The piping flowing substances into or out of the confined space should be isolated at the closest practicable, safely accessible point to the vessel.

6.9.8. Entry Team Meeting

- An Entry Team meeting must be conducted prior to any initial entry into a confined space and should include all applicable members:
    - Contractor(s) entering space
    - Safety Watch personnel
    - Rescue personnel
    - Operating Authority / Permit Issuer
    - Site or Contractor Supervisor(s) that may direct the work of any of the above
- In the event personnel are added to the Entry Team that did not attend the pre-entry team meeting, the Supplier must review the contents of the meeting with this person and be satisfied they are fully briefed on their role and responsibilities in the entry activities.
- The Entry Team should engage in cursory review of the contents of the Confined Space Package, with a primary focus on:
- Ensuring the stipulations set out in the Confined Space Hazard Assessment have been or will be met prior to entry, including
    - Pre-initial entry preparations such as isolation, lock out / tag out, and any cleaning, purging, or ventilation activities.
    - Controls to be applied during entry or work within the space.
- Ensuring familiarity with the procedure for initial and any subsequent entry under review.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Review of the Rescue Plan and ensuring all members are clear on their roles.
- All stipulated pre-entry preparation activities must be complete and verified prior to entry.
- For subsequent entries to conduct tasks within confined spaces, the size, scope, and necessity of an Entry Team meeting needs to be based on:
    - The level of hazards within the space and introduced by the tasks to be conducted.
    - The existing familiarity of Entrants, Safety Watch, Rescue, and Operating Authority with the confined space and its hazards (e.g., are the same personnel involved as those attending the initial entry meeting?).
    - At minimum, prior to any entry to complete a task, the Supplier must go over the Confined Space Hazard Assessment Report for the task at hand with the Entrants as part of the Safe Work Permit process (in lieu of a full Entry Team meeting).

6.9.9. Ventilation Equipment Requirements

- Ventilation requirements will be set out in the Confined Space Hazard Assessment Report.
- In the event constant ventilation is the only means by which a safe breathing atmosphere is created for the Entrant, there must be safeguards in place to warn any Entrants if ventilation fails. This may be done either by:
    - Having the ventilation equipment equipped with an alarm that can be heard by the Entrant in the event of failure, or
    - Having the Safety Watch monitor the ventilation equipment continuously and warn Entrants to exit the space if it fails.

6.9.10. Preventing Unauthorized Entry

- All Confined Spaces must either be:
    - Secured against entry (e.g., bolted shut or locked), or
    - Identified by a sign at the entry point to indicate that this is a Confined Space and that entry is not permitted without a permit.

***NOTE**: A sign with wording along the lines of the following should be placed at the entrance to any confined spaces Contractors can readily access during normal operations or spaces opened for permitted entries, as depicted below.*

DANGER
CONFINED SPACE
ENTRY BY PERMIT ONLY

Figure 4: Example of Confined Space Signage Requirements

- Bolted manways that are opened for an extended period for multiple entries may be locked out between entries without fully closing the manway by installing a manway T or cable on the bolt holes and secured with an operational or departmental lock as a way of managing the operating authority's control over entrance.

6.9.11. Electrical and Gas Based Tools and Equipment within Confined Spaces

- Compressed gas cylinders are not permitted inside a confined space.
    - Compressed air supply, handheld aerosol spray containers, fire extinguishers are exempted.
- Torches and hoses used for welding, brazing, or cutting must be removed from the confined space when not in use or when the confined space is vacated.
- Alternative measures to be certain gas does not continuously leak out of hoses may be used when removing the hose is not practical (e.g., disconnecting and tagging hoses removed at source).
- If the space is classified as a hazardous location based on the potential for flammable vapors, tools and equipment used must meet the appropriate level of *CSA* approval for the classification of the space (as per the *Canadian Electrical Code*).
- Non-sparking tools may also be specified by the Confined Space Hazard Assessment

6.9.12. Confined Space Closure Requirements

- Once work is completed within a confined space, prior to space closure, the following should be done:
    - Final visual inspections to ensure no personnel are inside the space prior to closure.
        - This is captured on the “Clear for Closure” section at the bottom of the Entry Log.
    - Ensure any active Safe Work Permit is formally closed with required sign-offs complete.

6.9.13. Rescue Requirements

- Every confined space entry requires:
    - The services of one or more rescue personnel
    - A documented Rescue Plan
- Contractors assigned rescue duties must be notified before Contractors enter a confined space and when all Contractors have exited from the space.
- If multiple confined spaces are being entered, notifying rescue personnel to be on an alert status is sufficient.
- In cases where there is a contract for rescue personnel to provide 24-hour service (e.g., during plant shut down), individual notification is not required.
- Assigned rescue Contractors must monitor any signaling system used to summon them while a confined space entry is underway or while on an alert status.
- Where an entry-rescue into an IDLH atmosphere is a possible rescue scenario, the rescue team must remain at the confined space during the entry itself.
- The rescue team must have PPE donned, including SCBA or SABA with an escape bottle, and respirator masks at the ready.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- A rescue worker may not enter the confined space unless there is at least one additional worker located outside to render assistance.
- The safety watch may serve as a rescue worker and may perform a non-entry rescue using an attached lifeline.
- In the event rescuing an entrant involves physically entering the confined space, a rescue worker in addition to an existing safety watch will be required to execute a rescue (i.e., one person enters to extract the entrant, the other remains outside to render assistance).
- Once rescue is initiated, the Supplier Supervisor shall trigger the site-specific Supplier Emergency Response Plan.
- The qualified confined space rescue team retains control over the rescue itself until the entrant is extracted.
- Rescue Contractors must wear SCBA or SABA with an escape bottle in any rescue within a confined space with an unknown or IDLH atmosphere.
- Contractors entering a space assessed as a “High Hazard Atmosphere” must wear a safety harness securely attached to a lifeline.
- The lifeline must be securely anchored outside the confined space.
- The Safety Watch is responsible to assist in ensuring the lifeline does not become entangled during entry and work inside.
- The Safety Watch must be able to extract the Contractor(s) without entering the space using the lifeline in an emergency and must be supplied with a mechanic device as required to facilitate this type of rescue.
- This requirement does not apply if the lifeline itself creates a hazard or extraction with the lifeline would be impossible due to the configuration of the space.

***NOTE**: These lifeline requirements may also apply in “Low” or “Moderate Hazard Atmosphere” spaces that have physical hazards (e.g., working at heights, engulfment, entrapment) that may be effectively controlled with a lifeline.*

6.9.14. Rescue Plan Requirements

- Confined spaces classified as “Low Hazard Atmosphere” may document the rescue plan on the Safe Work Permit.
    - This may not apply if there are non-atmospheric hazards that would complicate rescue, e.g., heights, tight spaces, entrapment, or engulfment, etc.
- Confined spaces classified as “Moderate” or “High Hazard Atmosphere” must have a formal rescue plan developed prior to space entry and maintained with other confined space entry documents.
    - This plan should be read and reviewed prior to initial entry by the Entry Team to:
        - Ensure familiarity with the plan for all participants (entrants, safety watch, and rescue team) with the plan.
        - Determine if any additional rescue provisions need to be prepared.

***NOTE**: A single rescue plan may be applicable to several confined spaces that share similar characteristics and hazards.*

6.9.15. Training and Competency Assurance

- Each person assigned duties or responsibilities related to a confined space entry must be adequately instructed in:
    - The hazards of the space.
    - The hazard controls / mitigations identified in the Confined Space Hazard Assessment and Entry Procedure (as they pertain to their specific duties).
- Formal applicable training must be completed by those Contractors assigned the roles of Entrant, Safety Watch ("Attendant"), and Rescue.
- Annual practice drills are required for assigned rescue personnel
    - Records of these drills need to be maintained.
        - If rescue services are contracted to a third party, the third-party company is responsible for training, drills, and records of their own personnel.

***NOTE**: See First Aid Requirements for details on minimum first aid qualification requirements for "Confined Space Attendant" (i.e., Safety Watch) and "Confined Space Rescue Person".*

6.9.16. Western Canada Confined Space Entry Procedure (step by step)

1. The Company reviews the applicable Confined Space Package and work plan for the confined space to ensure:
    a) Known resources for the entry are available and/or assembled.
    b) All required individuals are brought into the pre-initial entry meeting and any planned subsequent task pre-entry meeting.

***NOTE**: Initial entry and/or tasks requiring entry may involve contract companies. Where the contract company will be providing procedure documents for their tasks, these must be collected and included in the Confined Space Package for discussion at the pre-initial entry meeting.*

2. The Company and other supporting personnel prepare the Confined Space as prescribed by the Confined Space Hazard Assessment Report, including as applicable:
    a) Purging / Cleaning (that does not involve physical human entry).
    b) Mechanical / Blinding, Electrical and/or any other required isolation.
    c) Lock Out / Tag Out

    ***NOTE**: Individual Entrants must later apply a personal lock as part of their LOTO requirements.*

    d) Posting of confined space entrance signage to prohibit non-permitted entry.
    e) Assembling any scaffolding or entrance aids and, if required, devices for rescue (e.g., winches or other mechanical aid).

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

f) Opening and naturally or mechanically ventilating the confined space.

3. The Company and (as applicable) Entrant(s), Safety Watch, Rescue Team, and other Subject Matter Experts (SMEs) as the space or task may demand conduct a pre-initial entry meeting. This meeting involves a review and discussion of:
    a) The Confined Space Hazard Assessment Report, with a special focus on:
        i. Isolation, lock out, space preparation requirements. This review should take place even if already completed as an assurance exercise for all involved.
        ii. Control measures specified in the assessment including ventilation, SABA/SCBA or other PPE requirements or other control equipment need to be reviewed and a plan in place to gather any items not yet assembled prior to entry.
        iii. Atmospheric testing requirements before and during entries.
    b) Entry procedure(s)
    c) Role requirements and specific duties for the planned entry / entries, and especially specific duties for the safety watch and rescue team personnel (as per the Rescue Plan).

***NOTE**: Steps 2 and 3 may not be strictly sequential. The timing of the pre-initial entry meeting may vary:*

- An earlier meeting (especially for complex entries) allows time for additional review or adjusting the plan based on meeting discussion.
- A meeting closer to entry time allows personnel involved in the initial entry, or subsequent task-based entries, to attend and issues discussed in the meeting are fresh in the minds of those performing confined space entry duties.

***NOTE**: Typically, a pre-entry meeting will be held when a new task is undertaken within a confined space that involves the entrants performing that task. However, a single pre-initial entry meeting may cover the requirements for multiple entries for multiple tasks so long as:*

- All entries are taking place within a relatively short period of time
- All tasks are reviewed
- All personnel involved in all tasks are included in the meeting

Where there is a change of scope in tasks or an unanticipated change in conditions, an additional pre-entry meeting for task-based entries may need to be held and the Confined Space Hazard Assessment may need to be revised.

4. The Company / Permit Issuer or designate will test the Confined Space atmosphere prior to Entry.
    a) The Confined Space Hazard Assessment Report will stipulate:

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

i. What substances must be covered by the testing

ii. Acceptable levels for each of these substances

iii. Additional instructions for the testing protocol

b) Pre-entry atmospheric testing should be conducted from outside the space using a hose and pump assembly for an initial reading of hazardous gases and oxygen levels.

c) The results of all pre-entry atmospheric tests shall be logged on the Atmospheric Testing Log (that will remain at the confined space entrance). If testing is combined with the permit issuing process, initial results may also be captured on the permit.

d) The results shall be compared to the anticipated results or atmospheric criteria set out in the Confined Space Hazard Assessment Report.

e) If any atmospheric testing level requirements defined within the Confined Space Hazard Assessment Report are not met, the mitigation measures shall be reviewed and adjusted until acceptable atmospheric levels are achieved.

5. The Company, Entrant(s), and Safety Watch will complete a Safe Work Permit for initial entry. This may be started before or during Step 4.

   a) The Safe Work Permit for a Confined Space Entry cannot be fully completed or signed until pre-entry atmosphere testing is completed and logged.

   b) Unless specified otherwise (e.g. Work Authorization process), the Permit Issuer is an Enbridge Operating Authority and the Permit Acceptor is an actual Entry or team lead for multiple Entrants.

6. The Company / Permit Issuer or designate posts the required documents near the space entrance.

   a) The documents must include:

      i. The Safe Work Permit issued for initial entry

      ii. Any subsequent, active Safe Work Permit

      iii. Atmosphere Testing Log and Entry Log

      iv. Confined Space Hazard Assessment Report

      v. Any entry procedure or other task-specific procedures not otherwise integrated into the Confined Space Hazard Assessment Report.

***NOTE**: Documents only need to be near the space entrance during permitted entries. They may be left in the care of the Safety Watch if the Safety Watch will remain at the space entrance.*

7. Entrant(s) and Safety Watch should complete the Field Level Hazard Assessment just prior to entry.

   a) The FLHA may be completed as part of the pre-entry meeting or Safe Work Permitting process if these are also held just prior to entry near the confined space.

8. Entrant(s) or Safety Watch must put time of entry on the Entry Log.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

9. Entrant(s) don required PPE and proceed with entry and execute assigned testing / hazard identification activities. The Safety Watch will execute duties to check on or continuously watch Entrant(s), based on atmosphere hazard level specified in the Confined Space Hazard Assessment Report. The Rescue Team will either be at the entrance or capable of being contacted at any time during Entry and ready to perform rescue as per the Confined Space Hazard Assessment Report and/or Rescue Plan.
    a) For initial entry, the Confined Space Hazard Assessment will specify any additional testing and inspections or hazard assessments within the space that needs to be conducted as a prerequisite to subsequent tasks or entries. Entrant(s) should always informally assess mechanical and physical hazards once inside.
    b) All atmospheric test results from the initial entry should be captured on the Atmosphere Testing Log.
    c) Depending on the system used, a test or confirmation of the communication system between the Entrant and Safety Watch must be conducted immediately upon entry.
10. Upon completing required atmosphere tests and, if applicable, planned tasks to be completed during the initial entry, Entrant(s) exit the Confined Space, sign out on Entry Log, and inform Safety Watch of exit.
    d) Depending on the work plan, a temporary barrier and/or sign over the entrance may be required.
11. The Company/Permit Issuer and Entrant(s)/Permit Acceptor close the Safe Work Permit.
12. The Company or designate secure the space (as appropriate if additional task-based entry will not take place immediately).

In the event there are additional “Task Based Entries” following initial entry, the following steps apply:

13. The Company, Entrant(s), Safety Watch, Rescue personnel, and other SMEs as applicable hold a pre-entry meeting prior to entry for a specific task or set of tasks (if all personnel doing all tasks can attend).

    ***NOTE**: This step may not apply if completed in step 3 with all entrants.*

    a) This meeting involves a review and discussion of:
        i. The Confined Space Hazard Assessment Report for the task(s), focusing on:
            - Reviews of isolation, lock out, and space preparation already completed as an assurance exercise for all involved.
            - A review of control measures specified in the Confined Space Hazard Assessment Report for the task at hand including ventilation, respiratory, or other PPE requirements any plans or instruction for collecting or assembling control equipment
    b) Atmospheric testing requirements before and during entries.
    c) Entry procedure(s).
    d) Role requirements and specific duties for the planned entry / entries, and especially specific duties for the safety watch and rescue team personnel (as per the Rescue Plan).

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

14. The Company/Permit Issuer or designate tests the atmosphere prior to entry as per the requirements set out in the Confined Space Hazard Assessment Report for the task at hand.
    a) If any atmospheric testing level requirements defined within the Confined Space Hazard Assessment Report are not met, the mitigation measures shall be reviewed and adjusted until acceptable atmospheric levels are achieved.

    ***NOTE**: The classification of the confined space within the Confined Space Hazard Assessment Report for a specific task is based on the atmospheric levels specified in the assessment. If these cannot be achieved, the Confined Space Hazard Assessment Report must be reviewed and revised by someone qualified to complete a Confined Space Hazard Assessment Report.*

15. The Company/Permit Issuer and Entrant(s)/Permit Acceptor and Safety Watch complete a Safe Work Permit for the task-based entry. (This may be started before or during the previous step)
    a) The maximum length for a Safe Work Permit will be a single shift for the Entrants. As such it may cover multiple entries for a given task over that time.
16. The Company/Permit Issue or designate must post the required documents near the space entrance (see Step 6 above for required documents list).
17. Entrant(s) and Safety Watch should complete the Field Level Hazard Assessment just prior to entry.
    a) The FLHA may be completed as part of the pre-entry meeting or Safe Work Permitting process if these are also held just prior to entry near the confined space.
18. Entrant(s) or Safety Watch put time of entry on the Entry Log.
19. Entrant(s) don required PPE and proceed with entry and execute assigned task. The Safety Watch will execute duties to check on or continuously watch Entrant(s), based on atmosphere hazard level specified in the Confined Space Hazard Assessment Report. The Rescue Team will either be at the entrance or capable of being contacted at any time during Entry and ready to perform rescue as per the Confined Space Hazard Assessment Report and/or Rescue Plan.
20. Entrant(s) monitor the atmosphere while working in the confined space.
    a) The Safe Work Permit will specify the level of atmospheric monitoring and testing that is expected (based on the Confined Space Hazard Assessment).
        i. Unless under supplied air, continuous monitoring with a personal gas monitor with alarm (or equivalent level of protection) would be expected.
        ii. Periodic recording of atmosphere levels of hazardous substances or oxygen on the atmospheric testing log offers an additional layer of protection by recording trends of rising or dropping levels.
    b) Passive gas monitoring (i.e., no pump and hose assembly) is appropriate for local area monitoring within the confined space. A personal gas monitor may be used for this purpose if it measures all gases of concern.
21. Entrant(s) exit, sight out on Entry Log, and inform Safety Watch of exit.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

22. If the permit covers multiple entries in each shift, the atmosphere testing (with pump and hose from outside the space) must be repeated prior to re-entry if the space is vacated for more than 20 minutes.
    a) If the Confined Space Hazard Assessment has deemed the space as a “Low Hazard Atmosphere”, previous atmospheric testing has proven this out, and there is no way for a hazardous atmosphere to inadvertently develop, subsequent pre-entry testing is not required
23. The Company/Permit Issuer and Entrant(s)/Permit Acceptor close the Safe Work Permit.
24. The Company or designate complete a “Clear for Closure Form” (or completes this element on the Entry Log.
25. The Company or designate physically closes or secures the space as appropriate.
26. Trigger the appropriate Pre-Startup Safety Review (PSSR) if the confined space is a process vessel or involves process equipment.
27. The Company or designate files and retains documentation as required.

6.9.17. Safe Work Permit

- A Safe Work Permit by the appropriate operating authority must be issued to Entrants prior to entry.
- For British Columbia based worksites, if a confined space will contain an inert, nitrogen atmosphere during Contractor entry, a Notice of Project to WorkSafeBC must be submitted at least 7 days prior to the work being conducted.

6.9.18. Pre-Entry Atmospheric Testing

- Atmospheric testing prior to entry must be conducted as stipulated by the Confined Space Hazard Assessment / Procedure.
- Where any atmospheric or other hazardous substance testing results do not match those stipulated by the Confined Space Hazard Assessment:
    - A review of mitigation measures must be conducted prior to entry.
    - Additional measure may be applied.
    - If additional measures do not result in requirements being met, a new hazard assessment must be created.
- The assessment and/or procedure must stipulate pre-entry testing must be repeated within 20 minutes of entry if a confined space is vacated for more than 20 minutes.
    - This requirement may be waived for spaces that:
        - Have been deemed to have a “Low Hazard Atmosphere” (as per the Confined Space Hazard Assessment),
        - Have been sufficiently tested to prove out a “Low Hazard Atmosphere”, and
        - Are configured or isolated in such a way that it is not possible for a hazardous atmosphere to develop.

6.9.19. Documentation During Entry Activities

- The following logs must be maintained during active work within a confined space:

- Atmosphere Testing Log (records all pre-entry and period tests within confined space)
- Entry Log (records Contractor entry / exit)

- The following documents must be posted or made available near the entrance to a Confined Space while active entry preparations or work is taking place:
  - Confined Space Hazard Assessment Report
  - Entry Procedure or other task-specific procedures (may be integrated into the Confined Space Hazard Assessment Report)
  - Atmosphere Testing Log and Entry Log
  - Active Safe Work Permit

6.9.20. Continuous Atmospheric Monitoring

- For confined spaces deemed to have a moderate or high hazard atmosphere, continuous monitoring of gases that present an ongoing risk to entrants is required.
- When confined space involves entry into process vessels or spaces where gases from process equipment may accumulate, continuous monitoring will typically be applied to the same atmospheric hazards covered by a personal gas monitor (O_2, H_2S, CO, and % LEL).
  - The Confined Space Hazard Assessment Report will specify if additional substances will require continuous monitoring.
- When continuous atmospheric monitoring is mandated, periodic recording of atmospheric measurements is required. At minimum, reading should be recorded hourly while entry is underway.
  - If more frequent recording is required, this will be specified in the Confined Space Hazard Assessment Report.

6.9.21. Entrant

Entrant shall:

- Complete required Confined Space Entrant training.
- Participate in pre-Entry meeting.
- Only enter the Confined Space once authorized to do so by a Safe Work Permit.
- Follow all the requirements set out in the Confined Space Hazard Assessment Report during Entry activities including:
  - Atmospheric testing and monitoring requirements.
  - Implementation of specified hazard controls.
  - Wearing all PPE required by the Confined Space Hazard Assessment Report.
  - Signing in and out of Entry Log when entering and exiting Confined Space.

6.9.22. Safety Watch

Safety Watch shall:

Complete required Confined Space Attendant / Safety Watch training.

- Complete required Confined Space Rescue training (if expected to directly participate in
- rescue activities).

- Participate in pre-Entry meeting.
- Fulfill monitoring of Entrant duties as per Atmosphere Hazard Level.

6.9.23. Rescue Personnel

Rescue Personnel shall:

- Complete required Confined Space Rescue training.
- Ensure capability to fulfill Rescue Plan set out/referenced in the Confined Space Hazard Assessment Report.
- Based on Confined Space Hazard Assessment Report either:
    - Remains at Confined Space entrance fully ready for entry for Confined Spaced deemed to have a High Hazard Atmosphere (IDLH atmosphere).
    - Monitors communication system when on standby during Entry.
- Fulfill rescue duties as per training and requirements below when called upon to do so.

6.9.24. Safety Watch Requirements

- Every confined space entry requires the use of a safety watch.
- The duties and requirements for a safety watch vary with the Atmosphere Hazard Level as per the table below.

Table 3: Atmosphere Hazard Level

REQUIREMENT	LOW HAZARD	MODERATE HAZARD	HIGH HAZARD
Safety Watch	Yes	Yes	Yes
Location and Attention of Safety Watch	Must be able to fulfill duties below.	Must be stationed near space entrance.	Must be stationed near space entrance and exclusively and continuously attend to safety watch duties.
Rescue requirements for Safety Watch	Able to immediately summon rescue personnel.	Able to immediately summon rescue personnel.	Equipped and capable of performing rescue / fulfilling rescue duties.
Safety Watch check on wellbeing of Contractor(s)	Every 20 minutes.	Minimum of every 20 minutes; more often based on hazards of space or task performed.	Continuous.
Additional Duties of Safety Watch	N/A	N/A	Prevent entanglement of lifelines and other equipment.
Contractor contact with Safety Watch	A way for Contractor to summon Safety Watch at any time.	A way for Contractor to summon Safety Watch at any time, including from inside the space.	A way for Contractor to summon Safety Watch at any time, including from inside the space.

6.10. Crane and Hoist Safety

6.10.1. Suppliers

Suppliers shall ensure that:

- All Serious and Critical Lifts must be performed in accordance with the *Serious and Critical Lifts* section.
- Adhere to safe material handling section of these standards when appropriate to lifting with a crane. See 6.32 Material Handling and Storage section of this Manual.
- Only designated personnel shall be permitted to operate a crane.
- Crane operation and operators are required to adhere to CSA crane regulations.
- Supplier complies with the manufacturer's specifications and limitations applicable to the operation of all cranes and derricks.
- Rated load capacities, and recommended operating speeds, special hazard warnings, or instruction, shall be conspicuously posted on all equipment.
- Do not attempt to lift loads that exceed the rated capacity of the crane, hoist or lifting slings, rope, or chains. Remember, the smaller the angle on the legs of slings or chains, the less lifting capacity.
- An accessible fire extinguisher of 5BC rating, or higher, shall be available at all operator stations or cabs of equipment.
- Baskets used for personnel lifting will be designed and stamped by a certified Professional Engineer.
- Only trained and authorized personnel are permitted to operate hoisting equipment.
- Standing or riding on material hoists, crane blocks or crane loads is prohibited.

Suppliers shall ensure that Contractors:

- Operator will not leave his/her position at the controls while a load is suspended from the hoist.
- Loads shall not be handled by any equipment beyond the capacity specified in the manufacturer's chart.
- When handling heavy loads with pneumatic-tire mobile cranes or auto cranes which are provided with outriggers, the outriggers should be out on solid ground or good blocking and the machine on solid ground or mats.
- Check the area of lift and travel prior to the lift to ensure personnel are notified and in safe positions and the area is clear of obstructions.
- No persons will be allowed to ride the hook or load.
- Wear personal protective equipment needed during hoisting operations.
- Loads will be securely connected and balanced prior to lifting.
- Do not lift with kinks or twists in the wire rope or chains.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Proper padding, blocking, and protective devices will be used to avoid sling damage.

All Contractors shall be kept clear of loads about to be lifted and of suspended loads.

6.10.2. Inspections and Maintenance

- Inspections of the hoisting equipment shall be made by a Qualified Person.
- All rigging equipment shall be inspected before each use.
- Records of all formal safety inspections will be retained.
- Inspections based on manufacturer's recommendations shall be completed prior to each use and on regular intervals.
- For equipment in normal service (Normal **Service involves operation of lifting equipment with a randomly distributed load within the rated load limit or uniform load of less than (<) 65% of rated load limit for no more than 25% of the time for a normal work shift.)**, inspect at least once per year, or as specified by the manufacturer.
- For equipment in heavy service (Heavy **Service involves operation of lifting equipment within the safe working load that exceeds normal service.)**, inspect at least every 6 months, or as specified by the manufacturer.
- For equipment that is idle for 6 months or more, a full formal inspection prior to use.
- All maintenance repairs and routine service records will be retained.
- All damage repairs to the lifting boom, once completed, will be inspected, and approved by a registered engineer.

Table 4: Minimum Clearance Distances (US)

VOLTAGE (NOMINAL, KV, ALTERNATING CURRENT)	MINIMUM CLEARANCE DISTANCE (FT)
Up to 50	10
Over 50 to 200	15
Over 200 to 350	20
Over 350 to 500	25
Over 500 to 750	35
Over 750 to 1,000	45
Over 1,000	(as established by the utility owner / operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)

***NOTE**: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200kV. [75 FR 48142, August 9, 2010]*

Table 5: Minimum Clearance Distances (CAN)

NORMAL PHASE-TO-PHASE VOLTAGE RATING	MINIMUM CLEARANCE DISTANCE (M)
750 or more volts, but no more than 150,000 volts	3
More than 150,000 volts, but no more than 250,000 volts	4.5
More than 250,000 volts	6
The wind can blow powerlines, hoist lines, or your load. This can cause them to cross the minimum distance.	

6.10.3. Hoisting and Mechanical Lifting

- The operator of hoisting equipment is responsible for the safe lift and shall determine whether the load to be lifted is within the capacity of the hoisting equipment and that the appropriate lifting device (i.e. chain, choker, sling, or bridle) is used.
- Hoisting equipment should be inspected before it is put into use, and it should be tested before being used on heavy loads.
- Approved hand signals will be reviewed and used. A copy of the hand signal chart must be posted where the crane or hoist is used.
- The operator and signal person must carefully observe the position of power cables, piping, valves, pipelines, etc. before initiating the lift.
- The hoisting machine operator must keep his/her attention on the person giving the signals. The signal person must always keep his/her attention on the load.
- Synthetic slings are preferred to be used for hoisting rather than chains.
- Cables and fabric slings should be protected with pads or blocks where they are placed around sharp edges.
- Tag lines shall be used to control load swing, rotation and/or balance, when necessary, to prevent a hazard to Contractors. When the bottom of the load is waist high or lower, tag lines are not required, but can be used if additional stability is desired.
- U-bolt clamps shall have the U-bolt on the deadline.
- Ropes should be used for lifting lightweight containers and other minor weight bearing activities, such as use as a tag line.
- Ropes contaminated with oil, grease or chemicals should be properly discarded.
- When lifting pipe or any smooth-surfaced materials, slings (bridles and chokers) should be placed around the object with at least two turns or fastened choker fashion.
- Materials or equipment should not be left hanging on a hoist indefinitely. The item should be blocked and the tension on the lifting device slowly relieved after making sure the blocking or cribbing will support the load.
- Portable hoist, come-along, chain falls, and binders shall be visually inspected before each use to determine the condition of the operating mechanisms, chains, ropes, cables, and the hooks. The rated load capacity of the portable lifting devices shall be marked and clearly legible.

6.10.4. Slings – Safe Operating Practices

Whenever any sling is used, the following practices shall be observed:

- Each day before use, the sling and all fastenings and attachments shall be inspected for damage by a competent person designated by the Supplier. Additional inspections shall be performed during use, where service conditions warrant.
- Damaged or defective slings shall not be used and shall be immediately removed from service.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- All slings should be stored in a well-ventilated, dry building or shed. Never store them on the ground or allow them to be continuously exposed to the elements because this will make them vulnerable to corrosion and rust.
- Slings shall not be loaded more than their rated capacities.
- Slings shall be securely attached to their loads.
- Slings shall be padded or protected from the sharp edges of their loads.
- A sling shall not be pulled from under the load when the load is resting on the sling.
- Slings shall not be shortened with knots or bolts or other makeshift devices.
- Sling legs shall not be kinked.
- Slings used in a basket hitch shall have the loads balanced to prevent slippage.
- Suspended loads shall be kept clear of all obstructions.
- Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.
- Shock loading is prohibited.

6.10.5. Alloy Chain Slings

- All alloy chain slings must have permanently attached durable identification. The identification must include the size, grade, rated capacity, and reach.
- Prior to use, any alloy chain sling that is new, repaired, or reconditioned must be proof tested by the sling manufacturer or equivalent entity. A copy of the certificate of proof testing must be maintained and available for examination.
- Hooks, rings, oblong links, pear shaped links, welded or mechanical coupling links or other attachments must have a rated capacity at least equal to that of the alloy steel chain with which they are used, or the sling shall not be used more than the rated capacity of the weakest component.
- Alloy steel chain slings must not be used with loads more than the rated capacities prescribed in (OSHA's Guidance on Safe Sling Use 'Tables and Figures')
- If the chain size at any point of any link is less than that stated in OSHA's Guidance on Safe Sling Use 'Tables and Figures', the sling must be removed from service.

Table 6: Rated Capacity (Working Load Limit), for Alloy Steel Chain Slings (in lbs.)

(Horizontal angles shown in parentheses)

CHAIN SIZE (INCHES)	SINGLE BRANCH SLING–90° LOADING	DOUBLE SLING VERTICAL ANGLE (1)			TRIPLE AND QUADRUPLE SLING (3) VERTICAL ANGLE (1)		
		30° (60°)	45° (45°)	60° (30°)	30° (60°)	45° (45°)	60° (30°)
1/4	3,250	5,650	4,550	3,250	8,400	6,800	4,900
3/8	6,600	11,400	9,300	6,600	17,000	14,000	9,900
1/2	11,250	19,500	15,900	11,250	29,000	24,000	17,000
5/8	16,500	28,500	23,300	16,500	43,000	35,000	24,500

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

CHAIN SIZE (INCHES)	SINGLE BRANCH SLING–90° LOADING	DOUBLE SLING VERTICAL ANGLE (1)			TRIPLE AND QUADRUPLE SLING (3) VERTICAL ANGLE (1)		
		30° (60°)	45° (45°)	60° (30°)	30° (60°)	45° (45°)	60° (30°)
3/4	23,000	39,800	32,500	23,000	59,500	48,500	34,500
7/8	28,750	49,800	40,600	28,750	74,500	61,000	43,000
1	38,750	67,100	5,800	38,750	101,000	82,000	58,000
1 1/8	44,500	77,000	63,000	44,500	115,500	94,500	66,500
1 1/4	57,500	99,500	61,000	57,500	149,000	121,500	86,000
1 3/8	67,000	116,000	94,000	67,000	174,000	141,000	100,500
1 1/2	80,000	138,000	112,900	80,000	207,000	169,000	119,500
1 3/4	100,000	172,000	140,000	100,000	258,000	210,000	150,000

***NOTES**: (1) Rating of multileg slings adjusted for angle of loading measured as the included angle between the inclined leg and the vertical.*
(2) Rating of multileg slings adjusted for angle of loading between the inclined leg and the horizontal plane of the load
(3) Quadruple sling rating is same as triple sling because normal lifting practice may not distribute load uniformly to all 4 legs.

Table 7: Minimum Allowable Chain Size at Any Point of Link

CHAIN SIZE (INCHES)	MINIMUM ALLOWABLE CHAIN SIZE (INCHES)	CHAIN SIZE (INCHES)	MINIMUM ALLOWABLE CHAIN SIZE (INCHES)
1/4	13/64	1	13/16
3/8	19/64	1 1/8	29/32
1/2	25/64	1 1/4	1
5/8	31/64	1 3/8	1 3/32
3/4	19/32	1 1/2	1 3/16
7/8	45/64	1 3/4	1 13/32

- Alloy steel chain slings with cracked or deformed master links, coupling links or other components must be removed from service.
- Slings must be removed from service if hooks are cracked, have been opened more than fifteen percent (15%) of the normal throat opening measured at the narrowest point or twisted more than ten degrees (10°) from the plane of the unbent hook.
- In addition to the “before each use” visual inspection required for all slings, a written periodic inspection of alloy chain slings must be made at least once every 12 months or more often, dependent upon use, conditions, and service.
- Clean and inspect the chain so that defects would be visible.
    - Twists or bends
    - Nicks or gouges
    - Excessive wear or stretching

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Distorted or damaged master links, coupling links, or attachments.
- Defective Welds

- The periodic inspection must be documented and be available for examination. The record must include the most recent month and year the inspection was performed.

6.10.6. Wire Rope

- Wire rope slings shall not be used with loads that exceed the manufacturer's rated capacities. Rating tables are shown in OSHA's Guidance on Safe Sling Use 'Tables and Figures'. Slings not included in these tables shall be used only in accordance with the manufacturer's recommendations.
- Wire rope slings shall have permanently affixed and legible identification markings identifying the SWL, type(s) of hitch(s) used, the angle upon which it is based, and the number of legs if more than one.
- The following are minimum lengths for slings:
  - Cable laid and 6x19 and 6x37 slings must have a minimum clear length of wire rope 10 times the component rope diameter between splices, sleeves, or end fittings
  - Braided slings must have a minimum clear length of wire rope 40 times the component rope diameter between the loops or end fittings
  - Cable laid grommets, strand laid grommets and endless slings must have a minimum circumferential length of 96 times their body diameter
- Wire rope slings shall be immediately removed from service if any of the following conditions are present:
  - Ten randomly distributed broken wires in one rope lay, or five broken wires in one strand in one rope lay.
  - Wear or scraping of one-third the original diameter of outside individual wires.
  - Kinking, crushing, bird caging or any other damage resulting in distortion of the wire rope structure.
  - Evidence of heat damage.
  - End attachments that are cracked, deformed, or worn.
  - Hooks that have been opened more than 15 percent of the normal throat opening measured at the narrowest point or twisted more than 10 degrees from the plane of the unbent hook.
  - Corrosion of the rope or end attachments.

6.10.7. Synthetic Web Slings

- Each sling shall be marked or coded to show:
  - Name or trademark of the manufacturer.
  - The rated capacities for each type of hitch and type of synthetic web material.
  - Rated capacity shall not exceed.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Synthetic webbing shall be of uniform thickness and width and selvage edges shall not be split from the webbing's width.
- Fittings shall be:
    - Of a minimum breaking strength equal to that of the sling; and
    - Free of all sharp edges that could in any way damage the webbing.
- Stitching shall be the only method used to attach end fittings to webbing and to form eyes. The thread shall be in an even pattern and contain a sufficient number of stitches to develop the full breaking strength of the sling.
- Synthetic web slings shall not be used with loads more than the rated capacities specified by the manufacturer or in OSHA's *Guidance on Safe Sling Use 'Tables and Figures'*.
- When synthetic web slings are used, the following precautions shall be taken:
    - Nylon web slings shall not be used where fumes, vapors, sprays, mists, or liquids of acids are present.
    - Polyester and polypropylene web slings shall not be used where fumes, vapors, sprays, mists, or liquids of caustics are present.
    - Web slings with aluminum fittings shall not be used where fumes, vapors, sprays, mists, or liquids of caustics are present.
- Synthetic web slings must be immediately removed from service if any of the following conditions are present:
    - Acid or caustic burns.
    - Melting or charring of any part of the sling surface.
    - Snags, punctures, tears, or cuts.
    - Broken or worn stitches.
    - Distortion of fittings.

6.10.8. Hooks

- At least annually, hooks shall be visually inspected by a qualified person.
- Hooks found to have any of the following conditions shall be removed from service:
    - Bending, deformation or twisting exceeding 10 degrees from the plane of the unbent hook.
    - Distortion in the Throat opening of a hook causing an increase in the throat opening exceeding 15 percent.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.11. Critical and Serious Lifts

Critical Lift: Company considers the following operations Critical Lifts:

- Any load handling equipment lift, when the load is greater than 75% of the manufacturer's rating chart,
- Any tandem lift (multi-crane lift) involving two or more lifting devices lifting the same load simultaneously,
- Any lift where the load travels over or between overhead High Voltage power lines (this does not include cables in cable trays), and
- Any lift that is deemed a Critical Lift by the operator, supervisor, management personnel, or Health & Safety personnel.

Serious Lift: Company considers the following operations Serious Lifts:

- Crane lift where Contractors are being hoisted in a man-basket,
- Lift where failure of the lift could endanger existing Facilities of one-of-a-kind equipment or processes,
- Load where non-routine lifting or rigging equipment configurations are used,
- Lift where the load or any part of the load handling equipment could come within the safe limits of approach to High Voltage equipment or a power line,
- Lifts over existing permanent structures or operating equipment, and
- Blind lifts.

6.11.1. Suppliers

Suppliers shall ensure that:

- Serious or Critical Lifts will be performed in accordance with all applicable regulatory and company requirements.
- Serious or Critical Lifts shall not be performed when environmental conditions create an additional hazard (lightning, wind exceeding manufacturer's recommendations, etc.)
- Power lines are presumed to be energized unless the utility owner / operator confirms that the power line is de-energized, continues to be de-energized and is visibly grounded at the worksite. Minimum clearance distances are listed in the table, in Section 6.5 Boom Truck and Rigging.
- For Lifts performed near electrical power lines or distribution lines, no part of the crane, rigging or load must be allowed to come within the safe clearance distance from power lines
- If so equipped, crane limits must be set and verified prior to performing the lift.
- All Serious or Critical Lifts must have a Lift Plan. *Critical Lift Plan (HSF-096)* or approved Supplier form must be completed and approved by the Person in Charge (PIC) prior to beginning the Serious or Critical Lift.
- 3rd party Supplier(s) who perform lifting activities for Company shall create and follow their own written Lift Plan for performing the task. When 3rd party Suppliers develop the Lift Plan, their documentation can be used in lieu of *Form HSF-096*.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- The person developing the Lift Plan must:
    - have received formal crane operation training or recertification within the last five years
    - be familiar with and understand the limits of the lifting equipment that will be used
    - understand and be able to address the potential hazards of the lift including rigging (length, capacity, angles, spreader bar(s), etc.), load (weight, size, bulk, abnormal shape, multiple attachment points, etc.), adjacent vehicle traffic, communication, weather, work environment and load travel path
    - consult with Company Technical Staff only if engineering support is required (Company engineers are not responsible for developing the Lift Plan, only providing engineering support as needed)
- For serious and critical lifts, the minimum control measure required shall be completion of a lift plan. The lift plan shall be reviewed, agreed to, and signed off by all Contractors involved in the lift at the pre-lift meeting.
    - At a minimum, the information recorded on the Serious Lift Plan shall include:
        - Weight
        - Radius
        - Equipment type
        - Percentage of load chart
        - Rigging components
        - Rating capacities
        - Adequate clearances to prevent contact with site-specific hazard(s) or obstructions during load handling activities
    - In addition to the requirements of the Serious Lift Plan, the Critical Lift Plan shall include:
        - Equipment layout and swing path schematic
        - Rig arrangement schematic
        - Lift sequence

Suppliers shall ensure that Contractors:

- All involved personnel must attend a pre-lift meeting to discuss the Lift Plan, JSA, Lift Hazard Area and any areas of concern. Personnel that did not attend the pre-lift meeting are prohibited from being in the Lift Hazard Area during a Serious or Critical Lift.
- Understand and follow the requirements of the Lift Plan.
- Ensure that Company participants are made aware of the Supplier's Lift Plan.
- Company personnel working with the Supplier must abide by the requirements and limitations of the Supplier's Lift Plan.
- JSA must be completed prior to beginning the Serious or Critical Lift.
- Crane Operator and Signal Person must discuss and agree to the signals that will be used to direct the Lift.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Tag line(s) must be used. They must be adequately sized and sufficient in quantity to control load swing, rotation and/or balance, to prevent a hazard to Contractors.

6.11.2. Lifting Personnel

- A boom truck or mobile crane shall not be used to lift personnel unless other means such as scaffolds, ladders, aerial lifts etc. would be more hazardous or not possible due to the structural design or layout of the workplace.
- Personnel being lifted shall wear all required PPE. See PPE section.
- The Man Basket must pass inspection by a competent person at the beginning of each shift before lifting any personnel.
- A trial lift with the unoccupied Man Basket loaded at least to the anticipated Lift weight shall be made from ground level, or any other location where Contractors will enter the platform to each location at which the Man Basket is to be hoisted and positioned. [Source: 1926.1431(h)(1)]
- Operator shall not exceed 50 percent of the equipment's rated capacity at any time during the lifting of personnel. [Source: 1926.1431(h)(3)(iv)]
- Operator shall not hoist Contractors while crane is traveling, except where equipment travels on fixed rails; or it can be demonstrated that there is no less hazardous way to perform the work. [Source: 1926.1431(k)(12)(i)]
- When the Man Basket is in a stationary working position, all brakes (load, boom, swing, secondary, pawls, dogs, etc.) must be engaged.

6.11.3. Engineered Lift Plan

- Engineers developing an engineered lift plan must consult with the manufacturer of the crane, hoist or derrick that will be used for the lift.
- Each engineered lift must utilize a separate Engineered Lift Plan.
- Each engineered lift must comply with regulatory requirements including *ASME NOG-1-2015*.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.12. Electrical Safety

6.12.1. Suppliers

Suppliers shall ensure that:

- If overhead power line voltages are unknown, a Qualified Electrical Contractor or Utility Owner shall determine the voltages and the Limited Approach Boundary and shall take appropriate action to make the work area safe.
- When the initial voltage test results indicate a voltage reading greater than 15V for above ground piping or 50V for below ground piping, the mitigation must be performed under the supervision of Qualified Electrical Contractor.
- Contractors shall not place themselves or operate equipment within the Limited Approach Boundary of overhead power lines. As shown in the table, the Limited Approach Boundary is 3 m (10 ft.) for systems up to 50 kV.
- For work within 6 m (20 ft.) of the Limited Approach Boundary of overhead power lines (see figure below), follow these requirements:
    - Site orientations, pre-job meetings, and daily tailgate meetings shall discuss assessed Hazards, SWPs and location(s) of the overhead power lines.
    - Contractors shall be informed of the identified Hazards and any Control measures or precautions, in accordance with the Hazard Assessment.
    - A Signaler/Spotter shall be used when Contractors and/or equipment are in proximity to the Limited Approach Boundary.
    - Delivery truck operators shall be cautioned about any overhead power lines present, and a Signaler/Spotter shall assist with loading or unloading operations (as appropriate, other vehicle operators shall be similarly cautioned, e.g., high vehicles)
    - Warning decals shall be posted on cranes and similar equipment, regarding the 3 m (10 ft.) minimum clearance.
    - Delivery or other vehicles that have emptied their material (e.g., dump trucks) shall not be permitted to leave the work location until the boom, lift or box is down and safely secured.
    - Vehicles with loads higher than 4.3 m (14 ft.) shall follow specific procedures to maintain safe working clearances when in transit below overhead power lines.
    - Warning cones / goal posts shall be used as visible indicators of the 3 m (10 ft.) Limited Approach Boundary. A safe work area shall be established before work commences. (See figure below)
- Contractors shall maintain the Limited Approach Boundaries outlined in the table below. These boundaries apply to Contractors as noted, including their work involving tools, vehicles, or equipment.
- A designated Signaler or Spotter shall ensure the minimum safe distances (i.e., Limited Approach Boundaries, sometimes referred to as safe limits of approach) are maintained by all Contractors and equipment in the area. As part of this duty, the designated Signaler/Spotter shall monitor movements of all Contractors, tools, and equipment when work is in progress near Energized lines.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Performing Structure to Soil Potential testing are OQ task qualified.

Table 8: Limited Approach Boundaries

VOLTAGE OF POWER LINE OR CONDUCTOR		MIN. SAFE LIMITED APPROACH BOUNDARY	
PHASE TO GROUND AC VOLTAGE	PHASE TO PHASE AC VOLTAGE	NON-QUALIFIED CONTRACTORS	QUALIFIED ELECTRICAL CONTRACTORS
425–12,000	735–20,780	3.0 m (10 ft.)	0.9 m (3 ft.)
12,000–22,000	20,780–38,105	3.0 m (10 ft.)	1.2 m (4 ft.)
22,000–50,000	38,105–86,600	3.0 m (10 ft.)	1.5 m (5 ft.)
50,000–90,000	86,600–155,880	4.5 m (15 ft.)	1.8 m (6 ft.)
90,000–120,000	155,880–207,845	4.5 m (15 ft.)	2.1 m (7 ft.)
120,000–150,000	207,845–259,805	6.0 m (20 ft.)	2.7 m (9 ft.)
150,000–250,000	259,805–433,010	6.0 m (20 ft.)	3.3 m (11 ft.)
250,000–300,000	433,010–519,615	7.5 m (25 ft.)	3.9 m (13 ft.)
300,000–350,000	519,615–606,215	7.5 m (25 ft.)	4.5 m (15 ft.)
350,000–400,000	606,215–692,820	9.0 m (30 ft.)	5.4 m (18 ft.)

Table 9: Approach Boundaries to Energized Electrical Conductors or Circuit Parts for Shock Protection, Direct-Current Voltage Systems

(1)	(2)	(3)	(4)
NOMINAL VOLTAGE CONDUCTOR TO GROUND	LIMITED APPROACH BOUNDARY		RESTRICTED APPROACH BOUNDARY (INCLUDES INADVERTENT MOVEMENT ADDER)
	EXPOSED MOVABLE CONDUCTOR	EXPOSED FIXED CIRCUIT PART	
Less than 100V	Not specified	Not specified	Not specified
100V – 300V	3.0m (10ft 0 in)	1.0m (3ft 6in)	Avoid contact
301V – 1 kV	3.0m (10ft 0 in)	1.0m (3ft 6in)	0.3m (1ft 0in)
1.1 kV – 5kV	3.0m (10ft 0 in)	1.5m (5ft 0in)	0.4m (1ft 5in)
5.1 kV – 15 kV	3.0m (10ft 0 in)	1.5m (5ft 0in)	0.7m (2ft 2in)
15.1 kV – 45 kV	3.0m (10ft 0 in)	2.5m (8ft 0in)	0.8m (2ft 9in)
45.1 kV – 75 kV	3.0m (10ft 0 in)	2.5m (8ft 0in)	1.0m (3ft 2in)
75.1 kV – 150 kV	3.3 m (10ft 8 in.)	3.0 m (10ft 0 in.)	1.2 m (4ft 0 in.)
150.1 kV–250 kV	3.6 m (11ft 8 in.)	3.6 m (11ft 8 in.)	1.6 m (5ft 3 in.)
250.1 kV–500 kV	6.0 m (20ft 0 in.)	6.0 m (20ft 0 in.)	3.5 m (11ft 6 in.)
500.1 kV–800 kV	8.0 m (26ft 0 in.)	8.0 m (26ft 0 in.)	5.0 m (16ft 5 in.)

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

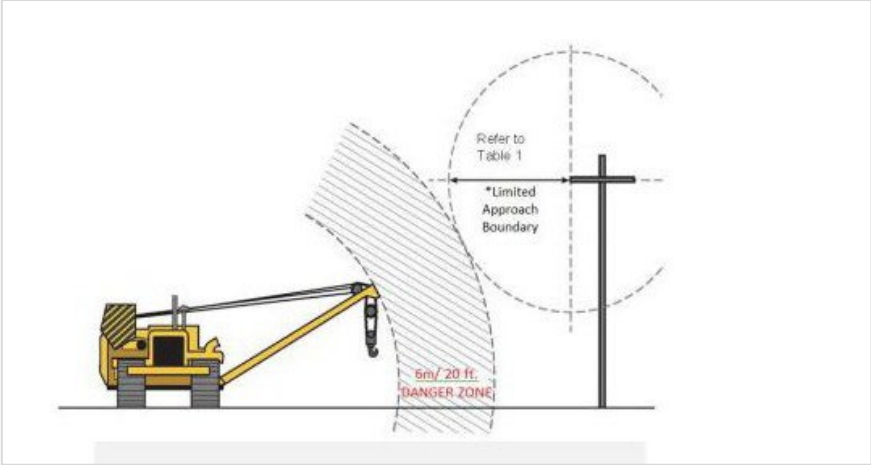


Figure 5: Signage and Signaler Required When Danger Zone Encroaches on Limited Approach Boundary

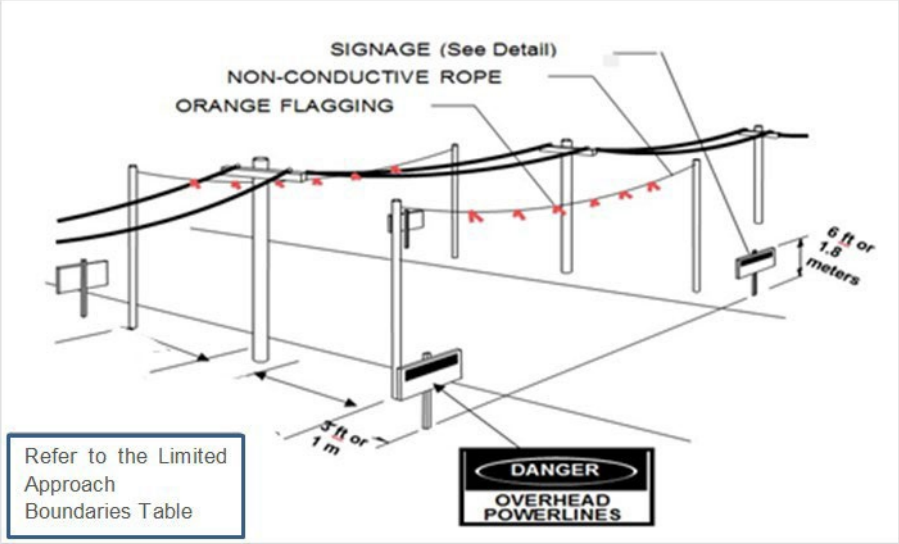


Figure 6: Typical Goal Post Setup

- Cheater cords (pigtails with electrical outlets) must be inspected by a Qualified Electrician and that a safe work permit is issued prior to use.
- Any cheater cords that are field-fabricated must be inspected by an electrician to ensure the cord is safe to use before first use.
- The electrician will attach a label to each cheater cord that clearly identifies the date of inspection.

- Any cord suspected of having any defects or damage shall not be used.
    - The electrician will destroy and dispose of any extension cord or cheater cord that is not safe to use.

When used in hazardous/classified areas:

- The Contractor will identify the cheater cord on the safe work permit.
- The Contractor will inform the permit issuer that they will be using a cheater cord.
- The permit issuer will review the safe work permit with the Contractor using the cheater cord.
- Connect the non-explosion proof ends of the cord and the equipment being powered first and locked or taped together securely so they will not inadvertently pull apart, then connect the explosion proof plug-in.
- When disconnecting, the explosion proof plug must be removed first and then all other connections can be disconnected.
- The permit issuer will visit the work area to ensure that hazards have been identified and mitigated.
- All plugs-in must be disconnected at the end of the permit.

6.13. Excavation and Trenching Safety

6.13.1. Suppliers

Suppliers shall ensure that:

- Company personnel, Company Inspector or approved Company representative shall be on site when excavation activity occurs within 4.5 m (15 ft.) of the Company facility.
- Before work begins, contact the PIC responsible for the workplace.
- Before beginning the excavation, the site must be evaluated for the following potential hazards:
    - Buried pipelines and utilities,
    - Vehicle and heavy machinery traffic,
    - Nearby structures,
    - Previously disturbed soil,
    - Possibility of a hazardous atmosphere.
- Pre-planning must be done to determine the following:
    - Will personnel be working in the excavation
    - What is the soil classification
    - What will be the depth and dimensions of excavation
    - Will the location require shoring or shielding equipment due to limited space
- A work plan identifying special provisions will be required when an excavation is:

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - over 6 m (20 ft.) in depth, or
  - in a swamp or muskeg, or
  - in an area where proper sloping cannot be achieved, or
  - In Canada, over 30 m (100 ft.) in length

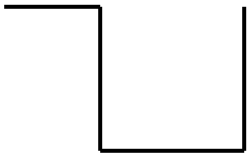
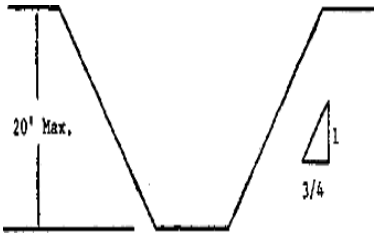
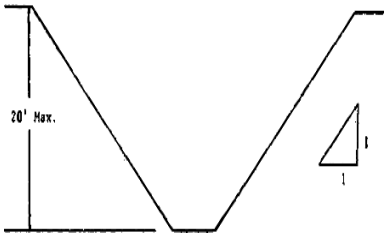
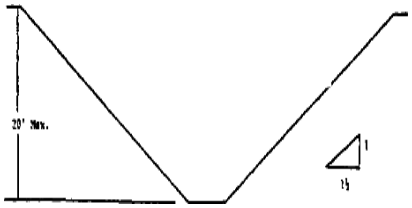
- The location of sewer, telephone, fuel, electric, and water lines as well as any other underground installations that may be encountered during excavation work must be located and marked prior to opening the excavation.
- Arrangements must be made as necessary by the Competent Person with the appropriate utility agency for the protection, removal, shutdown, or relocation of underground installations.
- Contact the state/provincial “one call” center no less than 48 hours before beginning any excavation, trenching, boring or other soil disturbing activity except in emergencies.
- Call the pipeline or utility company at the telephone number shown on the marker.
- Wait for the third-party pipeline or utility to send a representative to mark the exact location and route of the pipeline or utility.
- In Canada, line locating, and marking must be conducted within 14 days prior to the start of the ground disturbance. If more than 14 days has passed the line locating and marking must be re-done.
- All facilities inside the dig area and facilities within 5 m (16.5 ft.) of the dig area must be surfaced located and staked or flagged.
- In Canada, all facilities must be marked at 3 m (10 ft.) intervals for 30 m (100 ft.) either direction of the ground disturbance as is reasonably required,
- If it is not possible to establish the exact location of underground installations, the work may proceed with caution using special detection equipment or other safe and acceptable means (e.g., hand tools, probes, hydrovac).
- In Canada, continually use an electronic pipe locator to verify pipe location and depth. Probe or hand dig as deep as possible over the pipe. Mechanically remove cover to 1/3 of the probed or hand dug depth. Repeat electronic pipe locating and pipe probe or hand digging. Continue mechanically removing 1/3 probed or hand dug depth followed by pipe probe until top and sides of pipe can be probed, or hand dug.
- Company representative shall be present to supervise mechanical excavation within 60 cm (24 in) of the top, bottom, or sides of a pipe.
- During excavation, the bucket should not come within 15 cm (6 in) of the top of pipe or either side of the pipe.
- Excavation work will be conducted in a manner that does not endanger underground installations or Contractors engaged in the work.
- Any excavation, regardless of depth, that has unstable, sloughing, or flowing soil must be sloped, shored, or shielded.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Before personnel enter an excavation, that is 1.2 m (4 ft.) deep or more, the Competent Person must assess the excavation to ensure that an approved protection system is being used unless the excavation is in stable rock as determined by the Competent Person.
- The slope and configuration of sloping and benching systems shall be selected and when constructed will conform to the recognized engineering standards. The design of support systems, shield systems, and other protective systems shall be selected and constructed in accordance with all the recognized engineering standards.
- The size, type, and configuration(s) of the material to be used in the protective system must be identified in the design.
- A copy of the design must remain at the excavation site until the excavation is complete.
- In Canada, shoring is required when the slope of an excavation exceeds 45 degrees.
- The maximum height of any bench is 1.2 m (4 ft.). Bench widths should be as follows:
- Contractors are allowed on the bench: the width of the bench must be a minimum of 1.5 times the height of the bench.
- Contractors not allowed on the bench: A bench can have a minimum width equal to the height of the bench.
- Supplier shall maintain a written log of all excavation inspections conducted. This log shall include the date, worksite location, results of the inspection, and a summary of any action taken to correct existing hazards.
- Adequate protection must be provided to protect Contractors from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection will consist of:
    - Scaling to remove loose material.
    - Installation of protective barricades, such as wire mesh or timber, at appropriate intervals on the face of the slope to stop and contain falling material.
    - Benching sufficient to contain falling material.
    - Using restraining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations.
    - Materials piled, grouped, or stacked near the edge of an excavation must be stable and self-supporting.
- Support systems (such as shoring, bracing, or underpinning) must be used to assure the stability of structures and the protection of Contractors where excavation operations could affect the stability of adjoining buildings, walls, or other structures.
- Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to Contractors will not be permitted except when:
    - A support system, such as underpinning, is provided to ensure the safety of Contractors and the stability of the structure; or
    - The excavation is in stable rock; or

- A competent person has approved the determination that the structure is sufficient for use in excavation
- A competent person has approved the determination that such excavation work will not pose a hazard to Contractors.

Table 10: Sloping Requirements Based on Soil Types

SOIL TYPE*	SOIL QUALITIES	EXAMPLES OF SOILS	SLOPE OR BENCH** ANGLE	ANGLE EXAMPLE
Rock	Solid mineral matter	Stable granite, sandstone etc.	90 degrees Requires Shoring	
Type A**	Cohesive with compressive strength of 1.5 ton per square foot (tsf) or greater	Clay, Silty clay (1), Sandy clay, Clay loam (2), Caliche.	53 degrees ¾H:1V Requires Shoring	
Type B**	Cohesive with compressive strength >0.5 tsf but <1.5 tsf, granular cohesion less soils	Angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam, sandy clay loam. Also soils that would otherwise be 'Type A' but are fissured or subject to vibration.	45 Degrees 1H:1V	
Type C	Cohesive with compressive strength <0.5 tsf, granular soils	Granular, soft, sandy, or loose soils including gravel, sand, and loamy sand; or submerged soil or soil from which water is freely seeping, or submerged rock that is not stable.	34 degrees 1.5H:1V	

NOTES:

(1) Silt is loose sedimentary material with rock particles.

(2) Loam is a mixture of mostly moist clay with some sand and silt.

(*) If the soil is not classified, Type C soil shall be used.

(**) Benching is only allowed in soil classified as Type A or B.

- Where oxygen deficiency, toxic or flammable atmosphere exists or has the potential to exist, the atmosphere must be tested before Contractors approach the excavation to begin work and must be monitored continuously while Contractors are inside the excavation.
- Atmospheric testing must be conducted in excavations over 1.2 m (4 ft.) deep where hazardous atmospheres could reasonably be expected to exist (e.g. landfill areas, near hazardous substance storage, gas pipelines).
- Atmospheric monitoring will be performed using a properly calibrated direct reading instrument with audible and visual alarms. Monitoring will be continuous where ventilation controls are used to reduce the level of atmospheric contaminants.
- Monitors will be maintained and calibrated in accordance with manufacturer's specifications.
- Contractors are not allowed to intentionally work in a known flammable atmosphere – a flammable gas/vapor concentration of 10% LEL or greater of its lower explosive limit (LEL).
- Forced ventilation or other effective means will be used to prevent exposure to an atmosphere containing a flammable gas.
- Unauthorized entry into a hazardous atmospheric environment is strictly prohibited which includes entering an excavation with blowing gas.
- Utilities on the site must be protected and suitable precautions taken if any utility will be disturbed by the work.
- Utilities left in place must be protected by barricades, shoring, suspension, or other means.
- Work that may impact existing utilities that may need to be locked and tagged out using procedures from the Lockout/Tagout Program.
- All equipment, materials, supplies, permanent installations (e.g., buildings, roadways), trees, brush, boulders, and other objects at the surface that could present a hazard to Contractors that are working in the excavation must be removed or supported, as necessary, to protect Contractors.
- All surface obstructions that will create a hazard to Contractors must be removed or supported as necessary.
- Traffic around the site must be controlled, and barricades, signs, and/or flag persons used as needed to control both vehicular and pedestrian traffic.
- When mobile equipment is operated adjacent to the edge of an excavation, a warning system will be used when the operator does not have a clear and direct view of the edge of the excavation.
- The warning system must consist of barricades, hand, or mechanical signals, or stop logs
- Contractors must wear reflective vests if working in a high traffic area.
- A toothless excavator bucket or a bucket with a tooth guard is required when excavating all Company pipelines as well as when the Company is crossing another Company's pipeline.
- No pile driving operations or any other construction operations that could affect the integrity of the excavation will be permitted near or around the excavation while Contractors are in the excavation.
- If personnel are trapped by a cave-in, the following should be performed immediately:

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - Initiate emergency response plan
  - Call 911 or the local emergency services as quickly as possible
  - Never dig out a victim with heavy equipment
- Do not enter the excavation to perform rescue until the walls are stabilized
- Excavations must not be left open any longer than needed after the job task has been completed.
- Backfilling must proceed together with the removal of support systems and in a manner that will prevent Contractor exposure to the hazards associated with excavations.
- Where Contractors are required or permitted to cross over the excavation, walkways, or bridges with standard guard rails and toe boards must be provided.
- Contractors will not work in excavations that contain or are accumulating water unless precautions have been taken to protect Contractors from hazards posed by water accumulation.
- If water is controlled or prevented from accumulating by using water removal equipment, the water removal equipment and operation must be monitored by a person trained in the use of the equipment.
- If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means will be used to prevent surface water from entering the excavation. Precautions will also be taken to provide adequate drainage of the area adjacent to the excavation.

Suppliers shall ensure that Contractors:

- Competent person will conduct daily inspections of excavations, adjacent areas, and protective systems for evidence of a situation that could result in possible cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions.
- An inspection shall be conducted prior to the start of work and as needed throughout the shift. Inspections shall also be made after each hazard changing event (e.g., rainstorm).
- These inspections are required when the excavation will be or is occupied by Contractors.
- All open excavations left unattended must be barricaded and marked for easy recognition.
- The only exception to this could be pipeline trenching.
- When working in the excavation, all Contractors must remain within the protective system.
- Stairs, ladders, or ramps must be provided where Contractors are required to enter trench excavations that are 1.2 m (4 ft.) or more in depth.
- The maximum distance of travel in an excavation to a means of egress must not exceed 7.6 m (25 ft.).
- Ladders must extend at least 1 m (3 ft.) above the top of the excavation and must be secured against movement and slippage.
- Ingress and egress must never be performed using a backhoe or any excavating equipment.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- If the equipment operator does not have a clear and direct view of the edge of the excavation, a warning system, such as barricades, hand signals, or stop logs will be used.
- No Contractor will be permitted underneath loads handled by lifting or digging equipment.
- Contractors will be required to stand away from any vehicle being loaded or unloaded.
- No digging, lifting, or hauling equipment will be operated within the 'minimum distances' from the edge of the excavation while Contractors are in the excavation. Minimum distances are listed in the table below – *Minimum Distance for Materials from Edge of Excavation.*
- Excavated material must be stacked such that it will not create a hazard to the Contractors in the excavation.
- The minimum distance that materials shall be kept from the edge of an excavation is described in the table below.

Table 11: Minimum Distance for Materials from Edge of Excavation

AREA	MINIMUM DISTANCE REQUIREMENT
Canada	1 m (3 ft.)
USA	60 cm (2 ft.)

6.14. Fall Protection

Company defines a fall hazard as:

- 1.2 m (4 ft.) or more above a lower level from a *Permanent* walking/working surface (horizontal and vertical surface) or
- 1.8 m (6 ft.) or more above a lower level from a *Temporary* walking/working surface (e.g., construction activities) or
- Any fall where there is an unusual possibility of injury (e.g., falling through an opening in a work surface)

6.14.1. Suppliers

Suppliers shall ensure that:

- Potential fall hazards are evaluated and controlled.
- Where Fall Arrest is used, a rescue plan will be established, written, reviewed, and communicated.
- The written plan shall include provisions for rescue of Contractors in the event of a fall or ensure that Contractors are able to rescue themselves.
- Appropriately applied Fall Restraint does not require a written rescue plan
    - Rescue considerations will vary according to the situation but may be as simple as having another person present when fall restraint is being used.
- Contractors shall be protected from a fall or injury related to a fall, by either:

  - Elimination or Substitution (e.g., move work to ground level)
  - Guardrails
  - Control Zones
  - Personal Fall Restraint Systems (PFRS)
  - Personal Fall Arrest Systems (PFAS)
  - Safety Net System
  - Other system(s) designed by an engineer
- Fall protection systems may include one or more of the following:
  - Guardrails with midrails and toe boards
  - Covers for holes in floors, roofs, and other walking/working surfaces
  - Personal Fall 'Arrest' System or Personal Fall 'Restraint' System
  - Positioning device system
  - Control zones
  - Protection from falling objects
- Examples of situations where fall protection may be required include but are not limited to:
  - Unprotected sides and edges.
  - Hoist areas or shafts.
  - Ramps, runways, and other walkways (except for Contractors working on permanent walkways, work platforms or tank landings equipped with top and midrails and toe boards).
  - Excavations if not sloped.
  - Near dangerous equipment.
  - Wall openings (a gap or void, 75 cm (30 in) or more in height, and 30 cm (12 in) or more in width through which Contractors can fall to a lower level).
  - Incomplete scaffolds / work platforms.
  - Open top vessels, tanks, or roof of a building.
  - Crane baskets.
  - Personnel lift (aerial work platform or Elevated Work Platform).
  - Where three points of contact cannot be maintained on ladders without an enclosure.
- ANSI / CSA approved safety lines (vertical or horizontal lifelines) may be used for fall restraint or fall arrest.
  - Independently secure safety lines to approved structures of adequate strength.
  - Use softeners where lines attach to structures and elsewhere as necessary to protect against chafing or abrasion from contact with sharp edges.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Only approved lanyards are utilized to secure Contractors wearing a full body harness to an approved vertical or horizontal lifeline or fixed anchor point.
    - Lanyards shall be rated for 5,000 lbs. (22.2 kN), with double action snap hooks, and secured above the point of operation.
    - Shock-absorbing lanyards are required when using a PFAS system
    - Where used for fall protection, lanyards must not permit a Contractor to fall more than 1.2 m (4 ft.) vertically.
    - Ropes and straps (webbing) used in components of the body harnesses, lanyards and lifelines shall be made from synthetic fibers.
    - Where lanyards are used for horizontal work restraint, suitably anchor lanyards to prevent wearers from slipping over a roof edge.
- **Safety Belts are only permitted when used for horizontal Fall Restraint (applies when using** ANSI / CSA approved waist-type safety belts, with safety lines).
- SRLs that limit free fall to less than 0.6 m (2 ft.) shall be rated for a minimum of 3,000 lbs. (13.3 KN).
- SRLs that do not limit free fall to less than 0.6 m (2 ft.) shall be rated for a minimum of 5,000 lbs. (22.2 KN).
- Equipment anchorage, tie-off, and use must meet the following conditions:
    - Anchoring points must be permanently fixed objects.
    - Engineered anchor points, used in PFAS, must be able to support at least 5,000 lbs. (22.2 kN) for each attached Contractor.
    - Non-engineered anchor points, used for attaching PFAS, must be a sound and stable structure.
    - When tying off, the Contractor must tie off at a location where there are no obstacles in the potential path of a fall (including any obstacle in a swing fall).
    - The Contractor must follow the anchoring tie off and equipment tie off procedures that are specified by the fall protection system manufacturer prior to getting into a position where they could fall.
- Where an engineered anchor point option is available it must be used.
- Engineered anchor points must be inspected by a qualified person annually or as specified by the manufacturer.
- The manufacturer's procedures for the equipment must be followed. In addition, personal fall arrest equipment must comply with the following:
    - Harnesses must be attached in the center of the back near shoulder level, above the wearer's head.
    - Personal fall arrest systems must limit the maximum arresting force on a Contractor to 1,800 lbs. (8 kN).
    - Systems must bring a Contractor to a complete stop and limit maximum deceleration distance a Contractor travels to 1 m (3.5 ft.); and

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - Systems must have sufficient strength to withstand twice the potential impact energy of a Contractor free falling 1.8 m (6 ft.), or the free fall distance permitted by the system, whichever is less.
  - Systems must be rigged in such a way that a Contractor can neither free fall more than 1.8 m (6 ft.), nor contact any lower level.
- Periodic inspections include an annual inspection or as specified by the manufacturer, shall be conducted by a qualified person, and documented.
- Follow the manufacturer's instructions and training protocols for equipment maintenance, cleaning, and storage.
  - Do not store webbing and rope lanyards in direct sunlight.
  - Storage areas should be clean, dry, and free of exposure to fumes or corrosive elements.
  - Periodic cleaning of properly maintained fall protection equipment is necessary.
- Defective equipment shall be removed from service immediately and destroyed or discarded. Notify the responsible Supervisor before the end of the work shift.
- Fall protection equipment subjected to impact loading shall be immediately removed from service and inspected by a qualified person and discarded where appropriate.
- Pre-use inspection of Vertical and Horizontal Lifelines is intended to identify excessive wear, damage, and deterioration. Inspections should include but not be limited to:
  - Energy absorber (condition)
  - Anchor points
  - Cable/rail condition
  - Grabs (as applicable)
  - Connecting hardware

Suppliers shall ensure that Contractors:

- Wear a PFAS or PFRS when working within 2 m (6.5 ft.) or less of a Fall Hazard, except when working in the following situations:
  - Permanent platforms enclosed by guardrails, providing work activities do not extend outside of guardrails.
  - Temporary scaffolding and walking surfaces protected by guardrails, providing work activities do not extend outside of guardrails.
  - Fixed cage ladders.
  - Portable ladders – where three points of contact can be maintained on ladders.
- Utilize a Full Body Harness for arrest or restraint.
- Are expected to consult with a Supervisor or competent person when the Contractor is uncertain about the anchoring point to use.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Pre-use inspection of fall protection equipment (harness and lanyards) by the user shall be completed to identify excessive wear, damage and deterioration and should include but not be limited to:
    - Cuts, cracks, tears, frays, broken strands, enlarged grommets, and other signs of wear that might affect strength in lanyards, belts, and lifelines. There shall be no additional punched holes.
    - Stitching and materials for degradation and evidence of corrosion due to contact with acids, caustics, welding holes, splatter, etc.
    - Metal hardware for breaks, cracks, fractures, loose anchorage, distortion, and corrosion.
    - Check D-rings and D-ring metal wear pads for distortion, cracks, breaks, and rough or sharp edges. The D-ring bar should be at a 90-degree angle with the long axis of the belt and should pivot freely.
    - Note any unusual wear, frayed, or cut fibers, or distortion of the buckles.
    - Rivets should be tight and unmovable with fingers.
    - Body side rivet base and outside rivets should be flat against the material.
        - Bent rivets will fail under stress.
    - Failing hook latches, absence of locking latches, or a change in shape of the metal.
        - The snap hook load indicator is in the swivel of the snap hook.
        - The swivel eye will elongate and expose a red area when subjected to fall arresting forces.
        - Do not use the unit if the load impact indicator has been activated.
    - Lifeline unit housing for loose fasteners and bent, cracked, distorted, worn, malfunctioning or damaged parts.
- Pre-use inspection of Self-Retracting Lifelines (SRLs) by the user shall be completed to identify excessive wear, damage, and deterioration. Inspections should include but not be limited to:
    - Retraction and tension shall be tested by pulling out several feet of the lifeline and allowing it to retract back into the unit.
    - Always maintain a light tension on the lifeline as it retracts.
    - The lifeline should pull out freely and retract all the way back into the unit.
    - Do not use the unit if the lifeline does not retract.
    - Braking Mechanism Inspection:
        - Test for slippage of the lifeline while the brake(s) is engaged.
        - Release tension to ensure the brake(s) will disengage, and the unit will return to the retractable mode.
- All personnel working from an AWP shall wear fall restraint equipment including an approved safety harness and lifeline tied off to the manufacturer identified anchor point. The lifeline shall be a fixed or retractable length to prevent the operator from extending over the edge of the platform.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Contractors shall not anchor to an adjacent pole, structure, or equipment when working from an aerial lift.
- Unless specified by the manufacturer, handrails are not tie off points on the platform. Normal safety harness tie-off points are identified on the aerial lift.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.15. Fatigue Management

6.15.1. Suppliers

Suppliers shall ensure that:

- A fatigue management plan is implemented when Contractors are at an increased risk from the effects of fatigue. Examples of working conditions that may warrant a fatigue management plan include:
    - Contractors will be working extended length of shifts worked (12 hours not including travel time)
    - Contractors will be working (shifts) beyond 12 consecutive days
    - Contractors travel time to and from the Worksite (total workday, including travel, exceeds 14 hours)
    - excessive physical effort is required as part of normal work activity
    - environmental extremes are anticipated (e.g., heat, cold, noise, vibration, lighting)
- The Fatigue management plan should consider the following:
    - identification of the factors that lead to Fatigue
    - assessment of the risks associated with the 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
- Advanced notice is provided to the Company Representative of work that falls under the Fatigue management plan.
- Suppliers comply with the appropriate, State, Federal or Provincial Employment Standards regarding hours of work.
- Update Project Management of Contractor fatigue status.

Exceptions:

- Responding to emergencies
- Contractors responding to an initial emergency (including callouts) are exempt to allow sufficient staffing to safely sustain an effective response.
- During this period, Supplier will use sound judgment and maintain a watchful eye on the Contractors' behavior.
- As soon as practical the supervisor shall establish a sustained work plan.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.16. Flammable and Combustible Materials

6.16.1. Suppliers

Suppliers shall ensure that:

- Adequate precautions shall be taken to prevent the ignition of flammable vapors.
- Sources of ignition shall be controlled.
- Open flames and smoking are not permitted in flammable or combustible liquid storage areas.
- Avoid storing flammable or combustible liquids in areas exposed to heat which may pressurize its container.
- Substances that may cause combustion when combined with flammable or combustible liquids shall not be stored near flammable or combustible liquids.
- Safe types of mechanical air movers, explosion-proof electrical equipment, and static-grounded connections will be used when working in areas where flammable vapors or gases may exist.
- If using a contracted carrier, the carrier must, at all times, hold the appropriate approval from the aviation authority in order to transport hazardous or dangerous goods by air for the Company.
    - The pilot in command MUST be informed of any dangerous goods cargo before the start of the flight.
- Use DOT-approved containers when shipping samples by commercial carrier.
- Do not carry standard safety cans with gasoline or other flammable liquids in passenger or luggage space of vehicles.
- Fire extinguishers shall be available at locations where flammable or combustible liquids are stored.
- Do not store materials that will react with water in the same room with flammable or combustible liquids.
- The application of air pressure or compressed gas to any flammable / combustible liquid container (can, barrel or drum), for any purpose, is strictly prohibited.
- Flammable or combustible liquids and aerosol cans shall be stored in approved cabinets or in a separate building used only for that purpose. The building should be at least 15 m (50 ft.) from compressor buildings unless the exposed wall has a two-hour (2-hr) fire rating.
- Cabinets shall be Underwriter Laboratories (UL) listed and/or Factory Mutual (FM) approved, which is indicated by a permanent manufacturer's label on the cabinet.
- Approved cabinets should be vented outside of the building, if possible. If ambient temperature outside would cause freezing, vent approved cabinet inside of building.
- Storage cabinets must meet the requirements for design, construction, and capacity. This includes:
    - Not more than 60 gal (227 L) of Class I or Class II liquids, not more than 120 gal (454 L) of Class III liquids may be stored in a storage cabinet.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - Storage cabinets shall be designed and constructed to limit the internal temperature to not more than 325°F when subjected to a 10-minute fire test.
  - All joints and seams shall remain tight and the door shall remain securely closed during the fire test.
  - Cabinets shall be labeled in conspicuous lettering, “Flammable-Keep Fire Away.”
- ***Metal Cabinets shall be*** constructed in the following manner:
  - The bottom, top, door, and sides of cabinet shall be at least No. 18 gage sheet iron and double walled with 3.8 cm (1½-in) air space.
  - Joints shall be riveted, welded, or made tight by some equally effective means.
  - The door shall be provided with a three-point lock, and the door sill shall be raised at least 5 cm (2 in) above the bottom of the cabinet.
- ***Wooden Cabinets shall be*** constructed in the following manner:
  - The bottom, sides, and top shall be constructed of an approved grade of plywood at least 2.5 cm (1 in) in thickness, which shall not break down or delaminate under fire conditions.
  - All joints shall be rabbeted and shall be fastened in two directions with flathead woodscrews.
  - When more than one door is used, there shall be a rabbeted overlap of not less than 2.5 cm (1 in).
  - Hinges shall be mounted in such a manner as not to lose their holding capacity due to loosening or burning out of the screws when subjected to the fire test.
- **Flammable and combustible** materials shall not be stored in wooden cabinets.
- Storage tanks must comply with the SPCC Plan as appropriate.
- Storage tanks must be labeled to properly identify the contents and chemical identity.
- This section applies only to the storage of flammable or combustible liquids in drums or other containers (including flammable aerosols) not exceeding 60 gal (227 L) individual capacity and those portable tanks not exceeding 660 gal (2498 L) individual capacity.
  - Storage of flammable or combustible liquids in open containers shall not be permitted.
  - Barrels and containers for flammable liquids shall be sealed after each use and when empty.
  - Class I flammable and Class II combustible liquids shall be stored in approved safety containers of not more than 5-gal (19 L) capacity.
  - The approved safety cans shall be stored in approved cabinets in minimum quantities or in a separate building used for that purpose.
  - Portable tanks must be provided with one or more devices installed in the top with sufficient emergency venting capacity to limit internal pressure under fire exposure conditions to 10 psi., or 30 percent of the bursting pressure of the tank, whichever is greater.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Flammable or combustible liquids should be shielded from direct sunlight, and away from heat sources.
- Flammable and combustible liquid containers must be in accordance with the sizes listed in the table below, except that glass or plastic containers of no more than 1-gal (3.8 L) capacity may be used for a Class IA or IB flammable liquid.

Table 12: Maximum Allowable Size for Containers and Portable Tanks

CONTAINER TYPE	FLAMMABLE LIQUIDS			COMBUSTIBLE LIQUIDS	
	CLASS IA	CLASS IB	CLASS IC	CLASS II	CLASS III
Glass or approved plastic	1 pint	1 qt	1 gal	1 gal	1 gal
Metal (Other than DOT drums)	1 gal	5 gal	5 gal	5 gal	5 gal
Safety cans	2 gal	5 gal	5 gal	5 gal	5 gal
Metal drums (DOT specifications)	60 gal	60 gal	60 gal	60 gal	60 gal
Approved portable tanks	660 gal	660 gal	660 gal	660 gal	660 gal

Suppliers shall ensure that Contractors:

- Review SDS of flammable or combustible product to determine the correct class prior to product use.
- Wear appropriate hand protection (identified on the SDS) when working with commercial solvents, gasoline, and carbon tetrachloride.
- Do not use gasoline or carbon tetrachloride as a cleaning or degreasing agent.
- Remove defective equipment or containers from service immediately.
- Use and maintain adequate ventilation to remove flammable vapors when painting or using solvents.
- Observe the following safe practices and procedures to minimize exposure and to control hazards when using solvents:
  - Store and dispense all flammable cleaners in approved safety cans.
  - Contaminated rags shall be stored and disposed in an approved manner.
- Ground and bonded dispensing and receiving containers during transfers.
- Transport flammable liquids in standard safety cans with spring-loaded vents.
- Flammable liquid containers contents shall be marked by the manufacturer or stenciled, plainly visible, on the side or top of the container.
- Promptly dispose of rags soaked in kerosene, mineral spirits, or other flammable fluids.
- Keep contaminated rags in self-closing metal labeled containers until they can be disposed of.
- Store bales of rags and burlap sacks in well-ventilated, waterproof, non-combustible type buildings, and in such a manner as to allow air to circulate between individual bales. The bales shall be stored where they do not receive the direct rays of the sun through windows, and at a safe distance from any other source of ignitions, and a safe distance from flammable or combustible liquids.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.17. General Equipment Safety

6.17.1. Suppliers

Suppliers shall ensure that:

- General hand tools will be kept in good condition and used for their intended purpose. Worn or damaged hand tools shall be taken out of service and replaced.
- Power tools that come equipped with the manufacturer's point of operation guards shall not be operated with the guards removed. The manufacturer's specification guide will list the proper guard requirements and operational settings for any attachment.
- Scaffolds must be erected, moved, altered, or dismantled under the direction of a competent person.
- The scaffold shall have a signed and dated inspection / acceptance tag filled out by a competent person and attached to it before use.
- Power tools that are not double insulated will require a ground fault protection device be used with them.
- All hooks used on lifting devices shall be equipped with a self-closing safety latch.
- All rotating equipment shall be guarded with a fixed shield at the open points of rotation. This fixed guarding requirement includes bench grinders, table saws, and any shaft driven, or belt driven rotating equipment.
- Store high pressure hoses indoors or in a PVC container, out of sunlight such that they are UV protected.
- Inspect visually tools and equipment prior to every use.
- Re-certification shall be performed as required by the manufacturer's guidelines.
- Frequency of replacement is dependent upon use.
- Additional machine guarding shall be provided for any nip points, flying chips or sparks. The guards shall be constructed so that it does not create a hazard when operating the equipment.
- Air hoses used for compressed air to drive portable air tools shall be in good condition and pressure rated for the provided air pressure service. Air tool attachments shall be rated for that air pressure service and attached to the air tool with a retainer.

Suppliers shall ensure that Contractors:

- Properly store portable ladders when not in use.
- Shall not use portable metal ladders in or around electrical equipment.
- Visually inspect:
    - Ladders prior to use and if found defective taken out of service.
    - Portable hoist, come-along, chain falls, and binders before each use to determine the condition of the operating mechanisms, chains, ropes, cables, and the hooks. The rated load capacity of the portable lifting devices shall be marked and clearly legible.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Wire rope chokers and synthetic slings before each use and taken out of service if any wear indicators are visible. Wire rope chokers and synthetic slings are manufactured to close tolerances and shall be properly cleaned and stored after each use.
- Alloy steel chains for cracked or deformed links before each use.

6.18. General Office Safety

6.18.1. Suppliers

Suppliers shall ensure that:

- Office Contractors participate in safety training as per Supplier's policies.
- Aisles and hallways shall provide unobstructed movement and immediate access to emergency exits and to fire protection equipment.
- Regular maintenance of the lighting system should include cleaning the fixtures, replacing blinking or dim bulbs and repairing faulty lamp circuits.
- Those who work with potentially hazardous chemicals or substances receive Hazard Communication training annually and receive job specific training from their Supervisor.
- Office personnel going to field locations are aware of the training and PPE requirements for a field visit if required.

Suppliers shall ensure that Contractors:

- Keep all passageways, entryways, aisles, storerooms, service rooms and work areas clean, orderly, sanitary, and well maintained, with no obstructions.
- Check for raised or unsecured floor tiles to prevent tripping hazards.
- Properly position a chair before sitting down and once seated, always keep at least one foot and all chair legs on the floor.
- Do not roll across the floor while sitting in a chair and do not lean sideways from a chair to pick up an object.
- Use only stools or stepladders to reach materials stored above eye level. Chairs are unacceptable to use as climbing devices.
- Utilize rolling stools and ladders that are equipped with brakes that operate automatically when weight is applied.
- Do not operate office machines with moving parts, high temperature hazards, and electrical shock potential without proper safeguards in place.
- Disconnect (unplug) the power source before trying to remove jammed materials from a machine.
- Do not pull an electrical cord to shut off power to any equipment.
- Use of extension cords should be minimized and arranged to avoid tripping hazards and electrical overload.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Keep food, drink, and excessive combustible materials away from electrical equipment, computers, or workstations. Damage to circuitry or destructive fires may result.
- Keep flammable or combustible material and residue in a building or operating area to a minimum. Store in metal safety cans or storage cabinets that meet Underwriters Laboratories, Inc., or Factory Mutual approval.
- Review the SDS prior to use of any chemical.
- Secure paper cutter blades in the down position when not in use.
- Store knives, thumbtacks, and other sharp objects in proper containers or with the blades and points covered or shielded. Secure edges before disposing these items.
- File drawers and desk drawers should not be left open and:
    - Do not overload top drawers so that files tip over.
    - Secure file cabinets and bookcases as appropriate.
    - Keep heavy files in lower drawers.
    - Do not open a file drawer if someone is working underneath.
- Secure or anchor file cabinets or bookcases taller than 162.5 cm (64 in) to the wall to prevent toppling over.
- Safely stack material/boxes to avoid creating a hazard.
- When moving equipment, furniture, or boxes, use proper carts, dollies, or trucks.
- When carrying material from one floor to another, use the elevator (as applicable) whenever possible.
- Use plywood to spread out the load when moving heavy loads across raised floors.
- When material must be carried, use proper lifting and carrying techniques.
- Physically challenged persons, with either a permanent or temporary physical condition, should notify the Fire Warden assigned to their floor or office, if applicable.
- Are familiar with the location of the fire alarm station (if applicable) nearest to your workstation or office, and with emergency procedures including the appropriate evacuation route for your workstation or office.

During fire alarms:

- Help the Fire Wardens by clearing the area quickly, and aid them if they request assistance
- If a Fire Warden requests you to leave an area, do so and close the door on the way out

During evacuations:

- Do not use elevators; use the stairways, following the nearest exit signs and evacuation drawings, if applicable.
- Remove high heels to avoid falling downstairs
- Check closed doors for temperature and smoke before opening

Office Security:

- All Contractors must be alert to the preservation of office security, which includes prevention of unauthorized entry into the building and protection of the outside facilities.
- Keep all unattended doors and gates locked and report any strange activity to Supervision.

6.19. Hand and Portable Power Tools

Suppliers shall ensure that the rules are adhere to for each tool type specified below.

6.19.1. Requirements Related to All Hand and Portable Tools

- Inspect all tools, accessories and equipment for defects or other unsafe conditions prior to each use.
- No equipment or machine shall be operated unless the guards and protection (e.g., protective devices) are installed operating in accordance with their intended purpose, and properly maintained. Provide a method of machine guarding to protect Contractors from Hazards created by point of operation, ingoing nip points, rotating parts, or other Hazards. Reference Section 6.29 Machine and Equipment Guarding.
- Guards or other protective devices shall not be removed, defeated, bypassed, or altered under any circumstances.
- Alert other personnel working in the area before using tools or equipment to prevent exposure to possible hazards.
- Report unsafe or defective tools and tag “DO NOT USE” until repaired or replaced.
- Tools shall not be placed in pockets or held in hands when climbing ladders. Use a strong bag, bucket, or similar container to hoist tools between the ground and the job.
- Tools shall be handed from one person to another, never thrown.
- Knives and other sharp tools shall be carried and stored in a safe manner with the sharp edge covered.
- Edged or pointed tools will be placed in carrying cases or with the handle toward the receiver.
- Machine-operated tools or equipment are never left running unattended.
- Decontaminate all hand and power tools that have been used in an environment where asbestos, lead, poisonous plants, or other hazardous materials were present.
- The use of cheater bars or pipes (pipe extensions) is not considered a safe work practice and is not recommended.

6.19.2. Switches and Controls

- All hand-held powered circular saws, having a blade diameter greater than 5 cm (2 in), electric, hydraulic or pneumatic chain saws, and percussion tools without positive accessory holding means shall be equipped with a constant pressure switch or control that will shut off the power when the pressure is released.
- All hand-held gasoline powered chain saws shall be equipped with a constant pressure throttle control that will shut off the power to the saw chain when the pressure is released.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- All hand-held powered drills, tappers, fastener drivers, horizontal, vertical, and angle grinders with wheels greater than 5 cm (2 in) in diameter, disc sanders with discs greater than 5 cm (2 in) in diameter, belt sanders, reciprocating saws, saber, scroll, and jig saws with blade shanks greater than a nominal 0.6 cm (¼-in), and other similarly operating powered tools shall be equipped with a constant pressure switch or control. These devices may have a lock-on control if turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.
- All other hand-held powered tools, such as, but not limited to, platen sanders, grinders with wheels 5 cm (2 in) in diameter or less, disc sanders with discs 5 cm (2 in) in diameter or less, routers, planers, laminate trimmers, nibblers, shears, saber, scroll, and jig saws with blade shanks a nominal 0.6 cm (¼-in) wide or less, may be equipped with either a positive "ON-OFF" control, or other controls as described by the first two bullets above (i.e., first two bullets in this section).

6.19.3. Hand Tool Related

Open bladed work knives (does not apply to kitchen utensils)

- Open blade knives (e.g., locking blade utility knives) shall not be used unless a Hazard Assessment is completed to determine that alternate tools cannot be used to complete the task for which the open bladed knife is required. The Hazard Assessment shall review the scope of work, the cutting tool to be used and specific PPE (e.g., cut-resistant gloves or gauntlets).
- When it is determined that an open bladed knife is the only tool that can be used to complete a task the following criteria shall be met:
    - specific PPE shall always be worn when using an open bladed knife
    - material being cut is secure
    - approval is noted on any applicable SWPs
    - a working space appropriate to the task allows the Contractor to work with the open bladed knife in a safe manner without endangering themselves or other
- A hammer or sledge must have a securely wedged handle suited to the type of head used. The handle will be smooth, free of oil, shaped to fit the hand, and of the correct size and length.
- Do not use a steel hammer on a hardened steel surface. Heads will be dressed whenever they start to check or mushroom.
- When sledges or other heavy hammers are used, the Contractor holding the tool being struck shall use a tool holder.
- Wooden or fiberglass handled tools should not be taped or painted to check for handle cracks, splinters, or other defects. Cracked handles shall be replaced prior to use.
- The wooden handles of hand tools shall be kept free of splinters and/or cracks and will be kept tight.
- Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads and splinters.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Never use files without handles. Use files with a smooth, crack-free handle. Never clean by striking files against metal, use a file card.
- Keep chisels sharp and ground to a 60° angle. Chisel heads shall be dressed when they start to check or mushroom.
- Use hack saw blades recommended by the manufacturer appropriate to the type metal to be cut.
- Snips shall be heavy enough to cut the material with one hand on the snips. Protective gloves will be worn.
- Woodcutting tools with sharp edges or blades shall be used so that, if a slip occurs, the direction of force will not be toward the body.
- Protect sharp edges of woodcutting tools with a sheath or metal guard when not in use.
- Do not use open-end box wrenches with sprung or cracked jaws.
- Adjustable wrenches shall be “pulled,” not “pushed,” with the open jaw facing the user.
- Never strike a wrench with a hammer unless it is an approved hammer wrench.
- Do not use a wrench as a hammer.
- Screwdrivers shall not be used for punches, wedges, pinch bars, or pries.

6.19.4. Electric Energy Related Tools

- Use approved electrical equipment to power the tools.
- Inspect equipment prior to use and ensure equipment is in safe operating condition with all manufacturer guards are in place.
- Immediately tag as defective and remove from service any electrical cords and plugs with mechanical damage (e. g., exposed wiring; cords with frayed or deteriorated insulation; bent or broken prong of a plug, etc).
- Only qualified electrical Contractors can:
    - Inspect or repair defective portable electrical equipment.
    - Cut or splice power cords or extension cords.
- Arrange temporary wiring for a power supply (e.g., where needed for portable electrical tools, equipment, and lighting units).
- Tool handles must be insulated when working on live circuits.
- Electric cords, equipment and tools will be properly grounded (or double insulated if applicable) and maintained in good condition.
- Extension cords are approved three-wire type, with appropriate Conductor insulation and an overall jacket not susceptible to damage at low temperatures.
- Cords are not permanently secured to any structure or used for hoisting tool.
- Power cords are elevated where possible, to prevent tripping Hazards or being damaged by vehicles / equipment.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- If an extension cord is to be used, keep the cords connection out of any standing water, and use a heavy-duty extension cord with components rated for use in wet locations.
- Store electrical equipment and cords to avoid damage (e.g., mechanical, thermal, UV exposure, etc.).
- Use Ground Fault-Circuit Interrupter (GFCI) protection when using portable tools outdoors or when water, moisture or wet conditions are encountered.
- Use approved ground-fault circuit interrupters for all 120-volt, single-phase, 15- and 20-ampere receptacle outlets which are not a part of the permanent wiring of the building or structure. Receptacles on the ends of extension cords are not part of the permanent wiring and shall be protected by GFCIs whether the extension cord is plugged into permanent wiring.
- Electric tools and equipment switches are in the OFF position before being plugged in.
- Unplug the tool when attaching or removing bits, blades, or other accessories.
- Loosen and tighten drill chucks with a chuck key, not with pliers or a pipe wrench.
- In addition to the above, Contractors shall also follow these requirements:
    - Unattended temporary electrical equipment (such as lights, heaters, etc.) that will be left on in a Hazardous Area or Restricted Area 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 manufacturers' specifications.
    - All voltage and current testers shall be rated for the circuits and equipment to which they are connected.
    - Safety ground cables used in electrical cubicles and substations shall be stored in a central location.

6.19.5. Bench Grinders

- Bench grinders shall be bolted down to the work surface.
- Fixed grinding wheels wire buffing wheels shall have tool rests.
- The angular exposure of the grinding wheel periphery and sides for safety guards shall not exceed 90 degrees or one-fourth of the periphery.
- Inspect the following before each use of the bench grinder:
    - Look for loose bolts on the grinder base, flange, and spindle guards.
    - Check the abrasive wheel for cracks and any other visual damage.
    - Check the tool rests and tongue guards and re-adjust to the maximum allowable distance from the wheels:
        - 0.6 cm (¼ in) for tongue guards.
        - 0.3 cm (⅛ in) for tool rests.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Before installing a new abrasive wheel:
  - Perform a “ring test”.
  - Check the abrasive wheel for the correct size and type for the grinder.
  - Also, check that the wheel is approved for more revolutions per minute (rpm) than the grinder.
- Do not use grinders to shape wood as sawdust clogs the pores of the grindstone, causing it to overheat, expand and rupture.
- Do not use the side of the wheel for grinding unless the stone is designed for side grinding.
- When operating a grinder, stand to the side when starting the grinder.

6.19.6. Portable Circular Saws

- Equip portable, power driven circular saws having a blade diameter greater than 5 cm (2 in) with guards above and below the base plate or shoe.
- The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work.
- When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to covering position.

6.19.7. Pneumatic Energy Related Tools

- Never point an air tool at another person.
- The manufacturer’s safe operating pressure for hoses, pipes, valves, filters, and other fittings shall not be exceeded. Adjust service air to manufacturer’s specifications for tool to be used.
- Compressed air used for cleaning purposes shall be reduced to less than 30 psig.
- Compressed air must not be used to remove materials from skin or clothing.
- Only approved air nozzles are acceptable for use. Modification of nozzles is strictly prohibited.
- Do not use compressed air to clean workbenches or work areas.
- Set and maintain the air compressor regulators according to the manufacturer’s instructions.
- Do not adjust pressure relief and regulating valves to allow the air compressor to operate above the manufacturer’s recommended rating.
- All belts and pulleys are enclosed in a guard.
- Contractors using compressed air equipment shall wear PPE and ensure the working area is cleared of other Contractors. In addition, compressed air equipment shall:
  - include safety nozzles, plus effective chip guarding
  - never be used for cleaning Contractors or their clothing
  - not exceed 30 psi when cleaning equipment or floors
  - not be adjusted to allow the compressor to operate above the manufacturer’s specified rating

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Set the air supply properly for the tool being used.
- Shut off the air supply and drain the air prior to disconnecting tools.
- Safety restraints must be used to secure the tool to the hose.
    - AERO-Quip and other approved pressure activated retaining connectors may be used to meet this requirement.
- A safety clip or retainer must be installed to prevent attachments, such as chisels on a chipping hammer, from being unintentionally shot from the barrel.
- Compressed air guns should never be pointed toward anyone. Users should never "dead-end" it against themselves or anyone else.
- When utilizing air compressors to supply air movers, keep them outside the area where hazardous vapor concentrations exist and away from where they are exhausted.
- Ensure flow of induced air through annular orifice.
- Noise levels generated by an air mover may exceed permissible levels, use hearing protection for exposure over extended periods.
- Air movers shall not be shop-made / home-made.
- Nailers, staplers, etc., provided with automatic fastener feed and operating at more than 100 psig pressure at the tool shall have a safety device on the muzzle to prevent the tool from ejecting fasteners if not in contact with the work surface.

6.19.8. Air Grinders

- Operate air grinders at the manufacturer's recommended air pressure.
- Do not operate air grinders unless all manufacturers' guards are in place and working properly.

6.19.9. Air Receivers (volume tanks)

- Must be protected from over pressure with a safety relief valve which is tested at regular intervals.
    - Where a stop valve exists between a tank and safety valve, this shall be locked in an open position. A procedure shall be in place to ensure it is not left closed after maintenance/testing and that the pressure is constantly monitored while closed.
- Air receivers will have a drain and be checked periodically for accumulations of water/oil.
- Air receivers will be equipped with an indicating pressure gage.
- The tool's operating lever is properly functioning and is in the OFF position before attaching the air hose.
- When changing tools or parts, adjusting them, or when the tool is not in use, shut off and bleed down the air supply.

6.19.10. Chipping Hammers and Jackhammers

- Make sure the tool bit is locked in place. If the tool bit does not lock, ensure it is in place before operating.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Always keep a firm grip on the tool.

6.19.11. Impact Wrenches

- If a locking mechanism is required, use a one-piece neoprene retaining ring when attaching a socket to a larger impact wrench.
- Before attempting to loosen or tighten a bolt or nut, check that the directional lever is in the correct position for the job.
- When installing a socket on larger impact wrenches, make sure the locking pin is in place and the rubber O-ring is firmly seated.
- Make sure assistance is available, and that operators have a firm footing and adequate working clearances (especially when operating larger impact wrenches).

6.19.12. Pneumatic Hoses shall

- Be appropriately rated for the maximum pressure produced in systems.
- Have excess flow valves or chokes installed on all airlines at the compressor or header, to prevent high-volume air release.
- Not be used to raise and lower tools.
- Not be crimped to shut off the air supply, except in an emergency.
- Be checked periodically for wear or damage and replaced if necessary.
- If possible, be suspended from above to eliminate possible tangles, tripping hazards, unnecessary wear and damage by vehicles and carts.
- All hoses exceeding 1.3 cm (½-in) inside diameter shall have a safety device at the source of supply or a branch line to reduce pressure in case of hose failure.
- In addition, pneumatic hoses shall have temporary and quick connections secured, using whip checks on the following connection points:
    - compressor to hose
    - hose to hose
    - have safety pins where the connection point is designed for their use
    - have safety clips or retainers used at the attachment point on pneumatic impact percussion tools
    - be protected from tangles, unnecessary wear, and damage

6.19.13. Chain Saws

- Before starting, inspect the saw for loose parts.
- Keep the chain sharp and inspect it for proper tension and condition,
- Start the saw at least 3 m (10 ft.) from the fueling area.
- When starting, always place the saw on the ground with one foot through the rear handle and one hand on the handlebar grip to hold securely.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Never carrier the saw from place to place with it running.
- Always carry the chain saw with the bar pointed backwards.
- Never drop start a chain saw.
- When operating, maintain a firm grip on the saw with both hands.
- Always cut at high speed and do not cut with the nose or tip of the bar.
- Do not cut at heights above the shoulders.
- Do not stand directly in line with the chain (maintain sure footing).
- Do not cut while someone is standing in front of the cutting area.
- Keep the chain well oiled (oil reservoir is full).
- Fuel the chain saw in a well-ventilated area utilizing a funnel.
- Do not fuel while the engine is hot or running.
- Do not transport a chain saw in the vehicle cab.

6.19.14. Drum Handling Equipment

- Use drum lifter to lift or lower a drum from an upright position, team lifting may be required when a drum lift is not available.
- Use a drum dolly to move a filled drum.

6.19.15. Fuel Powered Tools

- Fuel powered tools, such as chain saws, water pumps, blow torches, etc., shall be stopped while being refueled, serviced, or maintained.
- Fuel shall be transported, handled, stored, and properly identified in approved containers.

6.19.16. Grinders and Buffers

- Contractors using hand-held grinders and buffers shall:
    - not use the side of a wheel unless it is designed for side-grinding
    - stand to the side when starting the grinder, out of the line of fire
    - adopt a stance to one side of a steel wire wheel, where possible
    - unplug the tool when changing wheels or guards
    - not use the tool to shape wood
- A Qualified Contractor shall check air grinders for maximum speed by dismantling the wheel and using a speed counter. If the speed exceeds the maximum revolutions per minute (rpm), reset the governor.
- Guards shall have a maximum exposure angle of 180 degrees and shall be located between operator and the wheel on right angle grinders.
- Prior to use, the grinder or buffer shall be inspected to ensure:

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- the wheel is free of cracks
- the wheel does not vibrate excessively
- the buffing wheel has no loose wires or excess wear
- the disc is the correct size and type for the grinder, and is approved for more revolutions per minute (rpm) than the grinder
- all components are properly secured and in place
- all manufacturer's guards are in place, secure and not damaged
- there is no dead-man/locking switch (these are prohibited)

6.19.17. Hand Trucks

- When using a hand truck, always face the direction the truck is heading.
- Hand trucks will be pushed rather than pulled when possible.
- Hand trucks will not be used to carry people.
- Hand trucks shall be inspected before each day's use.
- While descending a ramp or incline, the operator shall be on the uphill side of the hand truck.

6.19.18. Hydraulic Power Tools

- The fluid used in such tools shall be fire resistant fluid and approved for use by the manufacturer of the tool.
- The manufacturer's safe operating pressures for hoses, valves, pipes, filters, and other fittings shall not be exceeded.

6.19.19. Jacks

- Each jack shall be thoroughly inspected in accordance with the following:
  - For constant or intermittent use at one locality, prior to each use or at a minimum at least once every six months.
  - For jacks sent out of the shop for special work, when sent out and when returned.
  - For a jack subjected to abnormal load or shock, immediately before and immediately after.
- Jacks that are damaged or out of order shall be removed from use and tagged "DO NOT USE."
- The Operator shall make sure that the jack used has a rating sufficient to lift and sustain the load. (The requirement does not apply to engine barring jacks.)
- The rated load shall be legibly and permanently marked in a prominent location on the jacket by casting, stamping or other suitable means.
- Jacks shall have a positive stop to prevent over travel.
- A jack should only be used to lift a load, not support it.
- Hydraulic jacks exposed to freezing temperatures shall be supplied with adequate antifreeze liquid.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- In the absence of a firm foundation, the base of the jack shall be blocked. After the load has been raised, it shall be cribbed, blocked, and secured.
- Jacks shall be properly lubricated at regular intervals. The lubricating instructions of the manufacturer shall be followed, and only recommended lubricants shall be used.

6.19.20. Mowers, blowers and weed eaters

- Unplug electric powered mowers, weed eaters or blowers before cleaning, inspecting, adjusting, or repairing the equipment.
- Do not clean, inspect, adjust, or repair the equipment while the blades are in motion.
- Remove the ignition wire from the spark plug before reaching under mowers with hands.
- All guards and safety devices are in place and functioning properly.
- Inspect and remove small loose objects from the area that could become projectiles if struck by the blade or cable before starting the job.
- Mow across the face of the slope when mowing a slope or incline.
- Do not fuel the engine while it is running or while it is hot.

6.19.21. Post Pounders

- Any work involving post pounders are required to have written procedures or job hazard analysis for the installation and removal of T-posts and must include:
    - Types of T-Post drivers and pullers approved by the Supplier
    - Safe removal of frozen or stuck t-posts
    - Condition of T-posts (free from excessive rust, straightness, etc.)
    - Requirement of a painted section near top of post for a visual indicator that the driver is being lifted too high.
    - Ground Disturbance requirements, if applicable
    - T-post spade to be driven in completely or removed
- The Design of the post pounder itself must be designed to address the risk of hand safety from the pounder coming off the post with effective Ergonomic principles applied.
    - Examples of this may be through manual post pounders having an elongated nozzle to make it unlikely that a Contractor could lift it over an upright post or through mechanical means such as slide hammers or air actuated hammers which guard the Contractor from moving the Cylinder.

6.19.22. Powder-Actuated tools

- Only Contractors who have been trained to operate a specific tool in use shall be allowed to operate a powder-actuated tool.
- The Operator of powder-actuated tools will wear hearing protection, safety goggles or other face and eye protective devices.
- The tool shall be tested each day before loading to see that safety devices are in proper working condition in accordance with the manufacturer's recommended procedure.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Tools shall not be loaded until just prior to the intended firing time and loaded tools shall not be left unattended.
- At no time shall loaded or empty tools be pointed at Contractors.
- Hands shall be kept clear of the open barrel end.
- Only powder-actuated charges, studs, pins, or fasteners designed and recommended for use in a specific tool by the tool manufacturer will be used.
- Fasteners shall not be driven into hard or brittle materials including but not limited to cast iron, glazed tile, surface hardened steel, glass block, live rock, face brick or hollow tile.
- Driving into easily penetrated materials shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.
- Tools shall not be used in an explosive or flammable atmosphere.
- Tools shall be used with the correct shield, guard or attachment recommended by the manufacturer.

6.19.23. Pressure washing and steam cleaning

- The following PPE must be worn for each temperature range:
    - Up to 50º C or 120º F:
        - Safety glasses with side shields and face shield
    - 50º to 80º C or 120º to 180º F:
        - Safety glasses, face shield, rubber gloves, rubber boots and a slicker suit (the slicker suit trousers will always be worn over the boots)
    - 80º C or 180º F to boiling:
        - Wear a face shield, goggles, hard hat, rubber gloves, rubber boots and a slicker suit (the Operator must not have exposed skin.)
- All steam and water lines should be equipped with a check valve to prevent pressure from backing up into the cold-water system.
- Hose to pipe connections should always point downward and be installed as low as possible.
- Any water heater or steam generator shall be equipped with safety valves of the temperature-pressure type to accordance with the *ASME Boiler and Pressure Vessel Code*.
- Only use high-pressure armored or wire-reinforced steam hose.
- Hose connections shall be kept in good working condition.
- Nozzles should have insulating grips for coolness.
- Operators should always lead the hose out in a large loop so there are no turns or kinks.
- When hot water or steam is used near electrical equipment, the equipment should be completely covered if it is not moisture or weatherproof.
- To help prevent a spark when flammable vapors may be present, the nozzle should be grounded to the tank or container being cleaned.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.20. Hazardous / Restricted Areas and Portable / Personal Gas Monitors

6.20.1. Scope

This section applies to Contractors at all Company facilities. It covers work and use of some portable electronic devices in hazardous (classified) locations as defined by the Operations Technical Staff. Work conducted in these areas must be controlled in a consistent manner. A work permit or hot work permit may be required to achieve this goal.

This section sets requirements for performing work in locations based on the properties of the flammable vapors, liquids, gases, combustible dusts, and fibers that may be present and the likelihood that a flammable or combustible concentration or quantity is present.

These hazardous classified locations are assigned six designations as follows:

- Class I, Division 1
- Class I, Division 2
- Class II, Division 1
- Class II, Division 2
- Class III, Division 1
- Class III, Division 2

***NOTE**: The only definitions relevant to this document are for Class 1 Division 1 and Class 1 Division 2.*

6.20.2. Suppliers

Suppliers shall ensure that:

- Provide (at their own expense) appropriate Atmospheric Monitoring and detection equipment unless otherwise noted within the bid documents or at the Request for Proposal (RFP).
- When necessary, specific atmospheric Hazard measurement devices shall also be provided by the Supplier, e.g., if mono-styrene, acetone, benzene, or other Hazards are present. Company shall inform the Supplier when there is the potential for respiratory Hazards or contaminants that may not be detectable by standard 4-head monitors.
- Hazardous / Classified location shall be identified with the appropriate signage and shall be posted to ensure clarity for Contractors entering the area.
- Identification of hazardous locations shall also be reviewed as part of the work planning and execution process.
- Laptop computers are permitted in areas classified Class 1, Division 1 with a Hot Work Permit, continuous combustible gas monitor or personal combustible gas monitor. (East Canada)
- Follow manufacturer’s specifications regarding operation, servicing, bump testing and calibration.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- If an instrument fails a bump test or a calibration check, the Contractors shall perform a full calibration on it before using it. If the instrument fails the full calibration, the Contractor shall remove it from service.
- Functional bump testing:
    - be performed in accordance with the manufacturer's specifications before each day's use
    - for the mainline systems, use pentane or pentane equivalent gases; when pentane equivalent methane is used for calibration, then methane can be used for bump testing
    - for the vector system, use pentane or pentane equivalent gases for calibration, and methane for bump testing
    - When calibrated with pentane, a calibration gas with 0.35 percent pentane should be used to calibrate against 25 percent LEL. In this case, the default LEL setting should be set at 25 percent prior to applying the pentane calibration gas
    - when calibrated with pentane equivalent methane, a calibration gas with 2.5 percent methane should be used to calibrate against 50 percent LEL; in this case, the default LEL setting of portable gas monitors for calibration should be set at 50 percent prior to applying the pentane calibration gas
- Suppliers shall maintain bump test and calibration logs at the Site and make the logs available at the request of the Company Representative.
- Suppliers who calibrate Gas Detectors shall:
    - calibrate to the frequency indicated in the manufacturer's specifications
    - bump test portable gas monitors and verify calibration before every Confined Space Entry
    - attach a gas detector inspection tag to each gas monitor, including calibration date and initials of the Contractor who calibrated the monitors; no tag is required if an auto-calibration station is used for personal multi-gas monitors; however, the Contractor shall follow Company calibration requirements and the manufacturer's specifications for calibration
    - tag the calibration record for multi-gas monitors and grab sampling equipment when shared with a group of Contractors
    - record calibration results of manually calibrated portable gas monitors in the Gas Monitoring Instrument Service Log (either within Lotus Notes or other means) and retain as per the record retention requirements; it is not required to maintain a Gas Monitoring Instrument Service Log for portable gas monitors capable of self-monitoring calibration cycles indicating when calibration is required
    - All calibration and maintenance activities, including the *Gas Monitoring Instrument Service Log* shall be documented and retained according to the record retention requirements

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.20.3. Requirements

Hazardous Area Classification Legend

Class I Locations

Class I locations are those in which flammable gases, flammable liquid–produced vapors, or combustible liquid–produced vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Class I, Division 1

A Class I, Division 1 location is a location:

- (1) flammable liquid–produced vapors, or combustible liquid–produced vapors can exist under normal operating conditions, or
- (2) gases, flammable liquid–produced vapors, or combustible liquids above their flash points may exist frequently because of repair or maintenance operations or because of leakage, or
- (3) processes might release ignitable concentrations of flammable gases, flammable liquid–produced vapors, or combustible liquid–produced vapors and might also cause simultaneous failure of electrical equipment in such a way as to directly cause the electrical equipment to become a source of ignition

Class I, Division 2

Class I, Division 2 location is a location:

- (1) produced vapors, or combustible liquid–produced vapors are handled, processed, or used, but in which the liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems or in case of abnormal operation of equipment, or
- (2) flammable liquid–produced vapors, or combustible liquid–produced vapors are normally prevented by positive mechanical ventilation and which might become hazardous through failure or abnormal operation of the ventilating equipment, or
- (3) that is adjacent to a Class I, Division 1 location, and to which ignitable concentrations of flammable gases, flammable liquid–produced vapors, or combustible liquid produced vapors above their flash points might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

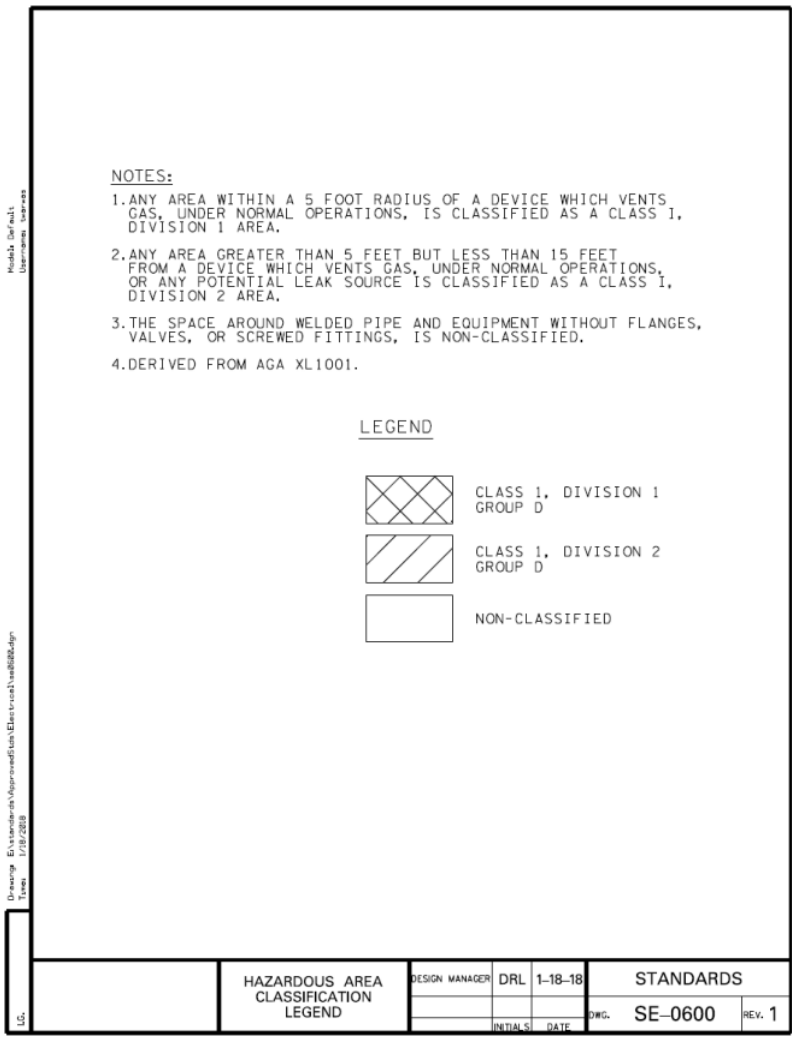


Figure 7: Area Classification Legend

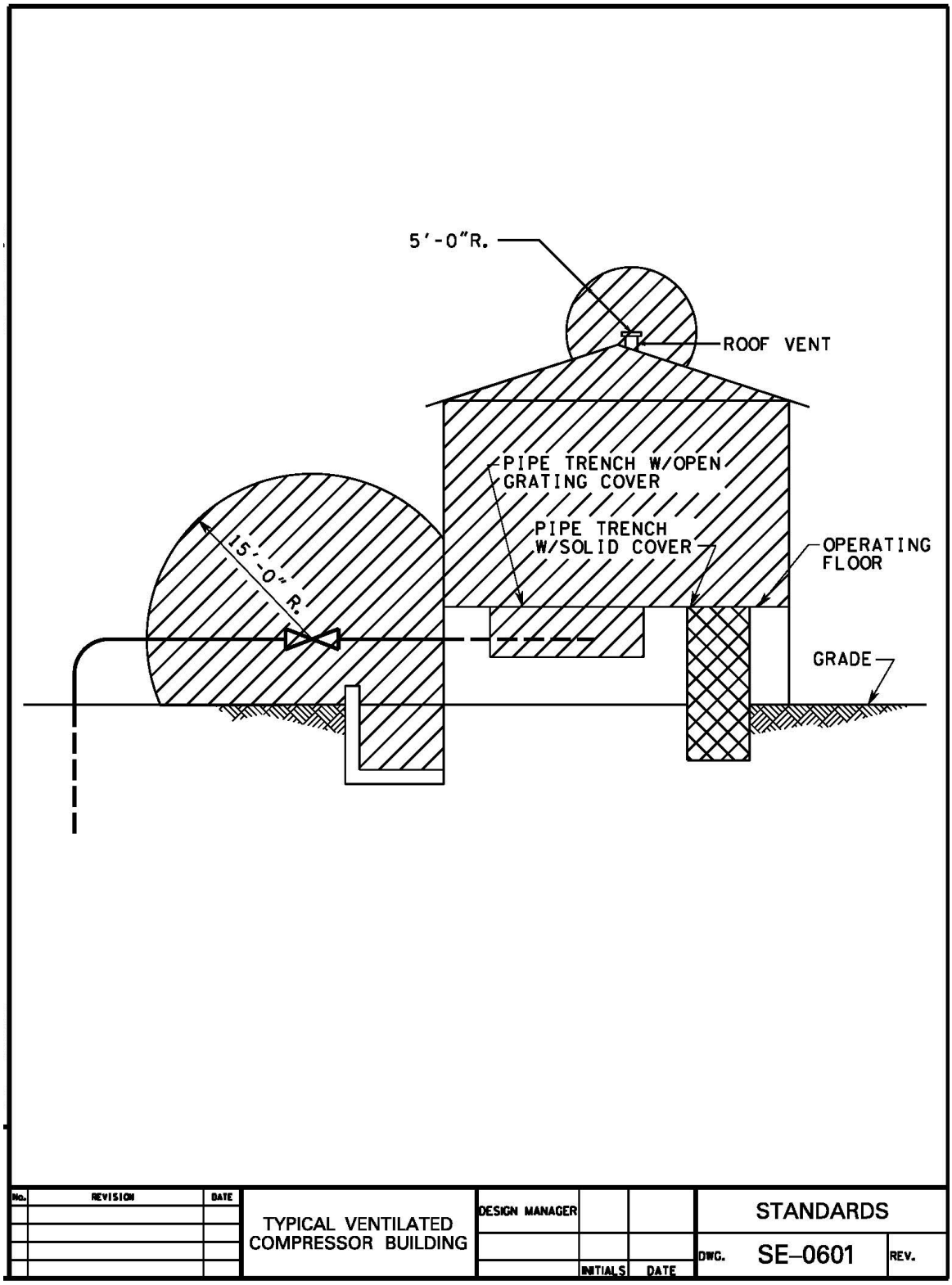


Figure 8: Typical Ventilated Compressor Building

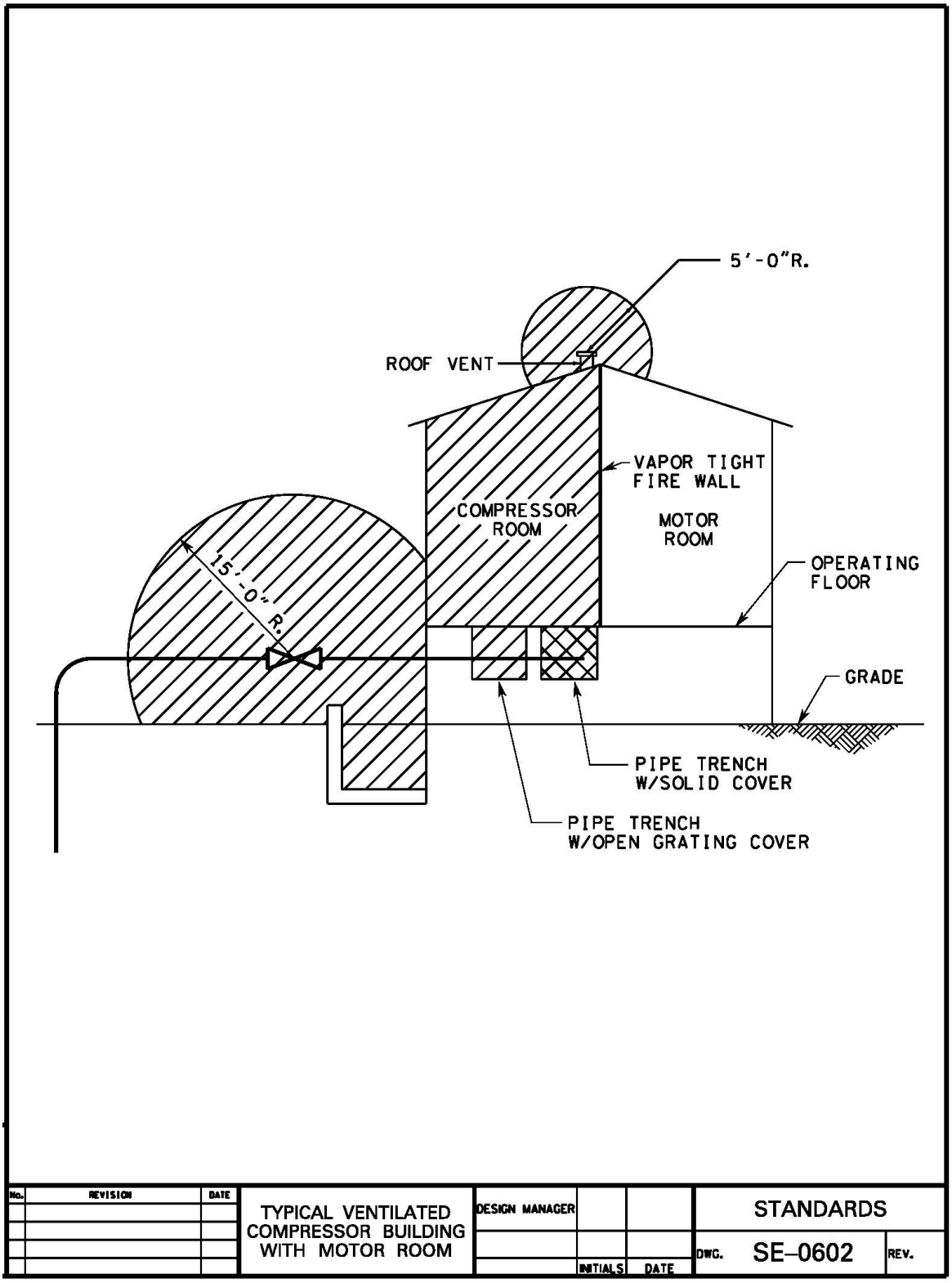


Figure 9: Typical Ventilated Compressor Building with Motor Room

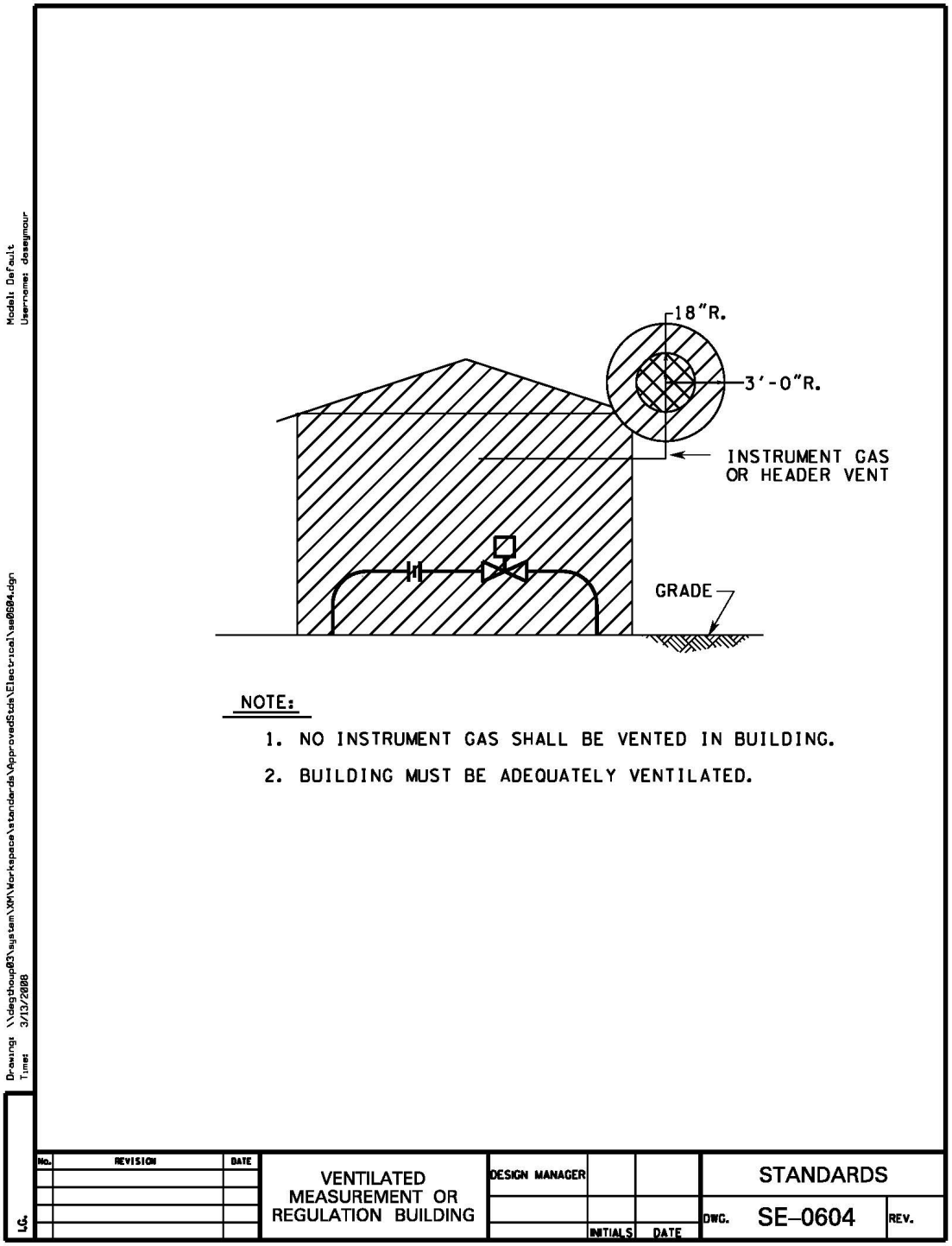


Figure 10: Ventilated Measurement or Regulation Building

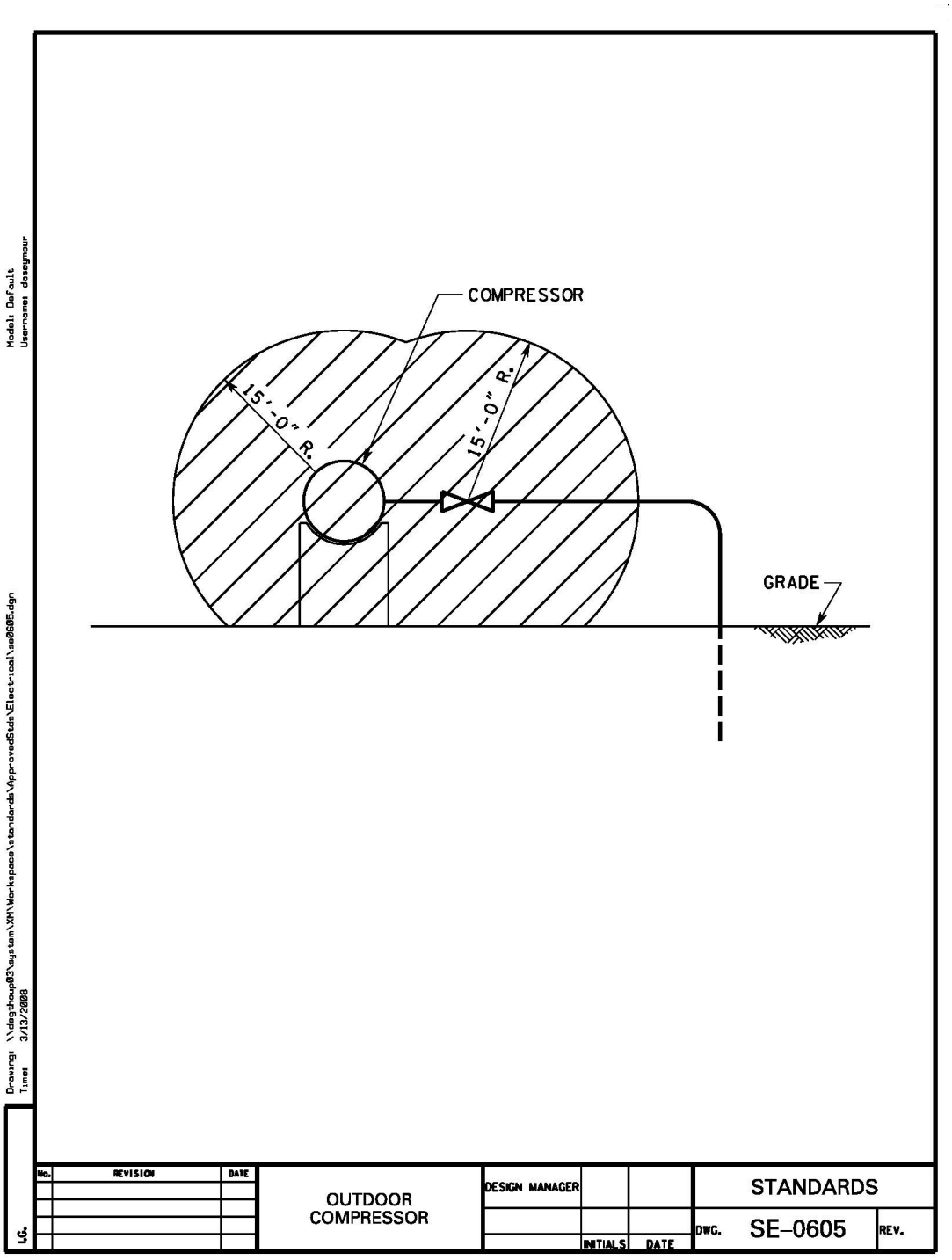


Figure 11: Outdoor Compressor

Personal Communication Devices and Computers

NOTE: *Non-intrinsically safe electronic devices such as laptop computers, tablets, cameras, two-way radios, and cellular telephones that have the potential to create an ignition source in a hazardous area.*

As a normal course of business, these devices are not allowed in Classified Areas. However, where a business need dictates, these devices may be used in a Classified Area provided the individual(s) utilizes a Personal / Portable Gas Monitor. These instances do not require a Hot Work Permit.

Laptop computers are permitted in areas classified Class 1, Division 1 with a Hot Work Permit, continuous combustible gas monitor or personal combustible gas monitor. (East Canada)

Personal / Portable Gas Monitors

Personal monitors shall be worn by each individual when:

- working in Confined Spaces
- removing storage tank seals, tank manways or tank mixers
- entering tanks that have not been cleaned and freed of gas
- work associated with Open Systems, such as scraper traps and provers
- spill or leak containment, clean-up, and repairs
- required by as noted on a safe work permit
- when required based by a Hazard Assessment
- when performing work in a hazardous / classified location

NOTE: *Personal Gas Monitors should not be worn when working in any environment that will exceed the instrument set points.*

Table 13: Types of Monitoring Instruments

HAZARD	MONITORING INSTRUMENT
H_2S	Detector tubes and personal, portable, and stationary monitors
Benzene	Detector tubes and personal badges
CO	Portable monitors
Oxygen	Portable monitors
Combustible vapors and gases	Portable and stationary Lower Explosive Limit (LEL) monitors
Fire	Stationary ultraviolet and/or infrared flame detection

- Multi-gas monitors recommended for (as a minimum):
  - Sweet gas facilities – LEL, CO & O_2
  - Sour gas facilities – H_2S, LEL, CO & O_2
- The alarm set points of portable gas monitors are listed in the table below.

Table 14: Portable Gas Monitor Alarm Set Points

ALARM SET POINT	H_2S	LEL	CO	O_2
Low Alarm	10 PPM 5 PPM	10% LEL	25 ppm	19.5%
High Alarm	20 PPM 10 PPM	20% LEL	100 ppm	23.5% 23%

Personal Gas Monitors shall:

- have multi-head functionality.
- be worn within 45 cm (18 in) of the Breathing Zone (area around mouth and nose).
- not be placed into shirts, coveralls, or jacket pockets unless the pockets are specially designed to hold portable gas monitors (i.e., mesh pocket).
- provide a visual and audible alarm that is equipped with low and high alarm points.
- be recharged in a safe area, away from the area being monitored; carry out recharging as soon as possible after the low-battery indicator activates, to ensure the monitor does not shut down.

Area Monitoring

- An Area Monitor consists of at least one individual wearing a monitor who always remains in the affected area during the work activity. Area Monitors shall:
  - monitor the potential Hazard
  - be equipped with a visual alarm (i.e., red indicator that lights when alarm levels are reached) in addition to an audible alarm, where possible
  - be placed where the atmospheric Hazard is likely, based on the substance (e.g., placed at lower levels when monitoring for substances heavier than air)
  - be used where there is potential for exposure to atmospheric Hazards, including, but not limited to:
    - Confined Spaces
    - Open Systems
    - venting systems
    - leak sites
    - Hazardous Areas
    - Restricted Areas

  - when actively working within 30 m (100 ft.) of Ground Disturbance work which is taking place within 3 m (10 ft.) of operating Facilities (e.g., gas or oil pipelines, above or below ground); in such cases, there shall also be continuous gas monitoring, as determined by the Hazard Assessment

- Combustible gas monitors do not provide accurate readings in an oxygen-deficient atmosphere.
- Passive monitors assess the atmosphere without the use of a pump. Active monitors have internal pumps that draw atmospheric samples from the immediate area or from a distance (e.g., inside a pipe, sump, booster pit).

Sampling Equipment

- Sampling equipment (including multi-head continuous gas monitors) shall:
  - be capable of sampling according to the potential Hazard
  - be positioned within a few feet of the work area and not interfere with the task, including:
    - at the source of the gas or vapor
    - low areas (for petroleum vapors and H_2S)
    - the most Representative location for Contractors at the site
    - areas with the highest potential for exposure
- When using grab sampling equipment such as detector tubes (e.g., Drager CMS) and photo ionization detectors (e.g., UltraRae)

Contractors shall:

- obtain multiple grab samples to obtain Representative exposure information
- always follow manufacturer's guidelines for testing time limits and specifications, but combine with Atmospheric Monitoring best practices
- stop Atmospheric Monitoring and leave the work area (following applicable safety procedures) when alarms are activated before specified length of time for measurement (i.e., one minute)
- For respiratory protection during the initial Atmospheric Monitoring of Open Systems and until work area has proven safe atmosphere:
  - The level and type of respiratory protection shall be based on the potential composition, volume, and pressure of the gas or vapor that may potentially be released during the break or opening.
  - When opening systems where a known potential for exposure exists, all Contractors in the immediate work area shall wear the appropriate RPE, in accordance with the completed Hazard Assessment until a safe atmosphere has been verified.
  - If the composition and/or concentration of the contaminant is unknown or there is a potential for a Hazardous Atmosphere, assume the atmosphere is hazardous, perform exposure assessments and use RPE in accordance with the Respiratory Protection section of this manual.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- If there is a potential for an atmosphere above 5 ppm of H2S (>5ppm H2S) or an oxygen level below 19.5 percent in the Contractor's breathing zone during the job:
  - Contractors must use supplied air (SCBA or SABA) as respiratory protection.
  - A Safety Watch out of range of a toxic atmosphere but within sight of the Contractor(s) must be used.
  - The Safety Watch must don SCBA or SABA but does not need to put on mask unless performing a rescue.
- refer to Confined Space section for initial Atmospheric Monitoring and ongoing testing requirements in Confined Spaces section of this Manual

- A functional test is a brief exposure of the monitor to a concentration of gas(s) more than the lowest alarm set point for each sensor. This test verifies sensor and alarm operation.
- Follow manufacturer's specifications regarding operation, servicing, bump testing and calibration.
- If an instrument fails a bump test or a calibration check, the Contractors shall perform a full calibration on it before using it. If the instrument fails the full calibration, the Contractor shall remove it from service.
- Functional bump testing shall:
  - be performed in accordance with the manufacturer's specifications before each day's use
  - for the mainline systems, use pentane or pentane equivalent gases; when pentane equivalent methane is used for calibration, then methane can be used for bump testing
  - for the vector system, use pentane or pentane equivalent gases for calibration, and methane for bump testing
  - When calibrated with pentane, a calibration gas with 0.35 percent pentane should be used to calibrate against 25 percent LEL. In this case, the default LEL setting should be set at 25 percent prior to applying the pentane calibration gas
  - when calibrated with pentane equivalent methane, a calibration gas with 2.5 percent methane should be used to calibrate against 50 percent LEL; in this case, the default LEL setting of portable gas monitors for calibration should be set at 50 percent prior to applying the pentane calibration gas
- Suppliers shall maintain bump test and calibration logs at the Site and make the logs available at the request of the Enbridge Representative.
- Contractors who calibrate Gas Detectors shall:
  - calibrate to the frequency indicated in the manufacturer's specifications
  - bump test portable gas monitors and verify calibration before every Confined Space Entry
  - attach a gas detector inspection tag to each gas monitor, including calibration date and initials of the Contractor who calibrated the monitors; no tag is required if an auto-calibration station is used for personal multi-gas monitors; however, the

Contractor shall follow Enbridge calibration requirements and the manufacturer's specifications for calibration

- tag the calibration record for multi-gas monitors and grab sampling equipment when shared with a group of Contractors
- record calibration results of manually calibrated portable gas monitors in the Gas Monitoring Instrument Service Log (either within Lotus Notes or other means) and retain as per the record retention requirements; it is not required to maintain a Gas Monitoring Instrument Service Log for portable gas monitors capable of self-monitoring calibration cycles indicating when calibration is required
- All calibration and maintenance activities, including the *Gas Monitoring Instrument Service Log* shall be documented and retained according to the record retention requirements.

- Personal monitors shall not be used when:
  - they are past calibration date
  - they have not been bump-tested
  - there is a faulty sensor
- Considerations for cold weather operation:
  - Most manufacturers of gas detectors place the design lower limit at -10 to -20 °C; be sure to check the operating manual
  - LCD screens will dim at temperatures from -15°C to -25°C. Keeping the monitor inside your coat and attaching a pump will allow you to still read the screen
  - The chemical reactions that occur in the gas detector begin to slow down at temperatures below -20°C longer monitoring is required to get a good reading
  - Use of a hand warmer in the gas detector carrying case will help speed the reactions slightly, they will keep the LCD screen reading longer and they will help speed up the chemical reactions
  - At temperatures -35 to -40°C, it is recommended to take a sample to the gas detector in a warm well-ventilated building

CAUTION	Gas monitoring or testing does not relieve the responsibility of using extreme caution and safety while working.

Personal / Portable Gas Monitors

- Every Contractor that enters a hazardous location must wear a four-head personal gas monitor as part of their PPE.
- Personal gas monitors are not required on green field project sites.
- All Personnel using a personal gas monitor must be trained on care and use of the monitor, bump testing methods and requirements and calibration intervals.
- Personal gas monitor area administrators must be trained on the system set-up (hardware, software, and procedures).

- Personal gas monitors must be bump tested and fully pass the bump test before use. The monitor must not be used if any of the four head sensors fails the bump test.
- Personal gas monitors must be calibrated according to the frequency specified by the manufacturer.
- Pentane gas must be used for bump testing and calibration of personal gas monitors.
- Suppliers may use other compliant personal gas monitors while working in hazardous locations.
- Trained Contractors must accompany visitors entering operating areas and must have a ratio of one (1) personal gas monitor per three (3) visitors while touring an operational area unless otherwise specified by a site-specific requirement. Visits include audits, safety tours, and regulatory inspections.
- If, while wearing a personal gas monitor, the monitor alarms (vibrates, blinking red light and audible beeping tone) it is an indication that the monitor has detected an environment that exceeds pre-set standards. The Contractor(s) must respond by leaving the hazardous location immediately.
- Monitors record important exposure data that must be traceable back to the user. If individuals are assigned a specific personal gas monitor, this must be recorded. Employees and Suppliers that do not assign a personal gas monitor to individuals must have a sign out record book. The record must be kept at the docking or bump stations. The record will contain the name of the Contractor using the monitor, the unit or serial number, the date and time signed out, and the date and time signed back in. The local area will keep the log sheets for 60 days and then file them in file net.

Site / Building Alarm Response

- If while wearing a personal gas monitor, the monitor alarms (vibrates, blinking red light and audible beeping tone) it is an indication that the monitor has detected a gas in the air around the monitor at a level equal to or above the set lower alarm level for that gas.
- The required responses are as follows:
    1. Leave the area immediately.
    2. Check if the personal gas monitor battery is low, a regular intermittent alarm may indicate that the battery level is low and needs a recharge.
    3. Determine if the alarm is valid.
    4. Ribbon off and tag the area to warn others of the hazard.
    5. Using the right PPE, assess the area for potential causes for the alarm (e.g. exhaust from mobile equipment/machines, leaking process equipment, etc.).
    6. If you cannot control the source of the alarm, report it to the Supervisor.
    7. Personal gas monitors are not to be used for gas leak detection please use the appropriate gas monitoring equipment to search out leaks.

Training

- Gas test training shall cover the theoretical knowledge and a practical skills demonstration. At a minimum it will cover:

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - Explosive range and flash point
  - Threshold limit values and occupational exposure limits of substances
  - Knowledge of gas testing instruments
  - Oxygen requirements
- Gas test training is required for explosively, oxygen and hazardous chemical tests for safe work permits covering hot and cold work. This includes:
  - Practical demonstration in proper use of all gas testing equipment
  - Written knowledge/understanding competency test
- Confined space entry gas testing includes the above. It is combined with confined space entry training and includes:
  - Review of legal requirements for confined space entry
  - Review of testing considerations for confined spaces
  - Written knowledge/understanding competency test

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.21. Hot Work

This section is in accordance with *29 CFR 192.751* and applies to all Contractors and visitors who may perform or be involved with welding activities and/or other hot work tasks.

- Company distinguishes between two categories of “Hot Work”, both of which are addressed below:
  - ***Category #1:*** Welding, cutting, grinding, open flame (i.e., an ignition source will be created)
  - ***Category #2:*** Use of non-intrinsically safe tools, cameras or other electronic devices or opening electrical panels in a classified hazardous area (i.e., a potential ignition source may be created)
- The “Hot Work” designation only applies when:
  - Category #1 or #2 is conducted in a classified / designated hazardous area
    - The hazardous area includes any area classified as Class 1 Division 2 or higher, or Zone 2 or higher.
    - If an area is not normally classified but may develop a flammable atmosphere due to the nature of the operations in the area, it would be treated the same as a classified hazardous area.
  - Category #1 in an area with combustible materials within 11 m (35 ft.).
  - Routine shop and fabrication work in non-classified areas fall outside the scope of “Hot Work” and hot work permitting requirements.
- Electrical work is typically Category #2 hot work. Some requirements expected for Category #1 hot work do not apply (i.e., Fire Watch or removal of combustibles) while others remain in place (i.e., continuous LEL monitoring).
- See Section 6.20 Hazardous/Restricted Areas for use of cameras or personal communication devices.

6.21.1. Suppliers

Suppliers shall ensure that:

- Cutting or welding is permitted only in areas that are or have been made safe for the hot work job.
- Hot work shall not be permitted in the presence of flammable or explosive atmospheres that may develop inside unclean or improperly prepared vessels, containers, tanks, or equipment which have previously contained flammable or explosive materials.
- If the hot work is being done from work platforms, scaffolds, etc., the Contractors must be protected against falling by using railings, a fall protection, or work restraint system.
- If the work task involves welding or cutting on an elevated work platform of 2.4 m (8 ft.) or higher above the floor, a flame-retarding tarp may be required to catch or deflect sparks.
- If the hot work will produce sparks or an open flame in a designated hazardous/classified location, two fire extinguishers shall be available for the job.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- The Safe Work Permit should only be closed after it is determined any fire hazard has passed and the Fire Watch is free to leave.

- Oxygen and fuel-gas cylinders must be kept far enough away from welding and cutting operations so that sparks, hot slag, or flame will not reach them, or if that is not possible, fire-resistant shields shall be used.

6.21.2. Hot Work Permitting

- Hot Work can only be performed after a Permit is issued.
- This applies to both categories of “Hot Work”
  - Category #1: Welding, cutting, grinding, open flame (i.e., an ignition source will be created)
  - Category #2: Use of non-intrinsically safe tools, cameras or other electronic devices or opening electrical panels in a classified hazardous area (i.e., a potential ignition source may be created).
  - Any time the work or tools that introduce an ignition hazard are within a designated / classified hazardous area, permitting applies
  - For Category #1, permitting also applies if the work is being done in an area with combustible materials within 11 m (35 ft.) (even if not technically or normally a classified hazardous area).
- Additional Safe Work Permit instructions as they apply to Hot Work are covered in Procedures for JSA, Safe Work Permit (SWP), and FLHA.
- The applicable permit or a copy of the permit must be posted in a conspicuous location in the work area where any Hot Work, Category #1 work is taking place.
- The Permit Issuer will ensure task hazards and area hazards are addressed through the Safe Work Permit process including:
  - Completion and/or review of the JSA, JHA, or procedure that addresses the Hot Work hazards and controls, and
  - Completion of an applicable FLHA.
- A Permit for Hot Work is required when work is taking place in a designated hazardous/classified location and:
  - Explosion proof or sealed Class 1, Division 1 or Division 2 electrical enclosures or conduit is opened.
  - Work on electrical equipment could possibly produce a spark.
  - Non-intrinsically safe tools and extension cords are being used (e.g., general service tools like drills, extension cords, pigtails, etc.)
  - Non-intrinsically safe electronic devices are being used.
- The Safe Work Permit Issuer may also post a Fire Watch during other hot work activities or require an additional Fire Watch if they think it is necessary for the protection of personnel, equipment and the surrounding area (e.g., more volatile combustibles, combustibles out of sight of a single Fire Watch, etc.).

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.21.3. Atmospheric Monitoring

- LEL monitoring is required before and always during hot work operations in a designated / classified hazardous area.
- LEL monitoring shall be performed, not only inside opened equipment, but also thoroughly monitor the area looking over, under, in between and around equipment.
- Monitor for LEL in low lying or down gradient areas near the work area.
- If monitoring results in a detectable level of LEL, then special precautions and considerations shall be identified and discussed such as additional cleaning and/or purging of equipment.
- LEL monitors need to be calibrated and operated in accordance with the manufacturer's requirements and receive a start-of-shift bump test to ensure any LEL readings prior to and during hot work are accurate. Always check oxygen levels when doing an LEL check as an oxygen deficient atmosphere may lead to an inaccurate LEL reading with certain monitors.
- Continuous LEL testing requirements for Hot Work, Category #2 may be managed by using a Personal Gas Monitor if the work does not involve opening the system or a line break (i.e., your personal alarm will go off in the event of an unanticipated gas leak or explosive vapors accumulate).
- A second Gas Monitor should be used for Hot Work, Category #1, or Category #2 where there are gas and vapor hazards to allow for spot testing, troubleshooting the source of LELs, and recording periodic readings.
- Stationary building gas detection devices (i.e., permanently installed monitors), are not acceptable for specific area detection.

6.21.4. Hot Work in Confined Spaces

- In addition to the usual confined space requirements, the following must be applied when the task inside the confined space is Hot Work:
    - Proper cleaning and ventilation to prevent the buildup of flammable or toxic gases once heat is applied.
    - Mechanical ventilation is also required to prevent a buildup of toxic vapors or gases from the welding operation itself.
    - The gas cylinders or welding machines must be left on the outside of the space.
    - The gas supply of a torch must be positively disconnected at some point outside the confined area whenever the torch is not to be used for a substantial period such as during the lunch hour or overnight (to prevent accidental gas leaks inside the space).
    - Where practicable, the torch and hose shall also be removed from the confined space.
- For Welders in particular, if the confined space is entered via a manhole or other small opening, a quick exit / non-entry rescue method should be applied if possible. This requires:
    - The Welder to wear a full body harness

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - Lifelines and a mechanical device to pull the lifelines with the welder attached in such a way they do not get jammed in a small exit opening
  - An attendant to monitor lifelines (and other gas or electric lines running into the space) to prevent entanglement and ready to extract the Welder.
- After welding operations are complete, the Welder shall mark the hot metal or provide some other means of warning other Contractors.
- Hot Work cannot start until an LEL reading of zero is confirmed (inside and outside the vessel).
- LEL must be continuously monitored during Hot Work (also both inside and outside the vessel).

6.21.5. Portable Containers

- A Hot Work Permit is required when hot work is performed on used drums, barrels, or other containers that have contained flammable or combustible materials.
- These types of containers must be made safe to be certain there are no flammable or toxic materials present which might produce flammable or toxic vapors when heated by welding or cutting or other Hot Work. Before any heat is applied, used drums or containers must have been:
  - Vented and thoroughly cleaned or filled with water, or
  - Purged with inert gas, or
  - Made safe by other approved methods
- Containers must also be vented to permit the escape of air or gases before and during preheating, cutting, or welding.
- Any pipelines or connections to the containers must be disconnected or blinded (blanked).
- Hot work cannot start until an LEL reading of zero is confirmed and LEL must be monitored during this type of hot work.

6.21.6. Vessels (scrubbers, Tanks, Heaters, etc.)

- Vessels, tanks, or other stationary containers must be made safe to be certain there are no flammable or toxic materials present which might produce flammable or toxic vapors when heated by welding or cutting or other hot work. Before any heat is applied, they must have been:
  - Vented and thoroughly cleaned or filled with water, or
  - Purged with inert gas, or
  - Made safe by other approved methods
- When preparations involve the blowing down, venting and/or purging, into the immediate work area of a flammable gas or vapor the Line Breaking and Equipment Opening safe work practice will be followed.
- Isolate the vessel by disconnecting lines, blinding, or double-block-and-bleed.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Purge, clean or ventilate to clear the vessel of all toxic and flammable vapors and gases.
- Hot work cannot start until an LEL reading of zero is confirmed (inside and outside the vessel).
- LEL must be continuously monitored during hot work (also both inside and outside the vessel).

6.21.7. Hot Tapping

- If welding or cutting is to be conducted on piping or vessels still carrying or containing flammable substances, this falls into the category of “Hot Tapping”.
- Hot Tapping requires compliance with engineering procedures specific to piping or equipment that are supported by a specific safety procedure.

Suppliers shall ensure that Contractors:

- Wear the appropriate PPE when welding, cutting, or grinding (and their helper). See Section 6.34 Personal Protective Equipment.
- Post a Fire Watch for all welding and cutting operations (Category #1) when it takes place:
    - In a designated hazardous/classified location; or
    - Where there are combustible and flammable materials that cannot be removed, protected, or shielded within 11 m (35 ft.).
- The Fire Watch must be trained and competent to carry out their duties.
- The Fire Watch is required to wear the appropriate eye protection.
- The duties of the Fire Watch include:
    - Watch for fire in all exposed areas.
    - Never leave the site of the hot work without a replacement.
    - Have fire-extinguishing equipment readily available.
    - Know how to use fire-extinguishing equipment.
    - Know how to summon emergency help.
    - Only try to extinguish a fire when it is obviously within the capacity of the equipment available or otherwise sound the alarm immediately.
    - Do not perform any other tasks while on fire watch duty.
    - Immediately stop the work when conditions change.
    - A Fire Watch is required to be present during work breaks and at least 30 minutes after the completion of welding or cutting operation.
- Remove or cover combustible materials near the Hot Work.
- Inspect the general surrounding area within 11 m (35 ft.) of the hot work location to determine the presence of flammable and combustible materials and designated hazardous areas.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Remove all combustible materials and flammable liquids if possible, and if not, protect them with flameproof tarps or shield them with metal or flame retarding curtains.
- Determine if wall and floor openings shall be covered or protected within 11 m (35 ft.) of the work area.

- Inspect the other side of the wall or ceiling for combustibles and flammable materials if the work task involves work on walls/ceilings.

6.22. Housekeeping

6.22.1. Suppliers

Suppliers shall ensure that:

- Garbage shall not be allowed to accumulate on a construction ROW.
- Ensure waste receptacles are emptied regularly and all garbage is collected and removed as required.
- Waste receptacles in operational areas must have lids.
- Food shall not be consumed or stored in operational areas.
- The use of industrial style dumpsters is recommended in areas where large volumes of waste can be expected.
- Waste shall be properly segregated, and flammable oil-soaked materials must be stored in a designated receptacle.
- Wildlife risks need to be assessed when determining waste receptacle and removal criteria.

Suppliers shall ensure that Contractors:

General Housekeeping

- Keep worksites clean and orderly.
- Keep restrooms and eating areas clean and sanitized.

Walkways, Pathways and Exits

- Keep interior and exterior walkways, pathways and exits free of tripping and slipping hazards by utilizing the following:
  - Clean snow off walkways.
  - Use sand or rock salt on icy walkways.
  - Immediately clean-up oil leaks and spills from floors.
  - Consider nonskid paint in areas where the floors have the potential to stay wet or oily.
  - Place nonskid mats on painted floors inside entrance doors.
  - Keep ramps, exits, stairs, walkways, and pathways clear of tripping hazards such as hoses, ropes, cords, portable tools, spare parts, trash, and debris.
  - Take the necessary precautions to prevent tripping hazards when hoses, ropes or cords are strung along or across walkways and pathways.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

Emergency Equipment

- Never place any materials that block access to emergency equipment such as:
  - Fire extinguishers
  - Eye wash stations and showers
  - Emergency Shut Down (ESD) stations and valves
  - Safety warning signs
  - Electrical switches and disconnects (at least 3 ft. or 0.9 m of clearance)
  - Life rings, life preservers, life rafts, escape capsules, etc.

6.23. Hydrostatic and Pneumatic Testing

6.23.1. Suppliers

Suppliers shall ensure that:

- For worksite(s) where a section of piping is being tested, a Company representative shall be on-site.
- At the testing location there shall be:
  - A safe means of access and egress to the system being tested,
  - Adequate lighting when night work is necessary and a fire extinguisher at both ends of a test section
  - Adequate heating and lighting facilities as required for test Contractors located a minimum of 15 m (50 ft.) away from any testing facilities.
- Other requirements include:
  - Only the Contractors directly involved in the testing are in the immediate vicinity of test heads, pressure pumps or exposed piping during testing,
  - Preventing them from moving or violently separating, ensure temporary piping or hoses used during pressuring and depressurizing activities are anchored or secured by such method(s) as whip check connections, steel braid line wrap, or staking to the ground,
  - The use of appropriate hoses, piping, fittings, valves, etc., and that such equipment has an adequate pressure rating for the service; inspect the equipment before use, to ensure it is in good condition,
  - Persons not directly involved in the testing shall be kept back a minimum of 30 m (100 ft.) from the pipeline, by the use of signs, fencing, and verbal warnings,
  - Verifying pressure on both sides of check valves when hydro testing and depressurizing, and
  - Providing a safe means to release pressure from both ends of the piping section; pressure shall be released prior to loosening or removal of fittings.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.23.2. Hydrostatic Testing

- Two zones shall be established around any hydro-test: a 15 m (50 ft.) Exclusion Zone and a 30 m (100 ft.) Zone. These requirements shall be followed during all hydro-tests. Unique circumstances may require additional measures to ensure the safety of Contractors and the public.
- For testing being conducted only on the ROW, expand the 15 m (50 ft.) Exclusion Zone requirements to the 30 m (100 ft.) Zone dimensions.
- If leaks are observed (through gauge drop or visual inspection) then the pressure must be reduced to zero pounds per square inch (PSI) prior to entering the Exclusion Zone. No adjustments of any kind are to be performed while the system is pressurized.
- Fuel containers, propane tanks, and other fuel storage shall not be permitted within the 15 m (50 ft.) Exclusion Zone. Testing trailers shall be parked with the entrance facing away from the test area. The testing trailer door(s) shall remain closed during testing operations. If it is necessary to test indoors, the 15 m (50 ft.) Exclusion Zone shall encompass the entire room in which the test is completed.

6.23.3. 15 m (50 ft.) Exclusion Zone

- On Company property, signs shall be placed by the Supplier on the day of the test. These signs, which are to remain in place until after the piping system has been depressurized, shall read as follows:

“DANGER – RESTRICTED ENTRY – HIGH PRESSURE TESTING AREA

AUTHORIZED PERSONNEL ONLY”

- All unnecessary equipment and Contractors shall stay out of this zone when the pipe is pressurized above normal operating pressures.
- Ensure the 15 m (50 ft.) Exclusion Zone applies over the entire length of the pipeline, spools or fittings being tested. Note: Within populated areas, traffic control is required and shall be identified in the Hazard Assessment and/or Permit.
- Contractors 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 shall be placed on public access points and located at a point 15 m (50 ft.) from the pipeline.

6.23.4. 30 m (100 ft.) Zone

- Facilities for test personnel and equipment shall be outside the 30 m (100 ft.) Zone.
- This zone will not be marked; the public and other Contractors shall stay at least 30 m (100 ft.) away from the pipe.
- This zone applies over the entire length of the pipeline section being tested.
- The public shall be kept out, except when crossing the pipeline in vehicles where identified in the Hazard Assessment and/or Permit.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Landowners along the right-of-way shall be notified in advance of the hydro-test and those living within the 30 m (100 ft.) zone shall be offered relocation assistance.
- In the event additional piping or facilities (not associated with the system being hydrotested) are present in the test area or within 30 m (100 ft.), of the pressurized components, the area shall be flagged and remain off limits to all Contractors during the test.
- When testing trailers or vehicles are parked implement extra precautions as necessary (e.g., stage behind large equipment).
- When testing in buildings, all points of entry are to be manned or blocked. All personnel working in the building must be appropriately notified.

6.23.5. Pneumatic Testing

- Must adhere to Company Engineering's specifications for pneumatic testing.
- Distinct warning signs shall be posted during air pressure testing, such as "DANGER, AIR PRESSURE TESTING IN PROGRESS."

6.24. Ignition Sources

6.24.1. Suppliers

Suppliers shall ensure that:

- Prior to entering a Restricted or Hazardous Area, Vehicles and equipment shall be shut off and not permitted to enter until Atmospheric Monitoring confirms the absence of hazardous vapors.
- When in Hazardous and Restricted Areas:
    - test for oxygen levels and flammable atmospheres prior to introducing ignition sources and continuously monitor these areas while ignition sources are present
    - if a flammable atmosphere is present, use only explosion-proof electrical installations and explosion-proof electrical equipment
    - use only intrinsically safe electronic devices unless the air is initially tested and continuously monitored for flammable vapors and the equipment is listed on the safe work permit
    - shutdown vehicles and equipment when not in use or when left unattended (do not restart the vehicle or equipment until Atmospheric Monitoring confirms the absence of a flammable atmosphere)
    - use non-sparking tools that are kept clean and free from ferrous or other contaminants which may hamper non-sparking properties
    - control all potential ignition sources
    - ground and bond as required in Bonding and Grounding section
    - PASO for diesel engines is required on all Canadian facilities when entering restricted or hazardous areas. [*CER Safety Advisory SA 2015-02*]
    - Each Supplier will develop procedures to ensure that:

  - the hazard of fire and explosion from vapors entering diesel engines is identified and controlled using the hierarchy of controls
  - describes the methods used confirm that PASO are in on all diesel-powered engines, and that they function prior to entering any hazardous area
  - Contractors are adequately trained to look for and check the functionality of the PASO
  - the PASO is inspected, tested, and maintained according to the manufacturer's instructions
- Perform and document checks for Positive Air Shut Off (PASO) devices on diesel powered equipment entering "hazardous locations".

- Diesel-powered vehicles / equipment being utilized in areas where flammable / explosive vapors may be present must have controls in place to prevent the vapors from entering the engine and causing a fire or explosion.
- **Positive Air Shut Offs (PASO)** must be tested and working for all diesel-powered engines. If the PASO is operational, the engine will not engage. If the engine engages, the PASO is not functional. The diesel-powered engine must not be permitted to enter the hazardous or restricted area.

Suppliers shall ensure that Contractors:

- Utilize Hot Work Permits to identify and document the controls used to mitigate the hazards from ignition sources.
- Perform atmospheric testing prior to permits being issued and continuous atmospheric monitoring.

6.24.2. Pyrophoric Iron Sulfide

- Precautions include:
  - identify equipment where iron sulfide is suspected
  - tanks and vessels shall be purged of hydrocarbon vapors before opening
  - when iron sulfide is suspected to be present, provisions shall be made to keep the inner surfaces of opened equipment wet
  - disposal of accumulated iron sulfide shall be handled quickly and carefully to avoid creating a hazard
- Use water spray to soak iron sulfide at least once every 24 hours, or more frequently if considered necessary by Operations Management. Approved products that are designed and intended to decontaminate/eliminate pyrophoric iron sulfide may also be used.
- Spray water into the vapor space at least once every 24 hours, or as often as necessary to keep this space damp. Other types of floating roof tanks do not require wetting down unless there is reason to suspect pyrophoric iron sulfide may be present.

6.24.3. Portable Catalytic Heaters

- Portable catalytic heaters shall:

- require continuous monitoring when used in an explosive or Hazardous Atmosphere
- be approved for use in an explosive or Hazardous Atmosphere; approval shall be from an applicable, recognized authority, such as the American Gas Association or the Canadian Gas Association
- have adequate ventilation to prevent a build-up of exhaust fumes and prevent the fumes from being drawn through the heater and into the space being heated
- have carbon monoxide monitors when required
- have only explosion-proof electrical fittings attached
- have a regulator between the propane bottle and the heater to reduce the pressure of gas to the heater, to a level specified by the manufacturer
- have a thermostatic block valve installed on the propane line where it enters the heater; this serves as an automatic, positive shutoff on the line when the heater is not in use, preventing gas from escaping through the heater to the atmosphere
- not be used in electrical enclosures where there are open relays, as the vapors leave an insulating residue on open contacts that is difficult to remove
- be used only in accordance with manufacturer's instructions

6.25. Isolating Line Breaks and Equipment Opening

6.25.1. Suppliers

Suppliers shall ensure that:

- Line breaking and equipment opening work must be subject to a hazard assessment that includes documented work steps, hazards, and required controls.
- The hazard assessment activity must include a walk down of the work area.
- This requirement may be fulfilled as follows:
  - For Eastern Canada, either a Safe Work Permit or JSA meets this criterion.
  - For Western Canada, this requires completing a JSA or reviewing an existing JSA (or equivalent) or procedure (that includes hazards and controls) and a Safe Work Permit.
- If the scope or conditions of the work changes (after the hazard assessment and/or permitting), the job must be shut down and the hazard assessment and permit (as applicable) review and potentially rewritten/reissued.
- Planned isolation and LOTO that were required prior to line breaking or equipment opening have been executed as planned.
- Work areas that may experience a hazardous atmosphere are free and clear of any other personnel prior to any gas or vapor release.
- In the event scope or conditions change, ensure hazard assessment, or permit documents are rewritten or re-issued as required to meet the new scope and conditions prior to work beginning again.

- Ongoing atmosphere monitoring and recording as required when working around open pipe or equipment with a potential to release gases or vapors.
- Clear communication to all Contractors involved and any other Contractors in the area under what conditions evacuation of the area must occur.
- Portable gas monitors (e.g., unit with pump and hose to find leaks or portable area monitor) may be required based on the nature of the job.
- The work should be planned and conducted to minimize the volume of flammable or toxic gas, vapor, or liquid released and the period in which there is potential for any release.
- Once isolation is established (any further gas, vapor, or liquid release is fully contained) and the area atmosphere is proven safe, respiratory protection may be removed but continuous area atmosphere monitoring should continue (see above) with periodic recording as set out in the Safe Work Permit (as applicable).

Suppliers shall ensure that Contractors:

- Participate in hazard assessment activities prior to work (e.g., JSA creation/review, discuss Safe Work Permit, FLHA, etc., as set out below).
- Apply all controls set out in the work plan / hazard assessment documentation, including PPE requirements (e.g., FR outer layer and SCBA/SABA if >5ppm H_2S in breathing zone).
- Wear and use gas monitors as required below (and as per JSA/Safe Work Permit) and exit the work area when atmosphere readings warrant or alarms sound (as communicated by PIC).

6.25.2. Isolation

- Isolation, de-energizing, proving de-energized state, and applying Lock Out / Tag Out needs to be planned and documented at some stage in the work planning or hazard assessment process.
- The potential hazards presented by gases, vapors, or liquids in lines and applicable controls need to be considered in this process (e.g., Is the fluid hot, toxic, flammable or flashes off flammable vapors, under pressure? Or more than one of these?).
- Isolation and LOTO must be completed using the appropriate forms.
- When planning mechanical isolation (for both upstream and downstream of the equipment), consideration should be given to the “Levels of Isolation Methods” (shown in the table below), to achieve a level of isolation and assurance of de-energized state that provides sufficient protection given the nature of the fluid being isolated (within the limits of the equipment configuration).

Table 15: Levels of Isolation Methods

ISOLATION LEVEL	MECHANICAL ISOLATION	ENERGIZED STATE
Highest Level	Air Gap	Positive Isolation
	Double Block Bleed and Blind	
	Single Block Bleed and Blind	
	Double Block and Bleed	Proved Isolation
Lowest Level	Single Block and Bleed	

6.25.3. Levels of Isolation Methods

- Blowing down, venting, or purging are effective controls as part of line breaking and equipment opening and must be considered prior to opening equipment. The risks they create, however, also require planning and additional controls which should be documented on the JSA, Procedure, Safe Work Permit, or other planning documents reviewed just before the job starts. For example:
    - Venting of any gas should always be done with consideration to where the vented gas will linger or migrate to—facility vents and flare systems are preferable to venting near or into a work area if possible.
- The following procedure steps are provided to assist in developing JSAs or procedures for line break or equipment opening activities to prevent a flash fire and/or exposure to toxic gases (especially H_2S). Where a region or equipment specific opening procedure does not exist, these are the minimum requirements for safe operations.

Equipment Opening Procedure

a) Assess the weather conditions, such as wind direction.

b) Assess the characteristics of the gas or vapor to be released.

c) Determine if there is fluid in the equipment that could continue to vapor off.

d) Don applicable PPE (e.g., SCBA/SABA if required for potential H_2S above 5 ppm in breathing zone) and apply any other applicable planned controls prior to breaking the equipment seal.

e) Check all sources to ensure pressure is blown down before breaking the equipment seal.

f) Consider leaving several bolts and/or nuts in place, but snug, when breaking the seal just in case there is still pressure present.

g) Position out of the line of fire; use proper body positioning to limit potential exposure.

h) If gas or vapor is expected to be released or is being released:

i. Leave the immediate area once the equipment seal is broke.

ii. Restrict entry to the release area; give the area time to clear of gas or vapor.

iii. Approach the release area from upwind with a LEL/ H_2S monitor.

i) Verify a safe atmosphere by thoroughly monitoring the area moving over, under, in between, and around the equipment at different levels.

j) Evacuate personnel from the work area if the monitor alarms.

k) Once a safe atmosphere has been verified, complete the opening of the equipment.

l) Continuously monitor the immediate work area for LEL/ H_2S while the equipment is open, evacuating personnel if necessary.

1. Contractors shall utilize the required PPE. See Section 6.34, Personal Protective Equipment.
2. The work must be conducted with continuous monitoring for flammable (LEL) and toxic atmospheres (especially H_2S) and oxygen deprived atmospheres.

3. At minimum, personal gas monitors must be worn by all participants in the work.
    a) In the event personal gas monitors are removed by Contractors under supplied air to prevent damage to H_2S sensor heads, another means to continuously monitoring for flammable atmospheres (LEL) must be used.

6.25.4. Safety Watch

- Is required for line breaking or equipment opening where there is a possibility of an atmosphere with more than 5 ppm of H_2S in the Contractors' breathing zone.
- Must participate in pre-job hazard assessment or tailgate meeting.
- Must be out of range of possible hazardous atmosphere but in constant line of site of Contractors.
- Must have SCBA/SABA donned but mask may remain off.

6.26. Journey Management

Suppliers shall ensure that where a Hazard Assessment determines the need for a journey management plan, the plan shall include:

- Contact information and travel schedule (identifying the route, timeline of travel and stops to be made)
- Emergency contacts and emergency response guidelines
- Communication frequency
- Weather and travel considerations
- Changes to travel plans
- If the Contractors journey is hindered by weather or other emergencies, the individual's top priority should be to move to a safe location, contact emergency personnel if necessary, then contact his or her supervisor as soon as reasonably possible
- In cases where a Contractor travels for extended periods of time as part of their regular job duties (extending the total workday beyond 12 hours), a travel management plan should be developed as part of the Supplier plan

6.27. Ladder Safety

Suppliers shall ensure that portable wooden ladders meet requirements from *OSHA 1910.23 Ladders*.

6.27.1. Portable Ladders

- Only CSA or ANSI approved ladders of commercial grade with visible/legible load ratings shall be used.
- All ladders must be maintained in a safe condition with special attention given to the following:

  - Joints between steps and side rails are tight.
  - Hardware and fittings must be securely attached.
  - Moveable parts must be free and operable.
  - Moveable bearings must be lubricated.
  - Frayed or worn rope replaced.
  - Safety feet must be operable.
  - Rungs and steps must be kept clean and free of defects.
- Safety feet and other auxiliary equipment shall be kept in good condition to insure proper performance.
- Portable ladders shall be properly stored when not in use.
- Short ladders shall not be spliced together to make long ladders.
- Do not use portable ladders to form a walkway between two platforms or surfaces.
- Ladders shall never be used in the horizontal position as scaffolds or work platforms.
- Single ladders longer than 9.1 m (30 ft.) shall not be used.
- Portable Metal ladders shall be labeled, “Non-electrical Work” and shall not be used in or around electrical equipment.
- Portable ladders need to be insulated or have non-conductive side rails or beams where there is a risk of electrical hazard.
- Portable stepladders longer than 6 m (20 ft.) shall not be used.
- Stepladders shall be equipped with a metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in an open position.
- Extension ladders longer than 18.3 m (60 ft.) shall not be used.
- On two-section extension ladders, the minimum overlap for the two sections in use is listed in the table below.

Table 16: Minimum Section Overlap on Two-section Extension Ladders

SIZE OF LADDER	OVERLAP M (FT)
Up to and including 10.9 m (36 ft.)	0.9 m (3 ft.)
Over 10.6 m (36 ft.) up to and including 14.6 m (48 ft.)	1.2 m (4 ft.)
Over 48 up to and including 18.2 m (60 ft.)	1.5 m (5 ft.)

- All wood parts of a ladder shall be free from sharp edges and splinters.
- Low density wood shall not be used in the site construction of ladders.
- Wood ladders are not permitted in hazardous / classified locations.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- If ladders tip over:
    - Inspect ladder for side rails dents or bends, or excessively dented rungs.
    - Check all rung-to-side-rail connections.
    - Check hardware connections.
    - Check rivets for shear.

Suppliers shall ensure that Contractors:

- Inspected ladders before use and if found defective shall be withdrawn from service for repair or destruction and tagged or marked as “Dangerous, Do Not Use.”
- Inspect ladders for the following items:
    - Loose or missing rungs or cleats.
    - Loose nails, bolts, or screws.
    - Cracked, broken, split, dented, or badly worn rungs, cleats, or side rails.
    - Splinters.
    - Corrosion of metal ladders or metal parts.

6.27.2. Ladder Use Guidelines

- Do not load ladders beyond their maximum intended loading limits.
- Ladders shall be placed with a secure and level footing, tied off, or held in position.
- Secure a straight ladder or extension ladder by tying the top portion to a fixed support.
- Secure locking ladder hooks before ascending or descending an extension ladder.
- Secure portable ladders at the base where a kick-out hazard exists.
- Step ladders are to be fully opened, spreaders locked and placed with level footing.
- Keep ladders clean and free of dirt, paint, oil, grease, or slippery materials. Wipe shoes of oil, grease, or mud before climbing a ladder to avoid slipping.
- Keep the trunk of the body between the rails of the ladder.
- The area around the top and bottom of ladders must be kept clear.
- Never move, walk, shift, or extend a ladder when it is occupied.
- Never use a step ladder as a straight ladder.
- Never use the top step or the top of the ladder as a step.
- Never use the back section cross bracing for steps on a step ladder.
- Never run hoses, extension cords, or ropes on a ladder.
- Face the ladder, use both hands while climbing and use three-point contact when ascending and descending.
- Keep your body near the middle of the rungs (body centerline stays between the side rails or beams).

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Climb ladders by grasping the rungs and not the side rails or beams.
- Keep both feet on the ladder rungs when stationary.
- Only one person is allowed on a ladder at one time and Contractors shall not walk underneath a ladder being ascended or descended.
- Do not use portable ladders in strong winds.
- The proper angle for setting up a ladder is to place its base a quarter of the working length of the ladder from the wall or other vertical surface (4:1 ratio).
- Ladders used to gain access to a roof, another work surface or other area shall extend at least 0.9 m (3 ft.) (generally three rungs) above the point of support or level accessed.
- Ladders shall not be placed in front of doors openings, unless the door is blocked upon, locked, or guarded.
- Barricade the area around ladders or position a Contractor in front of the ladder if it is placed in an aisle or other location where a person or an object could strike it.
- Ladders shall not be placed on boxes, barrels, or other bases to obtain additional height.
- The top of portable ladders must be placed so that the side-rails or beams are supported.
- Do not stand on rungs above a landing against-which a portable ladder is placed.
- Where practical, step ladders over 3 m (10 ft.) in length should have the top tied off. If not possible, someone must hold the base of the ladder.
- When working on a portable ladder above 1.8 m (6 ft.) the ladder must be held by a person when it is not secured.
- Use fall protection at heights above 1.8 m (6 ft.), unless:
    - the ladder is situated directly in front of the work and the Contractor does not need to lean to conduct the task (e.g., moving their body's centerline 'outside' of the side-rails or beams), or
    - you can maintain three-point contact, or
    - the work is considered light duty and short duration work.
- Place small tools in a tool bag and hoist with a rope to keep hands free for ascending and descending.
- Carry portable ladders below shoulder level.
- Ladders carried on vehicles shall be secured to prevent damage and falling off vehicle.

6.28. Lockout Tagout

6.28.1. Suppliers

Suppliers shall meet requirements established in *OSHA 29CFR 1910.147* and *Canadian Standard CSA Z460-13*.

Suppliers shall ensure that:

- Incorporate the Supplier's Lockout / Tagout program into the Company program.
- All Contractors involved in the Lockout Tagout job sign the permit.
- Lockout Tagout permit is completed prior to the start of the job.
- Suppliers will apply their own locks on equipment or a group lock box (depending on type of lockout) where they are an Authorized Contractor.
- All Affected Personnel shall be notified when a Lockout / Tagout is applied and removed from their work area.
- Suppliers shall be trained on the Suppliers lockout requirements that must comply with Occupational H&S legislation as well as the Company Lockout / Tagout program.

Suppliers shall ensure that Contractors:

- Follow the direction of the Authorized Contractor as it affects the operation of the equipment being locked and tagged.
- Remove personal lock(s) when task is complete or prior to leaving site (whichever comes first).
- Follow the direction of the PIC as it relates to the LOTO activities.
- Stop and/or correct work if LOTO procedures are not being followed.
- Personal lock is placed on the isolation points or lock box prior to working on any equipment.

6.29. Machinery and Equipment Guarding

6.29.1. Suppliers

Suppliers shall ensure that:

- Equipment has proper machine guarding.
- Guards shall be constructed from expanded metal, perforated or solid sheet metal, wire mesh on a frame or angle iron on sheet or iron pipe securely fastened to the floor or to the frame of the machine.
- Guards shall be constructed of a strength to support the weight of a Contractor if in a place that requires the Contractor to step on the guard or push against it.
- Toe boards shall be used where guardrails are provided around openings on equipment that is exposed to falling hazards.
- One or more methods of guarding (examples: barrier guards, two-hand tripping devices, electronic safety devices, etc.) shall be provided to protect the Operator and other Contractors in the machine area from hazards such as those created by point of operation, in-going nip points, rotating parts, flying chips and sparks.
- Guards shall be affixed to the machine where possible and secured elsewhere if, for any reason, attachment to the machine is not possible.
- The guard shall be such that it does not become an accident hazard itself.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Guarding devices shall be designed and constructed to prevent the Operator from having any part of his or her body in the danger zone during the operating cycle.
- Removal, alteration or defeating of guards on machinery or equipment is prohibited except for inspection, repair, or replacement purposes.
- Machinery or power tools that are not equipped with proper guards should not be operated. Guards and protection shall:
    - meet manufacturer's specifications and Applicable Legislation
    - be in good working order and inspected regularly
    - not be modified or removed
    - be replaced if damaged
    - be the correct size
    - be secure, and tamper-proof
    - prevent falling objects
    - allow for safe maintenance and inspection
    - create no new Hazards or interference
- Provide a method to protect Contractors from Hazards created by point of operation, ingoing nip points and rotating parts.
- When the periphery of the fan blades is less than 2.13 m (7 ft.) above the floor or working level, the blades shall be guarded. The guard shall have openings no larger than 1.25 cm (½ in).
- Machines designed for a fixed location shall be securely anchored to prevent moving. Examples are drill presses, pedestal grinders, lathes, milling machines, etc.

Suppliers shall ensure that Contractors.

Grinding and Buffing Wheels

- Perform ring test on grinding and buffing wheels.
- Adjust the tool rest, if necessary, so it is within 0.3 cm (⅛-in) of the wheel; make no adjustment while the wheel is in motion. Also, adjust the tongue guard so it is within 0.6 cm (¼-in) of the wheel.
- The safety shield must always be kept in place and be clean.
- Hand protection shall be used when grinding stock that could cause injury to hands.
- Respiratory protection should be worn when grinding items that produce dust or fumes.
- Ensure the face of the wheel is properly dressed and the guard is in place.
- When it is necessary to change a wheel, inspect the new wheel for cracks or other imperfections to make sure it has not been damaged.
- Unplug power to the grinder and place power cord in view before replacing the used grinding wheel.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- A safety washer must always be installed between the grinding wheel and the securing flange. The protective shield shall always be replaced after changing the wheel.
- After a new grinding wheel has been installed, stand to the side, and conduct a test run of one minute.
- Always wear safety glasses with side shields or goggles and a face shield when operating a grinder or buffer.
- Hold the work in such a manner that hands will not be injured in case of slippage.
- Apply the work gradually so abrupt contact with the grinding wheel can be avoided.
- Do not operate the wheel at a speed more than its design speed.
- Do not use the side of a wheel for grinding unless it was designed for that purpose.
- Make sure the composition or type of grinding wheel is compatible with the material being worked on.
- Defective grinders should be reported to the Supervisor, and an appropriate “Do Not Operate” tag should be installed until the defect is corrected.

6.29.2. Woodworking Machinery Requirements:

- Each machine shall be constructed to be free from sensible vibration when the largest size tool is mounted and runs idle at full speed.
- All belts, pulleys, gears, shafts and moving parts shall be guarded in accordance with specific requirements, which are detailed in a later portion of this section entitled Mechanical Power Transmission Apparatus.
- Each hand-fed planer and jointer with a horizontal head shall be equipped with a cylindrical cutting head, the knife projection of which shall not exceed 0.3 cm (⅛ in) beyond the cylindrical body of the head.
- Each hand-fed jointer shall have an automatic guard that will cover the sections of the head on the working side of the fence or gauge.
- Each saw shall be provided with a guard that will protect the Operator from flying splinters, broken saw teeth, and sawdust.
- Each saw shall be provided with non-kickback fingers or dogs and spreaders.
- All portions of the band saw blade shall be enclosed or guarded except for the working portion of the blade.
- All saws, knives and cutting heads shall be kept sharp.
- Push sticks or push blocks shall be provided at the workplace.
- Frames and all exposed non-current carrying metal parts of portable electric wood-working machinery operating at more than 90 volts to the ground shall be grounded.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Electric power-operated hand tools shall be of the approved double insulated type or grounded using a separate ground wire and polarized plug whenever there is more than 90 volts to the ground.

6.29.3. Machine Control and Equipment:

- A mechanical or electrical power control shall be provided on each machine to make it possible for the Operator to cut off the power without leaving his/her position at the point of operation.
- On each machine operated by electric motor, positive means shall be provided for rendering such controls or devices inoperative while repairs or adjustments are being made to the machines they control.
- Permanently wired woodworking machinery shall be equipped with a disconnect switch that can be locked in the off position.

6.29.4. Mechanical Power Transmission Apparatus:

- Power transmission equipment shall be regularly inspected and shall be kept in good working condition.
- Rotating shafts shall be kept in alignment.
- Hangers shall be inspected to make sure supporting bolts and screws are tight.
- Pulleys shall be inspected for loose bolts or nuts.
- Belts and fasteners shall be inspected and kept in good repair.
- Lubrication shall be performed per manufacturer's recommendations.
- Flywheels shall be enclosed with sheet, perforated, or expanded metal, or mesh wire on a metal frame.
- Flywheels protruding through a floor shall have a guardrail placed not less than 38 cm (15 in) or more than 51 cm (20 in) from the rim. Standard toe boards shall be provided.
- Guard exposed pulleys, belts and friction drives, gears, sprockets, and chain drives.
- *Hand operated gears such as hand operated winches do not require guards.*
- Keys, set screws and other projections in revolving parts, must be removed, made flush, or guarded with metal covers.
- Revolving collars shall be cylindrical.
- Screws or bolts used in collars and couplings shall not extend beyond the largest diameter of the collar or beyond the flange of the coupling unless covered with a metal sleeve.
- Exposed parts 2.13 m (7 ft.) or less from the floor or working platform, except runways used exclusively for oiling or running adjustments, shall be protected by a stationary casing that encloses shafting completely or by a trough that encloses sides and top or sides and bottom of shafting as location requires.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.30. Manual Handling of Materials and Back Safety

6.30.1. Suppliers

Suppliers shall ensure that:

- Storage of materials shall not create a hazard.
- Bags, containers, bundles, etc., stored in tiers shall be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapsing.
- Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles at loading docks, through doorways and wherever turns or passage must be made.
- Aisles and passageways shall be kept clear and in good repair with no obstruction across or in aisles that could create a hazard.
- Permanent aisles and passageways shall be appropriately marked.
- Bagged materials stored in tiers are to be stepped back and cross-keyed at least every 10 bags high.
- Non-compatible materials are to be segregated in storage.
- Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage.
- Vegetation control will be exercised when necessary.
- Proper drainage of work and storage area shall be provided.
- Clearance limits and warning signs shall be provided.
- Covers and/or guardrails shall be provided to protect personnel from open pits, tanks, vats, ditches, etc.
- Maximum safe load limits of floors (except floors or slab on grade) shall be conspicuously posted and not exceeded.
- Standard guardrails including top rail, mid rail and a toe guard should be installed to prevent stored materials from falling when applicable.
- Ramps, blocking or grading should be used to ensure safe movement of vehicles between different levels.
- Used lumber shall have all nails withdrawn and stacked to prevent falling.
- Piles of lumber that are worked manually are not to exceed 5 m (16 ft.) in height.
- Structural steel, poles, pipe, bar stock and other cylindrical materials, unless racked, shall be stacked, and blocked to prevent spreading or tilting.
- Since the weight, size, shape, toxicity or other characteristic of materials, goods or things, the manual handling of materials, goods or things may be hazardous to the health or safety of a Contractor, the Supplier shall issue instructions that the materials, goods or things shall, where reasonably practicable, not be handled manually. This guideline applies to all field operations.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

Suppliers shall ensure that Contractors:

- Contractors involved in materials handling will use the appropriate PPE. Gloves or other hand protectors, aprons, eye/face protection should be worn to prevent hand, body, and face injuries especially when handling material with sharp edges, wooden material, or corrosives.
- If a load is too heavy for one Contractor to lift, get help or use mechanical lifting equipment.
- Are discouraged to manually lift or carry loads weighing in excess of 99 lbs. (45 kg) or weights they are not comfortable lifting by themselves. Where possible utilize a dolly, cart, pallet jack or similar. Where feasible, lifting aids (lift tables, mechanical or powered assists, hoists, etc.) should be used to move heavy or bulky loads.
- Where a Contractor is required to manually lift or carry loads in excess of 99 lbs. (45 kg), a field level hazard assessment must be completed prior to task commencement.
- Canada, where a Contractor is required manually to lift or carry loads weighing more than 99 lbs. (45 kg), the Supplier shall give instructions to the Contractor that are
    - set out in writing
    - readily available to the Contractor
    - kept by the Contractor for a period of two years after they cease to apply

6.31. Marine and Offshore Operations Safety

6.31.1. Suppliers

Suppliers shall ensure that:

- Contractors who are involved in offshore marine operations receive the required Marine Survival training.
- Contractors may be required to attend training classes on specific customer platform or rig safety requirements prior to being transported to the customer's location.
- All Contractors who are reasonably expected to use a swing rope shall pass a swing rope test prior to being allowed to do so, and every four (4) years thereafter.
- All necessary equipment is provided for Contractors required to work in the offshore marine operations.
- PFDs (life preservers, life jackets, or work vests) worn by each Affected Contractor must be United States Coast Guard (USCG) approved pursuant to *46 CFR* part 160 (Type I, II, III, or V PFD) and marked for use as a work vest, for commercial use, or for use on vessels.
- Personal flotation devices shall be maintained in safe condition and shall be considered unserviceable when damaged in a manner that affects buoyancy or fastening capability.
- Annual inspection of Supplier owned Swing Rope shall be documented.

Suppliers shall ensure that Contractors:

- Participate in offshore marine work activities only after receiving the proper required training.

- Follow offshore marine procedures for wearing the proper PPE, boarding crew boats and platforms and working on the platforms.
- Follow all instructions of the Captain of any vessel used for transporting to offshore facilities.
- Proper slip resistant safety shoes are always required.
- All Contractors assigned to marine operations will wear a PFD (Personal Flotation Device) when being transferred between vessels, on outside decks of LNGs and on any platform dock or barge that has unguarded sides next to the water.
- Participate in all emergency drills at the discretion of any ship's Captain or platform manager.
- Vessels, docks, barges, and platforms are classified areas and restrict the use of open flames, flashlights, cameras, cell phones or any spark producing items. Smoking may be permitted in designated areas only.
- Check clothing requirements including inclement weather gear.
- Ensure electrical equipment will work on the electrical services provided on the ship or platform.
- Traveling to a vessel, upon arrival, inform the Captain they are taking a medication.
- Recommended Rope Specifications:
    - 3-Strand 1.9 cm (¾ in) Poly Dacron or Nylon rope with 5 knots standard, spaced 0.6 m (2 ft.) apart. Wrapped with 1.3 cm (½ in) synthetic rope between knots and dipped in polyurethane. Follow manufacturer's Rope Usage and Care guidelines.
    - Minimum load strength/capacity of the rope shall be 3 times the largest person or cargo to be transferred.
    - Rope Inspections. The rope shall be visually inspected by each individual prior to use.

Visually inspect the rope for:

- Pull or tug on the rope to test the connections for strength.
- Observe the rope for visible cuts, fraying, or unravelling.
- Observe any metal connections or hardware for rust.
- Observe any oil, mud, paint, or chemical coatings that may be on the rope.
- Check for degradation (brittleness) such as from UV damage (sun) or chemical exposure.
- Check for pad eye and other associated linkage for cracks, physical damage from impacts, and attachments.
- Test the strength of the rope by applying body weight over secured area before initiating the swing transfer.

6.31.2. Conducting a Transfer

- Personnel Basket transfers over water are hazardous; therefore, these transfers are to be used only when the Captain of the vessel has approved them. The following procedures shall be followed when using this form of personnel transfer:

  - Do not exceed the rated capacity of the transfer basket.
  - Wear a PFD.
  - Secure hard hat and glasses.
  - Hold on to the basket ropes or rigging with both hands facing inward.
  - Store all small loose items in the center of the basket. Large items are to be transferred by a cargo net.
  - Step off the basket only when it has completely landed.
- A JSA shall be completed and reviewed with all personnel prior to commencing swing rope transfer activities. Only one JSA is required to be completed and reviewed per swing rope transfer event. If anyone deems the transfer to be unsafe, the Captain is expected to abandon the transfer. Contractors are also authorized to use their Stop Work Authority (SWA) if they perceive conditions that are unsafe, or they object to the activity based upon a lack of understanding of these procedures. There will be no repercussion to the person(s) who stops the transfer exercising their SWA.
- All personnel will conduct a risk assessment and evaluate the hazards to determine if it is safe to proceed with the personnel transfer during adverse weather conditions such as high/choppy seas, high winds or water temperatures below 12.7°C (55°F).
  - Input from the Captain of the vessel should be requested as part of the risk assessment.
- Transfers shall be conducted with another person to observe/assist the transfer. They will be responsible for:
  - Assuring that the boat is in the proper position before swinging. The Captain/crew must maintain the engine to keep the boat an acceptable distance from the platform during the transfer.
- A deck hand must also be present to assist the person being transferred.
  - Issues the “Man Overboard” and keeps a visual location of any person who falls into the water.
- Rescue operations. If someone falls into the water during a transfer, rescue operations will immediately commence.
  - A life ring shall be available for rescue operations as required.
  - Accompanying personnel shall sound out the “Man Overboard” call.
  - Designated person shall continue a visual location of the downed person.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.32. Material Handling and Storage

6.32.1. Suppliers

Suppliers shall ensure that:

- During the storage and handling of materials, all materials are safety and properly stored on Company property, by utilizing proper storage techniques, distances, and conditions of order are maintained,
- Advanced planning for material handling and layout shall include the size, shape, type, and weight of the various materials.
- The storage of materials shall be segregated as to kind, size, length and then placed in neat, orderly stacks that are secured from collapse or movement.
- All materials, goods or things shall be stored and placed in such a manner that Contractors are not required manually to lift materials, goods or things in a manner that would lead to overextension of or excessive strain on the body.
- Products delivered in tanks, drums or cylinders shall be stored in a safe manner protecting the identification labels and following any special storage requires for the individual products.
- For storage and dispensing of flammable liquids, see Section 6.16 Flammable & Combustible Materials.
- All containers used for dispensing flammables shall be grounded and bonding shall be used when transferring flammables from one container to another.
- For Compressed Gas Cylinder storage, see Section 6.8 Compressed Gas Cylinders.
- Access to walkways, aisles, and emergency equipment should be kept clear of stored material.
- When unusual material handling operations are planned, special safety considerations should be developed and reviewed by the crew assigned the job.
- The proper equipment is utilized to handle the storage of bulk materials.
- Only trained and if required licensed Contractors will operate the material handling equipment.
    - All equipment operators shall be properly trained and certified/ licensed for the various types of handling equipment.
- All shelves will display their load rating or have ready the manufacturers load rating guide for the shelving.
- If the stacks of material are deemed high, they shall be stepped back as the height increases.
- For Hand Trucks, see Section 6.19 Hand and Portable Power Tools.
- All materials, goods and things shall be stored in the workplace in such a manner that the maximum safe load carrying capacity of the floor or other supporting structures is not exceeded.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.32.2. Pipe Storage

- Pipe shall be stored on specially designed dirt and sand sills or racks.
- Load ratings must be visible on pipe storage racks.
- All pipes containing asbestos pipe wrap material must be stored on plastic sheeting in order to protect the environment.
- All pipes shall be safely blocked, if the dirt sill or storage rack cannot prevent the individual pipes or pipe stack from moving.

6.32.3. Manual Drum Handling

- Determine the weight of the contents.
- Use a drum lifter to lift or lower a drum from an upright position and use team lifting when a drum lift is not available.
- Use a drum dolly to move an individual filled drum.
- To roll an empty drum, grasp the chime with both hands.
- Lean the drum slightly inward and roll slowly on bottom chime, rotating hands as the drum rolls.
- Return the drum to an upright position to change direction and with the drum facing in the new direction, reposition hands and begin roll procedure.

6.33. Mechanical Heavy Equipment Safety

6.33.1. Suppliers

Suppliers shall ensure that:

- The selection of heavy equipment shall be made according to the scope of work being completed.
- All mobile equipment used on Company sites shall be constructed and maintained to manufacturer specifications. Ensure all Suppliers owned, leased, operated heavy equipment is inspected before use and maintained in a safe condition.
- At a minimum, all heavy equipment shall be equipped with:
    - An audible back-up alarm and a manually operated horn
        - The horn must be distinguishable from the surrounding noise level
        - Operate the horn as needed when the vehicle is moving in either direction
        - Keep the horn in operative condition
    - Adequate front and rear light
    - Adequate braking system for tasks being performed
    - A screen, shield, grill, deflector, guard, or other adequate protection for the Operator where the Operator may be exposed to the hazard of a flying or intruding object.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Equipment shall have seat belts for the Operator when seated in the normal seating arrangement.
- Heavy equipment shall be provided with ROPS.
- Operators shall be qualified based on experience and training received to operate the equipment they are using. Only trained and qualified Contractors may operate mechanized heavy equipment. Heavy equipment operators are trained in the safe operation of their equipment based on type and manufacturer.
- An exclusion zone shall be established around all mechanized equipment. This includes control of swing zones and any area over which a suspended load could travel.
- No person shall enter the exclusion zone without permission from the Operator and/or Spotter.
- The Operator shall never exceed what the heavy equipment is capable of performing according to manufacturer limitations and safety factors. Do not exceed the maximum lifting capacity of the equipment that is displayed on the mechanized equipment.
- Operators must complete daily inspections of equipment and be prepared to present this upon inspection.
- Operators shall complete pre-job hazard analysis (JSA) prior to any work. This shall include, but is not limited to review of excavation hazards, material handling, access and egress to the equipment, electrical hazards, proper rigging of loads, and load limitations.
- Do not start the equipment or operate the controls from any position other than the driver's seat. No one except the Operator may ride in or on the mechanized heavy equipment.
- Operators shall ensure that equipment is properly disengaged and configured when leaving the equipment – even for short periods of time.
- Before leaving the Operator's seat, lower the boom to a safe position with the bucket on the ground, and turn off the equipment.
- Maintain general site housekeeping to facilitate safe equipment operation.
- Spotter shall be used whenever appropriate to ensure that inadvertent contact is not made with any person or other piece of equipment.
- Do not operate earthmoving or compacting equipment with an obstructed rear view in reverse unless: The equipment has a reverse signal alarm distinguishable from the surrounding noise level; or a Spotter signals that it is safe to do so.
- Verify the location of underground utility lines by using the "One Call System" before starting any excavation or underground boring activities.
- Contractors take into consideration marked and unmarked terrain hazards which could inhibit the safe operation of mechanized equipment.
- After completing excavation or trenching activities, ensure that spoil piles are correctly placed, stable, and that booms, buckets, loaders, blades, etc. are in the correct stable position.
- Shut down the engine when filling the fuel tank. When filling the fuel tank on the mowers, rest the fuel can on the tank or metal funnel to eliminate static electricity.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- When mobile lifting equipment or excavation equipment is used near energized overhead power lines or stationary electrical equipment at least 3 of 5 layers of safety controls will be used.

Suppliers shall ensure that Contractors:

- Inspect all mechanized heavy equipment prior to each use.
- Operate mechanized equipment in a safe manner at all times.
- Operate equipment only after receiving training and demonstrating a complete understanding of the safe work practices to be followed while operating equipment.
- All Contractors in the general area shall wear High Visibility Safety Apparel (HVSA) in accordance with the PPE section.
- Remove all keys when the machine is unattended and not in use.
- Wear required PPE.
- Seat belts must always be used.
- Assure that site conditions (e.g., grades, weather, and electrical lines and other physical obstructions) are conducive to safe equipment operation prior to equipment use.
- Before moving a load, verify that:
    - Cables, chains, slings, and other attachments are properly applied and secured, and safety latches are functional on all hooks.
    - Load is properly balanced and free from entanglement.
    - No one is in danger of injury from movement of the load or line.
- Do not allow anyone to work or stand underneath loads suspended from lifting or digging equipment.
- Allow only one Contractor to give signals to the equipment Operator. The Operator must obey a “stop” signal given by anyone.
- All personnel approaching operating equipment must establish eye contact with the equipment Operator and have the Operator acknowledge that they indeed see them.
    - This practice shall be exercised from a safe distance of at least 6 m (20 ft.) away from the equipment.

6.33.2. Excavators / Track Hoes

- Support and protect any exposed underground installations while the excavation is open or remove them as necessary to protect personnel.
- When mechanized equipment must operate near an excavation and the Operator does not have a clear, direct view of the edge of the excavation, place barricades or stop logs around the perimeter of the excavation or use a Spotter and hand signals to assist the Operator.
- To avoid cave-ins:
    - Position excavator at a safe distance from the edge of an excavation or trench.
    - Take special precautions if an excavation or trench is accumulating water.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Place removed material far enough from the excavation or trench to prevent overstressing the trench walls and to maintain a clear work path – refer to Table 11: Minimum Distance for Materials from Edge of Excavation.

6.33.3. Bulldozers

- Bulldozers with a winch will be equipped with a protective guard over and at the rear of the Operator. The guard must be constructed of at least 0.3 cm (⅛-in) steel plate or at least 0.6 cm (¼-in) woven wire mesh with openings no larger than 2.5 cm (1 in).
- Block or completely lower the bulldozer blade when the bulldozer is not in use.
- Substantial cribbing is in place before working on or under a raised blade. The height of the cribbing must not exceed the width of its base.
- All persons are in the clear before moving the machine. Do not operate the machine on a ROW until all Contractors are in the clear.
- Stop the engine and shut down equipment before making repairs or greasing the machine.

6.33.4. Backhoes

- Before using the loader, be sure the backhoe is in the transport lock position.
- Do not use the bucket as a work platform or personnel carrier.
- Carry the backhoe bucket low to avoid obstructed vision and to maintain maximum stability while traveling.
- Do not operate equipment if anyone is within the backhoe swing pivot area.
- Drive straight up and down the slope.
- Avoid turning on a slope if possible.
- If necessary, make a wide, slow turn on the slope and carry the bucket low.
- Driving across a steep slope is prohibited.
- Swing the bucket to the uphill side to drop the spoil, if possible, when operating on a slope.

6.33.5. Loading / Unloading Equipment

- Always follow the procedures recommended by the manufacturer to load equipment.
- Truck and trailers are of adequate size and weight capacity for the piece of equipment to be hauled.
- Trailer is parked on level stable ground.
- Do not park the truck, trailer, or lowboy under power lines for loading / unloading.
- Brakes are set on the transport and the wheels are chocked.
- Use a Spotter do not load or unload equipment on a truck, trailer, or lowboy alone.
- Once equipment has been loaded it must be properly secured using a minimum of four tie downs.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- All accessory equipment such as booms, blades, buckets, bush hogs, etc. must be completely lowered and secured.

6.34. Personal Protective Equipment (PPE)

6.34.1. Suppliers

Suppliers shall ensure that:

- Review applicable and most recent location-specific PPE Hazard Assessments when conducting Pre-job Safety Meetings.
- Provide Contractors with required PPE and the appropriate training to perform duties in compliance with this section.
- Contractors and Visitors wear the proper PPE.
- PPE requirements are reviewed with visitors to the site.
- Each project shall conduct an initial PPE Hazard Assessment using a PPE hazard assessment form to determine if current or potential hazards are present which require using PPE.
- Additional hazard assessments will be performed at all worksites to determine if hazards are present or are likely to be present which necessitates the use of additional task specific PPE.
    - If such hazards are identified, Affected Contractors must have and use the type of PPE that will protect them from the hazards identified.
- Contractors shall be aware of all additional PPE requirements and observe sign postings when hazards are present.
- When PPE is specified for certain work assignments or locations, its use is mandatory.
- Records of PPE hazard assessment and reassessments are required to be kept for the life of the project.

Suppliers shall ensure that Contractors:

- Maintain PPE in a sanitary and reliable condition.
- Store PPE in a manner that protects against dust, sunlight, heat, extreme cold, excessive moisture, chemicals exposure and physical damage.
- Wear Supplier provided PPE when potentially exposed to workplace hazards and when required by this section.
- Inspect their PPE routinely; if equipment is found to be defective it shall be removed immediately.
- Report PPE malfunctions to Supervisors or another appropriate person.
- Visiting facilities belonging to another Company will adhere to the PPE requirements in force at that facility.
- Demonstrate an understanding of the following:

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Selecting the appropriate PPE to control identified hazards.
- When to use PPE.
- Limitations of various types of PPE.
- How to don, doff, adjust, and wear the PPE.
- Proper care, maintenance, and useful life of PPE.

- Contractors shall be re-trained when:
  - Changes in the workplace render previous training obsolete.
  - Changes are made to the Contractor's job requiring new PPE.
  - Changes in the types or manufacturer of the PPE.

6.34.2. Hard Hats

- Hard hats must meet *CSA Z94.1* or *ANSI Z89.1:*
  - Class G for general use. (Proof tested to 2000 volts); operating plants and pipelines
  - Class E for electrical trades involved in high voltage work. (Proof tested at 20,000 volts.)
  - Class E Type 2 (Side Impact Model) (*CSA Z94.1-2005* or *ANSI Z89.1-2009*) for Suppliers working on Projects worksites; new pipeline and plant construction or those Contractors exposed to risk of a side impact hazard
  - Winter liners should be flame resistant
- Each hard hat must be marked with the information specified by *ANSI Z89.1* for that type of protector and for the hazard involved.
- Always wear an approved, industrial hard hat while on Company property, such as in gas processing plants, gas treating stations, compressor stations, on offshore platforms, on pipeline ROWs, and at other pipeline facilities such as meter stations, pig launchers and receivers, tank batteries, etc.
- Never alter or modify the shell or suspension of the hard hat (drill holes in, paint, etc.).
- Hard hats shall be worn properly – as the manufacturer intended (e.g., not turned backwards unless manufacturer has designed hard hat to be worn this way).
- Regularly inspect hard hats and replace at the first sign of. Color fading, breakage, cracks, crazing, discoloration, flaking, delamination, chalky appearance, stiffness/brittleness.
- Follow the maximum recommended replacement schedule by the manufacturer (replace sooner if hard hat condition dictates).
- Hard Hat Exemptions:
  - Hard hats do not need to be worn when sheltered in a motor vehicle, helicopter, cabin of a boat, equipment with enclosed cabs, buildings, or break areas (unless otherwise posted or if exposed to head contact hazards).

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Hard hats are optional for Contractors actively engaged in welding or when wearing an SCBA when the site Hazard Assessment indicates that overhead and falling object hazards are controlled or not present.
- A hard hat exemption may be granted for specific tasks based on the hazard assessment for that task and approved by the Company Project Manager. With this exemption, hard hats must still be worn when reasonably practical.

6.34.3. Helmets

- Motorcycle helmets shall be worn while operating all-terrain vehicles (ATVs), utility terrain vehicles (UTVs) and Snowmobiles.
  - Hard hats may be worn while riding on UTVs (equipped with ROPS and seat belts):
    - within fenced facilities or
    - outside fenced facilities while on level, improved roadways
  - Helmets are required while riding on UTVs in all other conditions
- Contractors required to enter work areas or perform work activities where they are exposed to head contact hazards must remove helmets and wear approved hard hats, unless actively operating an all-terrain vehicle.
  - Motorcycle helmets are not approved industrial head protection and are not acceptable as substitute protection.

6.34.4. Eye and Face Protection

- Eye and face protection must meet either *ANSI Z87.1* (US) or the *CSA Z94.3* (Canada) standard.
- Contractors will wear safety glasses while performing work in a plant, compressor station, pipeline facility or ROW location, shop and on a platform.
- All Contractors must meet the Minimum Requirements for Eye and Face Protection when carrying out the listed activities that present eye and face hazards.
- Contractors are not required to wear safety glasses while sheltered in the office or break area, warehouse (unless a hazard assessment identifies a risk of eye injury), living quarters or a motor vehicle.
- Safety glasses with side shields or goggles will be worn when working with compressed air. A face shield is also recommended.
- Safety glasses with side shields or goggles will be worn when operating air tools. Depending on the work being performed, a face shield may also need to be worn (e.g., chipping, grinding, and brushing).

Table 17: Minimum Requirements – Eye and Face Protection

ACTIVITY	EYE AND FACE PROTECTION REQUIRED
Abrasive blasting	• Blasting hood
Chipping, hammering metal, sledge hammering, jack hammering, using	• Safety glasses with side shields, or • Impact goggles

ACTIVITY	EYE AND FACE PROTECTION REQUIRED
compressed air, operating gas, electric or hand saws, concrete work	• Face shield as needed
High-voltage work	• Face shield[1] (switching hood recommended over 5 KV), and • Safety glasses with side shields
Low-voltage work	• Safety glasses with side shields
Removing asbestos materials	• Face shield and safety glasses with side shields, or • Goggles or • Full face respirator
Handling liquid hazardous substances (e.g., toluene, NGL, wet cell batteries)	• Chemical splash goggles, and any additional protective equipment indicated on container labels or SDSs • Face shield when handling large quantities, exposed to liquid spray, or transferring liquids
Mowing	• Safety glasses with side shields
Operating chainsaws, using weed trimmers	• Face shield or safety glasses with side shields, or • Impact goggles • Mesh face shields are recommended when operating chainsaws
Arc Welding	• Welder ○ Welding helmet and safety glasses with side shields, or ○ Welding mono-frame goggle. ○ As per *OSHA 1910.252*, shaded lenses must be shade 10-14 based on type of welding, shade 4 – 8 for gas welding • Helper ○ Same as above, or ○ Face shield along with shaded[2] safety glasses with side shields, or ○ Face shield and shaded[2] welder/cutter goggles.
Oxy-acetylene welding, brazing, or soldering or cutting,	• Welder ○ Welding helmet and safety glasses with side shields, or ○ Face shield and shaded[2] safety glasses with side shields, or ○ Shaded[2] mono-frame welder/cutter goggles. • Helper—same as Welder

ACTIVITY	EYE AND FACE PROTECTION REQUIRED
Wire brushing, buffing, grinding (electric and pneumatic), cut-off saws and concrete saws	Standard: *CSA Z94.3 (Canada) / Hi-Impact Z87 (US)* • In the US, Face Shields and • Safety glasses with side shields
Working in windy conditions	• Protection as required

***NOTES**: Face shield should have dielectric properties and ultraviolet protection. Minimum shade of three (3).*

6.34.5. Prescription Safety Glasses

- Where there is a danger of impact, safety glasses must have polycarbonate lens.
    - Contact lenses do not provide eye protection in the industrial sense and must be worn only with approved safety eyewear. Furthermore, contact lens use should be restricted in the presence of fumes, vapors, splashes, intense heat, or highly particulate atmosphere(s).
    - Contact lenses are permitted if:
        - Appropriate eye protection is worn.
        - Contractors inform their Supervisors so that proper care may be administered in an emergency. Polycarbonate, plastic, and glass lenses must be marked in accordance with *ANSI Z-87.1, Industrial Eye and Face Protectors.*

6.34.6. Hearing Protection – Requirements

- Hearing protection devices with a minimum Noise Reduction Rating (NRR) of 25 dBA shall be furnished by the Supplier and must always be properly worn within areas posted as “hearing protection required” areas, and in areas where sound levels exceed 85 dBA. Examples include but are not limited to:
    - Operating jack hammers
    - Lawn mowers
    - Lawn trimmers
    - Other high noise level equipment.
- Dual hearing protections (ear plugs and earmuffs) must be worn in areas where sound levels exceed 100 dBA. Examples include but are not limited to:
    - Working in compressor rooms
    - Operating air compressors.

6.34.7. Hand Protection – Requirements

- The Supplier provides the appropriate type of hand protection for all work activities.
- Supplier shall follow Hand Protection Specifications or other Company policies on hand protection.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Supervisors will arrange for the appropriate hand protection.
- All Contractors must meet the minimum requirements for hand protection when carrying out the listed activities that present a hazard to the hands (see table below).

Table 18: Minimum Requirements for Hand Protection

ACTIVITY	HAND PROTECTION REQUIRED
High-voltage work	• *ANSI/ASTM*-approved rubber gloves of appropriate voltage rating worn under leather gauntlet gloves[1]
Low-voltage work	• *ANSI/ASTM*-approved rubber gloves of 1000 volt rating worn under protective leather gauntlet gloves[2]
Handling acids or caustics (including acid batteries)	• Neoprene or nitrile gloves
Handling NGL (risk of spray)	• Neoprene gloves and protective sleeves
Handling pipe, valves, and casing, and measuring equipment where exposed to induced voltage	• *ANSI/ASTM*-approved low voltage lineman's rubber gloves and protective leather gauntlets
Handling toluene	• Nitrile gloves
Vibrating/high impact equipment	• Vibration-dampening gloves
Washing and cleaning using detergents.	• Rubber gloves
Welding and associated activities	• Leather gauntlet-type gloves

***NOTES**: Rubber gloves must be at least 450 mm (18 in) long and extend 25 mm (1 in) past the leather gauntlet for every 10,000 V. Gloves may not be necessary if insulated hand tools rated at 1000 V are used. The leather gauntlet gloves may be removed if finger dexterity is required and the rubber gloves are not subject to damage.*

- *Wear appropriate hand protection when there is potential exposure to induced high voltage, including when handling pipe, valves, casing or measuring equipment.*

6.34.8. Foot Protection – Requirements

- Safety footwear must comply with the following standards:
  - *CSA Z195-02*
    - Grade 1 protective toe cap to provide protection against impact to the toes.
    - Protective sole plate to protect against penetration of sharp objects into the bottom of the foot.
    - Oil and acid resistant soles.
    - Protective footwear provides ankle support.
    - Non-slip where there is a hazard of slipping.
- Each pair of footwear must be marked with the information specified by the above-mentioned standards for each specific type of footwear.
- Athletic looking shoes, including those meeting either *ASTM F2413* (US) or *CSA Z195-02* (Canada) standards, are not allowed at a Company worksite.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Always wear approved, safety toed (steel or non-metallic) work footwear while in a plant, compressor station, pipeline facility and on a platform.
- Canvas or synthetic fiber cloth shoes are prohibited footwear for Contractors working in non-office environments and are not allowed.
- Safety toed; work footwear does not need to be worn when sheltered in:
    - Control rooms, lunchrooms, living quarters, offices
    - Motor vehicle, boat, helicopter
- Consider the work environment and the potential for foot or ankle injury when choosing a type and style of safety footwear.
- The work environment shall determine the choice of:
    - Shoes or boots (ankle support, hot or cold environment),
    - Sole, e.g., puncture resistant, nonskid, stitched vs. vulcanized, cold resistant, electric shock-resistant, chemical resistant.
    - Fastenings (e.g., laced versus unlaced, closed top versus open top),
    - Accessories (e.g., metatarsal plate).
- Protective footwear should be replaced if:
    - Soles are worn so that the slip resistance of the footwear has been drastically reduced.
    - Soles are cracked, leather is cut, or toe caps are exposed as this damage reduced the protective qualities of the footwear.
- Contractors and visitors on a supervised or controlled tour of a facility, or whose occasional visits are of an administrative nature may be exempt from the requirement for safety footwear, but only if they do not have the potential to be exposed to any hazard.
- During protective footwear purchases, Contractors should consider other H&S risk as identified from the project specific PPE Hazard Assessment. The identified risk can be mitigated by other available protective footwear features designed into. These features include, but are not limited to:
    - Electrical hazards (EH)
    - Slip resistant (SR)
    - Non-metallic toe cap (NU)
    - Puncture resistant (PR)
    - Waterproof
    - Metatarsal guard (MG)
    - Firm ankle support (6-in /15 cm shoe top)
    - 1.3 cm (½-in) heels

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Project-specific PPE Hazard Assessment may require special footwear for unusual jobs. In these special cases the footwear will be provided by the Supplier. These unusual jobs and/ or activities may include, but not limited to:
    - Rubber knee or hip length boots
    - Rubber pull over booties for electrical hazards
    - Special weather conditions (cold weather and ice)
    - Chemical resistant boot covers

6.34.9. High Visibility Safety Apparel (HVSA) Requirements

- All HVSA worn shall meet the performance requirements for Class 2 (or Class 3 for identified tasks below) of the ANSI / *ISEA* 107 American National Standard for High-Visibility Safety Apparel and Headwear.
    - *Class 3* HVSA shall for worn:
        - When working on or next to roadways with traffic speeds above 80 km/hr. (50 mph),
        - By traffic control personnel, and
        - As determined by the hazard assessment.
- HVSA can include:
    - Vests
    - Shirts
    - Jackets or coats
    - Coveralls
- HVSA shall be worn when performing work tasks:
    - Where there is exposure to vehicle traffic such as on the ROW of a private, county, state or federal road or highway.
    - At a construction site where heavy equipment, such as cherry pickers, backhoes, track hoes, etc. are being utilized.
    - As the designated Signaler or Spotter.
- Flame-resistant (FR) high visibility vests are required (when exposed to vehicle traffic) when in the immediate area of the above defined section on Specific Hazards that Require FR.

6.34.10. Protective Clothing – Requirements

- Disposable chemical protective gear used in FRC specified areas must also be flame resistant.
- When working around rotating or reciprocating machinery, observe the following precautions:
    - Ensure gloves, ties, and loose clothing does not become entangled in equipment. Button or properly roll up long sleeves and tuck in shirt tails.
    - Do not wear loose jewelry (e.g., necklaces, chains, cords) outside clothing.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Drawstrings on clothing (e.g. hoodies) shall be removed to prevent risk of entanglement.
- Long hair shall be tied back or otherwise secured to prevent any risk of entanglement.

- Do not wear, do not store with food, do not launder with other clothing or store with clean clothing any personal or protective clothing that becomes saturated with oil, solvents, or hazardous or toxic substances.

Table 19: Requirements for Protective Clothing

ACTIVITY	BODY PROTECTION REQUIRED
Handling NGL (risk of spray)	• Neoprene apron
Removing asbestos materials	• Disposable hooded coveralls (preferably Tyvek brand) with elastic fittings • Rubber boots or disposable boots (preferably Tyvek brand) • Elasticized shoe covers
Steam cleaning or high-pressure washing	• Rubber apron or slicker suit • Rubber boots
Handling acids, caustics, or other hazardous chemicals (large quantities)	• Neoprene or nitrile apron or slicker suit
Operating chainsaws	• Approved leg chaps • Heavy pants • Long-sleeved jacket or shirt
Mowing and weed trimming	• Heavy pants • Long-sleeved jacket or shirt
Abrasive blasting	• Heavy pants, • Long-sleeved jacket or heavy shirt
PCB Exposure	• Suitable chemical and/or oil resistant gloves (see the glove manufacturer's specifications for suitability) • Goggles if there is potential for a chemical or oil splash hazard • Protective clothing such as a coverall or work apron
Spill Clean-up	• Level A, B, C, or D as designated by the Event Commander
Welders and welder's helpers (radiant energy)	• Heavy pants, • Long-sleeved heavy shirt

ACTIVITY	BODY PROTECTION REQUIRED
High voltage electrical equipment maintenance, service, repair, testing and operation	• Flame-Resistant Clothing

6.34.11. Flame-Resistant Clothing (FRC)

- ***Approved FRC***: Flame resistant clothing (FRC) that meets the performance requirements of the following standards.
    - *NFPA 2112 Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire*.
    - *ASTM F2733 Flame-Resistant Rainwear for Flame Hazards.*
    - *ASTM F1891 Standard Specification for Arc and Flame-Resistant Rainwear.*
    - *CAN/CGSB-155.21-2001 Recommended Practices for the Provision and Use of Workwear for Protection Against Hydrocarbon flashfire; or*
    - *CAN/CGSB-155.20 Workwear for Protection against Hydrocarbon Flashfire.*
- FRC is required for all Contractors working in hazardous/classified locations.
- Contractors and Visitors must wear FRC inside fenced or operating facilities or where hot work is being performed on the Right of Way (ROW), or as required by an assessment of the task hazards.
- Suppliers shall provide FRC in a sufficient number and style to protect Contractors and visitors.

6.34.12. Specific Hazards that Require FR

- Working within 4.6 m (15 ft.) of a planned release of flammable liquids or gases to the environment including but not limited to:
    - Pipeline and facility releases during gas blowdowns, gas evacuations and gas purges
    - Blowing down valve bodies
    - Blowing down, evacuating, and purging launchers and receivers
    - Installing leak clamps
    - Gas handling work within a station site
- Working in areas where there is a risk of an unintentional release of flammable liquids or gas, including but not limited to:
    - During a leak investigation when working within the vicinity of the expected leak
    - During repairs to damaged pipeline
    - Assembling and disassembling truck connections for flammable liquid transfer
    - Removing or inserting a pig into a pig barrel

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - While installing a stopple or hot tap
  - During hot and cold cutting of live lines
  - When working within 4.6 m (15 ft.) of an operating air mover that is being used to pull potential leaking gas away from a work area
- Performing or monitoring hot work under the issuance of a hot work permit or when entering a classified area where a hot work permit has been issued.
- Working in a Greenfield construction area where there is a potential risk of unintentional release.
- For electrical equipment operations, maintenance, service, repair and troubleshooting please refer to electrical safety for additional FRC requirements.
- Any work in a known flammable atmosphere with 10% LEL or greater.
- Any work where an assessment of the task hazards deems the use of FR clothing as a requirement.

6.34.13. Wearing Flame-Resistant Clothing

Flame-Resistant Clothing (FRC) shall be worn and maintained accordingly:

- FRC shall be worn as described in the manufacturer's instructions. FRC should be inspected, laundered, repaired and/or taken out-of-service per the manufacturer's recommendations.
- Long sleeved FRC shall be worn in designated FRC areas / jobs.
- Contractors shall wear FRC as the outer-most garments except when other personal protective clothing is required. Only approved FR outerwear is permitted to be worn over flame-resistant garments.
- Contractors should not wear synthetic blends such as nylon, polyester, rayon, polyethylene, etc. under the FRC. Only natural fibers such as 100% cotton or wool or FR are recommended to be worn underneath FRC.
- FRC shall be worn in such a manner as to completely cover the torso, arms, and legs (sleeves rolled down, shirt tucked in and body fully zipped or buttoned up). In addition, appropriate hand protection the appropriate gloves should be worn whenever FRC is required. FR smocks are not allowed.
- Where there is a risk of exposure to heat stress, FRC should be constructed of lighter weight FR materials.

The table below lists the acceptable styles of FRC.

Table 20: Acceptable Flame-Resistant Clothing Styles

FIRE RESISTANT CLOTHING	EXAMPLES
Shirts	• Long sleeve FRC shirts.
Pants	• Long FRC pants or FRC denim.
Coveralls	• Long sleeve FR coveralls may be worn as a single layer. When worn over FRC or non-FRC, they will provide more protection.

FIRE RESISTANT CLOTHING	EXAMPLES
Bibs	• FRC bibs must be worn in conjunction with an upper level of FRC (i.e. FRC long sleeve shirt or FRC jacket).
Jackets	• FRC Jackets may be worn lined or unlined. If the lining is FRC, it may be worn as outerwear.
Other	• Rainwear, High Visibility Vest, Welders Aprons, etc.

6.34.14. Laundering, Care, and Inspection

- FRC must be kept clean and in good condition.
- FRC that is damaged, torn, or threadbare must be repaired in accordance with the manufacturer's instructions or retired.
- Soiled or contaminated FRC shall be removed from service and cleaned.
- Keep FRC reasonably free from grease and oil.
- Do not use chlorine bleach when laundering FRC.
- FRC shall be laundered or dry-cleaned in accordance with the manufacturer's instructions.
- FRC should be systematically inspected before each use for damage, soiling or contamination.

6.34.15. Task Specific PPE Requirements:

Working with UAS

The pilot and visual observer are required to wear the following PPE:

- Approved safety footwear
- Class 2 HVSA to distinguish themselves from other Contractors
- Approved hard hat with a chin strap
- Face shield or safety goggles where dust and flying debris may be present
- First Aid kit

Operating Mowers / Weed Eaters

When operating mowers and weed eaters, wear hearing protection, safety glasses with side shields, steel toed footwear and heavy pants with a long-sleeved shirt.

Working from Aerial Lift Bucket

When working from an aerial lift bucket requires the use of a full body harness with a lanyard attached to the designed point on the bucket.

Welders and Welder's Helpers

- All Welders and Welder's Helpers should wear clothing that will provide sufficient cover and is made of suitable materials that will minimize skin burns caused by sparks, spatters, and radiation.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- All Welders and Helpers should wear leather gauntlet-type gloves with seams on the inside to prevent stitches from burning.
- Welding helmets or mono-frame goggles shall protect the face, forehead, neck, ears, and eyes.
- Goggles, with the appropriate filter shade (at least 3), or a welding helmet shall be worn during oxyfuel gas welding and cutting operations.
- Welders and Helpers should take precautions to avoid breathing the fume plume by positioning the work where it is not directly under their face, or by ventilation.
- If need be, an air purifying respirator may be worn.

Operating Off-Road Equipment

- When operating off-road equipment, the Operator, and any passengers (if allowed by the manufacturer) must wear:
    - Appropriate hearing protection.
    - Wear appropriate eye protection – safety glasses at a minimum unless wearing a full-face helmet.
    - Clothing suitable for the operating conditions and environment (long sleeves and long pants to ankles and wrists).
    - Approved motorcycle helmet (a full-face helmet is recommended as it provides protection to the jaw area) must be worn.
    - Hard hats may be worn when operating within a Company facility fencing when traveling on smooth roadways at speeds under 15 km/hr.
    - Ensure that adequate clothing is worn to provide protection from weather conditions.

Using Electrical Power Tools

- When using electric power tools, wear safety glasses with side shields and no loose clothing.

Operating a Chain Saw

- When operating a chain saw, wear hard hat and hearing protection, safety glasses with side shields and face shield, safety toed footwear, gloves, and heavy pants with long-sleeved shirt.

Arc Flash PPE for Electrical Work

- For electrical work, test and check voltage rated rubber gloves.
- General electrical PPE requirements are illustrated in the figure below.

Table 21: Voltage-Rated Rubber Gloves

CLASS	USE
Class 00	Use for circuits up to 500 volts AC
Class 0	Use for circuits up to 1000 volts AC

Class 1	Use for circuits up to 7,500 volts AC
Class 2	Use for circuits up to 17,000 volts AC
Class 3	Use for circuits up to 26,500 volts AC
Class 4	Use for circuits up to 36,000 volts AC



Figure 12: Arc Flash PPE Guide

6.34.16. Personal Flotation Device (PFD) – Requirements

Working Over or Near Water

- Contractors working over or near water, where the danger of drowning exists, will be provided with a PFD such as U.S. Coast Guard approved life preserver or buoyant work vest except when using a safety harness and lanyard or lifeline.
- Work vest will be stored in a separate location from life preservers.
- Prior to and after each use, PFDs shall be inspected for defects which would alter their strength or buoyancy.
- Defective units will not be used and will be replaced.
- A PFD will be worn when:
    - Riding in a boat other than in an enclosed cabin
    - Transferring from a boat to or from the platform or dock
    - Working in areas above the water such as barges, bottom walkways and decks without a guardrail or if working outside a guardrail
    - Descending to the Plus 12 Level (lowest deck) of an offshore platform
- Entry into the water shall only be permitted when:
    - A diver is to perform specific work
    - An abandon platform order is given
- Personal floatation devices meeting *CGSB Standard 65-GP-14M* is to be worn by all personnel when working near water and there is a risk of drowning.

Performing a Line Break/In Immediate Area of a Line Break or Equipment Opening

- Contractors must use the following if performing a line break or equipment opening or are working in the immediate vicinity of the line break:
    - Fire-resistant (FR) clothing as an outer layer, worn as directed by manufacturer (e.g., buttoned up, sleeves rolled down, etc.).
    - Respiratory protection during the initial line break or opening until isolation is proven and work area has proven safe atmosphere.
        - The level and type of respiratory protection is based on the potential composition, volume, and pressure of the gas or vapor that may potentially be released during the break or opening.
        - When opening systems where a known potential for exposure exists, all Contractors in the immediate work area shall wear the appropriate RPE, in accordance with the completed Hazard Assessment until a safe atmosphere has been verified.
        - If the composition and/or concentration of the contaminant is unknown or there is a potential for a Hazardous Atmosphere, assume the atmosphere is hazardous, perform exposure assessments and use RPE in accordance with the Respiratory Protection section of this Manual.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- If there is a potential for an atmosphere above 5 ppm of H2S (>5ppm H2S) or an oxygen level below 19.5% in the Contractor's breathing zone during the job:
  - Contractors must use supplied air (SCBA or SABA) as respiratory protection.
  - A Safety Watch out of range of a toxic atmosphere but within sight of the Contractor(s) must be used.
  - The Safety Watch must don SCBA or SABA but does not need to put on mask unless performing a rescue.

6.34.17. Pigging Operations

- FR clothing as an outer layer, worn as directed by manufacturer (e.g., buttoned up, sleeves rolled down, etc.)
- Gloves and eyewear (and if required additional splash protection PPE) that sufficiently protect against the products or materials that contaminate pigs or collect and/or flow from barrels.
- Personal gas monitors (PGMs) and/or portable area monitors are required to establish LEL and other toxic levels as part of opening and closing procedures.

6.35. Pigging

6.35.1. Suppliers

Suppliers shall ensure that:

- Pigging operations are performed as per the local Company procedure and plan in coordination with Company Gas Control / Control Rooms as applicable and required.
- Apply hazard controls outlined in the requirements below including:
  - Avoiding the line of fire created by the barrel and door.
  - Preventing ignition sources in the hazardous location when barrel door is open.
  - Wearing applicable respiratory protection, FRC and other required PPE.
  - Making use of gas monitors to establish a safe atmosphere.
- Suppliers conducting pigging operations must have a written procedure that sets out the following minimum requirements:
  - Detailed operational steps.
    - Hazards and controls required for each step (as well as any general hazards and controls that apply)
      - This includes hazards arising from pressures, known product, or residual products that may be captured by pigs (e.g., iron sulfides)
  - Full instructions on communication requirements (e.g., with Company Gas Control, Control Room, adjacent facilities, or operations, etc.).

- Pigging operations may only be conducted by or under the immediate supervision of a Contractor trained and qualified to perform the particular pigging operation.
- Where permitting requirements apply (e.g., Safe Work Permits or environmental permits, etc.), these must be completed and be made available on site as applicable.
- Where hand wheel valve operations are required or potentially required in the pigging procedure, any requirements regarding these should be specified in the procedure to ensure operator and equipment safety, including consideration such as:
    - Correct isolation of motor operator valve when using a hand wheel to prevent unintended engagement of the motorized valve when an operator uses the hand wheel.
    - Requirements to remove hand wheels following operations as applicable.
- Avoid the line of fire generated by the pig receiving or sending barrel and the barrel door. This includes:
    - Minimizing activity in front of the door and ensuring individuals are not in the line of fire when barrel is being pressurized during sending or receiving activities.
    - When practical, standing on the side of the pig barrel opposite of the closure hinges. This is especially the case when first opening the barrel.
    - Ensuring any non-essential personnel are not near the pig loading/receiving operation. At minimum, this should include the 8 m (25 ft.) perimeter from the barrel door (see hazardous area requirements below).
- The pigging crew must have assurance that the pigging barrel is fully vented, and all pressure fully blown down prior to opening the pig barrel door.
- Pressure gauges depressurization, consulted and must be functioning and of suitable resolution and accuracy to ensure full depressurization before opening.

Suppliers shall ensure that Contractors:

- For respiratory protection during the initial opening of the barrel and until work area has proven safe atmosphere:
    - The level and type of respiratory protection shall be based on the potential composition, volume, and pressure of the gas or vapor that may potentially be released during the break or opening.
    - When opening systems where a known potential for exposure exists, all Contractors in the immediate work area shall wear the appropriate RPE, in accordance with the completed Hazard Assessment until a safe atmosphere has been verified.
    - If the composition and/or concentration of the contaminant is unknown or there is a potential for a Hazardous Atmosphere, assume the atmosphere is hazardous, perform exposure assessments and use RPE in accordance with the Respiratory Protection section of this Manual.
    - If there is a potential for an atmosphere above 5 ppm of H2S (>5ppm H2S) or an oxygen level below 19.5% in the Contractor’s breathing zone during the job:
    - Contractors must use supplied air (SCBA or SABA) as respiratory protection.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - A Safety Watch out of range of a toxic atmosphere but within sight of the Contractor(s) must be used.
  - The Safety Watch must don SCBA or SABA but does not need to put on mask unless performing a rescue.
- In the event it is necessary for pigging operators to remove their PGM to protect H_2S heads from damage from overexposure to H_2S (e.g., in high H_2S environments where Contractors perform all open barrel activities with supplied air), an alternative means of measuring LEL hazard needs to be implemented.
- Respiratory protection can only be removed by Contractors once a monitor reading establishes a safe atmosphere.
- The area surrounding the pigging barrel must be treated as a hazardous location when the barrel door is open, or any local atmospheric vents are open.
- The size of the hazardous area (Class 1, Division 2 or Class 1, Zone 2 or higher) will be based on an engineering judgment (see the *Hazardous Locations* defined term in Appendix B) but will never be less than 3 m (10 ft.) from the barrel door or vent opening(s).
- Only essential personnel wearing PPE must be allowed in the hazardous area when the door is open. See Section 6.34 Personal Protective Equipment for PPE requirements.
- Only intrinsically safe tools may be used during opening and closing procedures.
- Catch basins and retrieval apparatuses or devices to retrieve pigs from barrel must be permanently or temporarily bonded when in use to prevent a static charge ignition source.
- Catch basins are required for all pig barrel openings and must be sufficiently cleaned and maintained to protect both Contractors and the environment.
- Pigging Operators must report any leaking valves upon discovery. Pigging operations using barrels with leaking valves must be suspended pending repair or a further assessment and mitigation strategy approved by area management.
- In the event unsuspected iron sulfide is found, the barrel door should be closed immediately to prevent accidental ignition until a mitigation plan is developed.

6.36. Pipe Labelling Requirements

Every assembly of pipes, pipe fittings, valves, safety devices, pumps, compressors, and other fixed equipment that is used for transferring a hazardous substance from one location to another shall be:

- marked, by labelling, color-coding, placarding or any other mode, to identify the hazardous substance being transferred and, if appropriate, the direction of the flow; and
- be fitted with valves and other control and safety devices to ensure its safe operation, maintenance, and repair.

6.36.1. Suppliers

Suppliers shall ensure that labeling is applied by Company requirements, the minimum applicable legislative requirements and industry best practices.

6.37. Powered Industrial Truck

6.37.1. Suppliers

Suppliers shall ensure that:

- Always operate forklifts/trucks as per manufacturer's instructions and in a safe manner. This includes operating the equipment within the pre-established load limits.
- Identify forklifts equipped with front-end attachments other than factory installed attachments with information to show the approximate weight of the forklift and any attachment combination at maximum elevation with load laterally centered.
- Maintain legible nameplates and markings on all forklifts.
- Industrial trucks must not be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts.
- Obtain written manufacturer's approval prior to forklift making:
    - Modifications and additions which affect its capacity and safe operation.
    - Changes affecting capacity, operation, and maintenance instruction plates, tags, or decals.
- Forklifts may only be used in applications and atmospheres according to its design designation.
    - Trucks approved for use in hazardous areas shall have the manufacturer's label or some other identifying mark indicating approval for the intended use by a recognized national testing laboratory (e.g., Underwriters Laboratories [UL] or Factory Mutual [FM] or Underwriters Laboratories Canada [ULC]).
    - Durable markers indicating the designation of the type of truck for use in hazardous areas shall be applied to each side of the vehicle in a visible but protected area. These markers shall be distinctive in shape.
- The entrance to hazardous areas shall be posted with a sign to identify the type of forklift truck permitted.
- All forklifts/trucks are inspected annually and before use.
- All forklifts/trucks are maintained in a safe condition. Maintain and inspect forklifts following the frequency as determined by the jurisdictional requirements and the manufacturer's recommendations.
- Only Qualified Personnel are permitted to operate a forklift. All forklift/truck Operators are properly trained to operate the specific equipment which they will be expected to operate and have a valid operator's license/certification.
- Personnel who do not operate a class or forklift for which they were qualified for more than 12 months shall be re-evaluated prior to operating.
- Remove forklifts from service and tag out the unit if a visual examination or inspection shows any condition affecting the safety of the vehicle.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Repairs must be made by Authorized Personnel with parts equivalent as to safety and the original design. If possible, all Forklift/truck repairs should be made outside of the operating area.
- Locate battery charging installations for battery operated forklifts/trucks in proper designed and designated areas for that purpose.
- Maintain safe clearances, clear aisles, and other facility conditions safe for forklift operation.
- Safe clearances must be allowed for aisles at loading docks, through doorways and wherever turns or passage must be made.

Suppliers shall ensure that Contractors:

- Remove keys when not in use to prevent unintended use by unqualified Operators.
- Keep a valid operator's license/certification card (if applicable) in their possession when required to operate a forklift/truck.
- Inspect and document inspection of the forklift /truck at the start of each shift that the equipment will be used, using Form HSF-060 Powered Industrial Truck Inspection or equivalent.
    - Check the fork pins and stops to make sure that they are in place.
    - Check all cowling and body parts.
    - Check the wheels and tires for excessive wear.
    - Look for any broken or loosened parts.
    - Check the fuel level, crankcase oil level, radiator water level.
    - Check the engine air cleaner, the fan belt, the hydraulic fluid level, and the battery water level.
    - Check the hour meter and record it.
    - With the engine running, check operation of the hour meter, headlights, taillights, and warning lights.
    - Check the oil pressure gauge, the water temperature, ammeter, and sound the horn.
    - Check and test braking system.
    - Conduct functional test for the lifting/attachment operation being performed.
- Wear the proper required personal protective equipment when operating a forklift/truck.
- Wear seatbelts while operating forklifts and prohibit additional riders on the equipment.
- No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.
- Wheels must be blocked if the truck is parked on an incline.
- Never add fuel of any type to the forklift/truck while the engine is running. Keep a fully charged fire extinguisher mounted on the forklift/truck.

- When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, keys removed, and brakes set.
- Stunt-driving and horseplay are not allowed.
- Do not move loads with broken pallets or loads beyond the capacity of the forklift or loads that are unbalanced.
- Stack, block, and interlock bags, containers, bundles, and limit the height of storage to ensure stability and security against sliding or collapsing when picking up with a forklift/truck.
- Crib and securely block structural steel, poles, pipe, bar stock and other cylindrical materials stored on the floor or ground.
- When moving loads keep them as low as possible and slightly tilted back.
- If required to unload trailers from a loading dock, ensure the trailer is chocked and if unattached from a tractor, supported with stands.
- Dockboard or bridgeplates shall be properly secured before they are driven over. Dockboard or bridgeplates shall be driven over carefully and slowly and their rated capacity never exceeded.

6.38. Public Work Area Traffic Management Guide

6.38.1. Supplier

Suppliers shall ensure that:

- A Traffic Control Plan will be prepared in accordance with the governing jurisdiction's legislative requirements. All required permits, if applicable, must be obtained prior to the commencement of the work.
- The Traffic Control Plan (TCP) takes into consideration the hazards specific to the worksite, such as but not limited to:
    - Evaluating the anticipated traffic patterns
    - Traffic volumes
    - Traffic speeds
    - Alternative routes
    - Changing seasonal conditions – snow, varying amounts of day light, etc.
    - Working hours – Contractor fatigue
    - Time / duration of the job (daylight, dusk, high traffic, few hours, multiple days)
    - Project yard or staging area locations
    - Project schedule
    - Duration of the project

    - Changing project conditions
- To develop a *traffic control plan* the following should be considered:
    - Determine the location of the proposed work area and identify the required degree of encroachment into the roadway.
    - Determine the duration of the work to be undertaken.
    - Evaluate the need for traffic flow control.
    - Select the most appropriate traffic control layout for the work based on the site evaluation and work area requirements.
    - Review the traffic control layout to ensure that all site-specific conditions are adequately accommodated.
    - Plan for the safe movement of pedestrians, cyclists, and other vulnerable road users, ensuring that vehicle and pedestrian movements are separated.
    - Determine schedule of traffic control devices, including sign sizes and quantities in accordance with the local jurisdiction's legislative requirements.
    - For long duration work, determine whether existing pavement markings need to be removed and replaced by temporary pavement markings.
- Roadway work zones should be designed with the following considerations:
    - Contractor safety
    - Road user safety (motorist, pedestrian / cyclist, and others)
    - Road user's ability to traverse through the work zone
    - Pedestrian paths shall, as far as is reasonably practicable, be separate from vehicle roadways and clearly delineated. Physical separation should be used wherever possible.
    - Advanced warning (provision of advanced notice to road users that they are approaching a work zone)
    - Worksite identification (visible identification of the work area by passive and / or active traffic control devices to show road users where work is taking place)
    - Positive guidance (provision of information to road users required to avoid hazards, when and where this information is needed, will be conveyed using uniform traffic control devices)
- Develop an emergency and event management traffic control plan, which facilitates emergency vehicle access to work zone locations as necessary.
- The Company Representative overseeing the work will review, to their satisfaction, the Supplier's Traffic Control Plan prior to work commencing.
- Ensure that the Traffic Control Plan is understood by all responsible parties before the site is occupied. Any changes to the Traffic Control Plan shall be approved by the Company Representative responsible for the work.
- Determine if paid duty Officers are required.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- During the execution of work activities, Traffic Control Devices shall be inspected, at least daily, and the integrity of the Traffic Control Plan reviewed and adhered to. Traffic flow will be monitored, and the traffic plan adjusted as conditions warrant.
- Mobile digital message boards, where required, should be dispatched to all high traffic entry, and exit points (i.e. pipe yard, construction yard, public roadway turn offs to projects, etc.) and intersections. The message boards will be positioned and located in accordance with the governing jurisdiction's requirements and will remain in place until the completion of the applicable scope of work.
- The Supplier Representative will ensure that records of traffic control inspections are kept at the work location and are made available to Company Representatives for review and audit. The following should be considered:
    - Inspect the work zone by driving through it in the daytime and at night, as appropriate, after the temporary traffic control devices for the work zone have been installed.
    - Observe and record actions and reactions of drivers through the work zone (such as speeds, conflicts, late lane changes, frequent breaking).
    - Correct any deficiencies as they are identified and ensure any changes to the Traffic Control Plan are documented.
    - Inspect the work zone traffic control devices over the life of the project, as specified by the governing authority (at least daily), while traffic controls are in effect.
    - Ensure that traffic control devices that are no longer needed, whether on a long-term or short-term basis, are either removed from the roadway, removed to the other side of the shoulder, covered, or turned, so that they are not visible to passing motorists.
- The Traffic Control Plan is reviewed as part of the Field Level Hazard Assessment (FLHA) or Job Safety Analysis (JSA).
- After work has been completed, reintroducing regular traffic requires controls to ensure the Safety of Contractors and the Public.
- Traffic Control Devices will be covered if not required or removed, in the opposite order that they were installed, and in a manner that will not endanger the Contractors tasked with their removal.
    - Positive barriers (trucks / jersey barriers) should be maintained where possible.
    - Collect the Traffic Control Devices and disassemble them on the side of the vehicle which is away from the traveled part of the highway.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

6.39. Respiratory Protection

6.39.1. Suppliers

Suppliers shall ensure that:

- Provide respirators that meet *CSA Standard Z94.4* and *CSA Standard Z180.1*.
- Respiratory Protection Hazard Assessments are conducted to identify work areas, processes or tasks that require Contractors to wear respirators and to determine proper protection is selected for given tasks.
- Respirators are to be selected based on the respiratory hazards to which Contractors may be exposed in the workplace. A hazard evaluation must be conducted for each work area where airborne contaminants may be present in routine work or during an emergency. The hazard assessments shall include:
    - Identification and development of a list of hazardous substances used in the workplace by work process.
    - Review of work processes to determine where potential exposures to hazardous substances may occur. This review shall be conducted by surveying the workplace, reviewing the process records, and talking with Contractors and Supervisors.
- The hazard assessment must be revised and updated as needed (i.e., any time work process changes may potentially affect exposure). If a Contractor feels that respiratory protection is needed during an activity, they are to contact their Supervisor. The potential hazard shall be evaluated. The results of the assessment should be communicated to all affected Contractors. This communication must be documented.
- If it is determined that respiratory protection is necessary, all other elements of the respiratory protection program will be in effect for those tasks, and the respiratory section of Suppliers plan will be updated accordingly.
- The proper type of respirator for the specific hazard involved will be selected in accordance with the manufacturer's instructions.
- Selection of the types of respirators used for site specific breathing hazards must be made by Supplier supervision.
    - Respirator Selection Guide table
- The tables mentioned above list the minimum level of respiratory protection requirements for tasks and substances that are (remember, a higher level of protection may be worn):
    - Hazardous to human health
    - Regularly performed by Contractors
    - Specific to plant and pipeline operations and maintenance
- For tasks not listed, consult the following regarding the selection of respiratory protection:
    - Safety Data Sheet (SDS)
- The *Respirator Selection Guide* can be used to select the proper respirator for a specific worksite or task. In selecting respirators for individual Contractors, the Supervisor shall evaluate the following additional information:

  - Any unusual conditions associated with the work or activity.
  - Anticipated respirator use time.
  - Chemical, physical, toxicological, and warning properties of the air contaminant.
  - Air contaminant concentration likely to be encountered.
  - User's ability to seal the selected respirator.
  - User's perceived comfort of the respirator.
- No Contractor shall wear a respirator in an atmosphere where the contaminant concentration exceeds the Maximum Use Concentration (MUC) for the respirator being worn.
- If the calculated MUC is higher than any use limitation specified on the NIOSH approval label for the cartridges or filter being used, the concentration appearing on the NIOSH label will take precedence over the calculated MUC.
- Determine Contractors who will use Respiratory Protection (i.e., Medical Qualifications, Fit Testing etc.).
- Medical evaluations where required by jurisdiction (frequency of use, potential exposure, and or type of respirator) and respirator training will be completed prior to the fit testing.
  - Contractors that are required to obtain medical clearance will not be allowed to engage in work activities or in to work areas were respiratory protection is required until medical clearance has been provided.
  - The Medical Evaluation will be administered annually for those Contractors required to wear respirators by their jurisdiction.
  - A Physician or Other Licensed Health Care Professional (PLHCP) will be used to perform medical evaluations.
  - The medical evaluation will be administered in a manner that ensures the Contractor understands its content.
  - The Contractor will be given an opportunity to discuss the questionnaire and examination results with the PLHCP, if requested.
  - A written recommendation regarding the Contractors ability to use the respirator will be obtained from the PLHCP.
- Additional medical evaluations are required under certain circumstances such as:
  - Contractor reports medical signs or symptoms related to ability to use respirator.
  - The PLHCP or Supervisor recommends re-evaluation.
  - Information from the respiratory procedure, including observations made during fit testing and procedure evaluation indicates a need.
  - Change occurs in workplace conditions that may substantially increase the physiological burden on a Contractor.
- The following information must be provided to the PLHCP before the PLHCP makes a recommendation concerning a Contractors ability to use a respirator:
  - Type and weight of the respirator to be used by the Contractor.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - Duration and frequency of respirator use (including use for rescue and escape).
  - Expected physical work effort.
  - Additional protective clothing and equipment to be worn.
  - Temperature and humidity extremes that may be encountered.
- Contractors who pass the medical evaluation and wear tight fitting respirators will be fit tested prior to use.
  - Two types of fit testing, qualitative and quantitative, can be administrated dependent on the type of respirator to be used.
  - Fit testing must be conducted annually or more frequently if a Contractors facial or medical conditions change.
- Fit test records must be maintained for each Contractor until the next fit test is administered.
- All compressed air used for breathing purposes shall be uncontaminated and shall meet, as a minimum, the standard of the *ANSI/Compressed Gas Association (CGA), for Type I Grade D Breathable air.*
- Supplier and rental compressors used to provide breathing air must meet these standards.
  - Breathing air used from air compressors as a source must be filtered and must be monitored for carbon monoxide.
  - Visually inspected and the following determinations made prior to its use by Contractors:
    - Make certain the high temperature alarm is operational.
    - Determine the number of hours since the oil/air separator (if present) was last replaced and have the dealer replace prior to renting if unknown or if the operating hours exceed the manufacturer's instructions.
  - The compressor oil and filter operating hours should be determined, and both changed prior to rental if unknown or if the operating hours exceed one-half (1/2) of the manufacturer's instruction.
  - All rental equipment must appear to have been carefully maintained.
  - Rented piston-type air compressors should never be used to supply breathing air to Contractors.
- Breathing air from compressed gas cylinders must be Grade D and have a certificate of analysis indicating the gas contained in the cylinder meets *ANSI/Compressed Gas Association Grade D* standards.
  - The certificate of air analysis for each cylinder shall remain at the worksite if the cylinders are in service and on location.
  - In addition to the vendor certification, all compressed air cylinders must be checked for oxygen and moisture content prior to first use. The oxygen content must be between 19.5 and 23.5%. The moisture content in the cylinder must not exceed a dew point of -50 ºF at 1 atmosphere of pressure.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - Cylinder valves and valve stems must have the protective caps in place when the cylinders are not in use.
  - Cylinders should be secured in an upright position to prevent toppling and lessen the exposure to trip and fall hazards.
- Plant air shall not be used as a source of breathing air unless approved by the appropriate Company Representative and inline safety equipment has been installed which removes moisture, oil mists, particulates, organic vapors, and monitors for carbon monoxide.
- Contractors required to utilize respiratory protection are properly trained.
- Apart from a trimmed mustache, Contractors who may be required to wear a respirator must always be clean shaven.
- Respirators should be individually assigned whenever possible. Each individually assigned respirator shall be personally identified in a way that does not interfere with the respirator performance.
- Contractors using full face respirators and requiring vision correction may use special spectacle kits, if needed. Contact lenses are not to be worn with respiratory equipment. Fit testing will be conducted with the spectacle kits in place.
- Individual and multiple people use respirators shall be cleaned and disinfected after each use.
- Proper cleaning and disinfecting of SCBA, abrasive blasting hoods or airline equipment should be performed according to manufacturer's recommended procedures only.
- If an air purifying respirator filter is to be used for more than one day the filter media shall be dated when installed and replaced as specified by the manufacturer.
- Single use disposable respirators and filter mask shall be disposed of by approved methods and not reused.
- Supplied air respirators and breathing equipment shall be inspected routinely, and.
  - Before each use.
  - At least monthly.
  - Following the manufacturer's recommended procedures.
- All respirator equipment shall be properly stored in a clean sealable bag, in a dust free area out of the sunlight and weather.
- It is recommended that respirators be stored without canisters or cartridges attached.
- All respirator equipment repairs are to be performed by Qualified Personnel or vendor.
- All non-disposable respirator equipment must be inspected monthly.
- Monitor respirator use to ensure that respirators are used in accordance with their specifications.
- Assist in the elimination of breathing hazards through engineering controls as the primary approach to Contractor protection.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Medical records for each Contractor must be preserved and maintained for at least the duration of employment plus 30 years.

Suppliers shall ensure that Contractors:

- Wear the proper respiratory protection when exposed to respiratory hazards.
- Inspect, maintain, and store the provided respiratory protection equipment.
- Conduct a quick positive/negative respirator pressure check prior to starting to work requiring a cartridge or canister type respirator.

6.39.2. Air Purifying Respirators

- Disposable air purifying respirators are individually assigned and are considered single use respirators.
- Single use dust respirators can be used in concentrations up to 5 times the exposure guideline (PEL, TLV, etc.) if the exposure guideline is greater than 0.05 mg/m^3.
- Air purifying cartridges (i.e. vapor cartridges) are used on a single use basis and will be changed out prior to use during the next work shift.
- The appropriate cartridge, canister, or filter for protecting against the air contaminant shall be used.
- Air purifying respirators can be used for contaminants with poor warning properties if the contaminant concentrations have been measured and the filter media has been shown to remove the contaminant in a laboratory test.
- Half-face respirators can be used in concentrations up to 10 times the exposure guideline.
- Full-face respirators can be used in concentrations up to 50 times the exposure guideline.
- Full-face respirators shall be specified if the contaminant can irritate the eyes at the expected concentration.
- Contractors using full face respirators that require vision correction will request and be provided special spectacle kits.
- Any Contractor who voluntarily wears a respirator when one is not required (i.e., in certain maintenance and coating operations) is subject to the medical evaluation, cleaning, maintenance, and storage elements of this section, and will be provided with necessary training. Contractors who voluntarily wear filtering face pieces (dust masks) are not subject to the medical evaluation, cleaning, storage, and maintenance provisions of this program.

6.39.3. Atmosphere-Supplying Respirators

- Only Pressure Demand Regulators shall be used.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- When using in an IDLH or oxygen deficient atmosphere, a 5 minute (minimum) auxiliary escape cylinder and safety harness shall be used. (Five-minute escape packs are not considered an auxiliary air supply.)
- Standby personnel shall be available when someone else enters an IDLH or oxygen deficient atmosphere. The standby shall be in communication with the entry person and have reserve breathing equipment available.
    - All standby personnel will meet the approval and training requirements of this Specification.
- Abrasive blasting situations requires the use of an air supplied respirator equipped with a loose-fitting hood or helmet with a minimum air flow rate of 6 cfm.
- Waist belts for air supplied respirator systems shall be used so that the mask tailpiece is fastened to a ring or the belt.
- In IDLH or O_2 deficient atmospheres, persons using air supplied respirator systems shall be equipped with safety harnesses.
- For respiratory protection during the initial Atmospheric Monitoring of Open Systems in Hazardous / Restricted Areas and until work area has proven safe atmosphere:
    - The level and type of respiratory protection shall be based on the potential composition, volume, and pressure of the gas or vapor that may potentially be released during the break or opening.
    - When opening systems where a known potential for exposure exists, all Contractors in the immediate work area shall wear the appropriate RPE, in accordance with the completed Hazard Assessment until a safe atmosphere has been verified.
    - If the composition and/or concentration of the contaminant is unknown or there is a potential for a Hazardous Atmosphere, assume the atmosphere is hazardous, perform exposure assessments and use RPE in accordance with the Respiratory Protection section of this Manual.
    - If there is a potential for an atmosphere above 5 ppm of H2S (>5ppm H2S) or an oxygen level below 19.5% in the Contractor's breathing zone during the job:
        - Contractors must use supplied air (SCBA or SABA) as respiratory protection.
        - A Safety Watch out of range of a toxic atmosphere but within sight of the Contractor(s) must be used.
        - The Safety Watch must don SCBA or SABA but does not need to put on mask unless performing a rescue.

6.40. Safe Handling of Pipeline Liquids

6.40.1. Suppliers

Suppliers shall ensure that:

- Pipeline liquids are handled as a hazardous chemical.
- All Contractors handling pipeline liquids are trained in the proper PPE use, proper sampling techniques and/or proper handling or disposal methods.

Suppliers shall ensure that Contractors:

- Handling liquids containing H_2S, review the individual SDS for that material.
- Sampling or liquid transfers shall be handled following the established safety procedures for flammable liquids which include grounding, non-sparking tools/equipment, explosion proof equipment and no open flames.
- Wear the specific types of PPE identified from the Hazard Assessments for personal protection and respiratory protection recommended for the job specific task of sampling pipeline liquids.

6.41. Safeguards, Barricades and Warning Signs (Temporary)

6.41.1. Suppliers

Suppliers shall ensure that:

- Unprotected temporary openings in floors or elevated work platforms shall:
  - be covered with plywood that is at least 2 cm (¾-in) in thickness
  - have secured coverings capable of supporting twice the maximum intended load
  - only be removed to perform a particular task
- Coverings shall only be removed to perform a particular task. Coverings shall be replaced immediately after the task is complete or as appropriate during the task if other Contractors are present near the work area.
- Suitable safeguards, flagging or barricades with warning signs or flashing lights shall be used to protect Contractors from any work activity that may endanger them. Examples of such activities include sand blasting, open excavations, temporary openings in floors, construction, welding arc flash in prefab areas, pressure testing or overhead work.
- Prior to and during construction activities Supplier shall have hazard identification procedures used to systematically identify and mark all above ground facilities, equipment, piping and pipeline components that are subject to vehicular or mobile equipment damage and provide adequate protection. The piping and equipment to be identified includes in-service piping, equipment, and facilities, as well as piping and equipment associated with the construction phase of a project. Protection shall be provided by maintaining a minimum clearance of at least three feet around all piping and equipment by utilizing barricades, barrier tape, cones, or fencing.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Flagging shall be used as a warning to Contractors of hazards that exist in work areas. Flagging tape shall be:
    - installed to completely encompass the work area containing the potential hazard, including access from levels above or below
    - prominently placed when conditions or activities may or do present a hazard to Contractors or the public
    - placed to ensure Contractors cannot enter the area where the hazard exists, without prior knowledge of the hazard
    - removed when the potential hazard no longer exists
- The following types of flagging shall be used:
    - RED – “Danger Do Not Enter” – Red with black lettering. This type of flagging is used where there is danger of a hazard, such as falling objects. Only Contractors involved in the work and aware of the hazards are allowed in these areas. All others must obtain prior permission from the flagging owner (i.e., Contractor who installed the flagging).
    - YELLOW – “Caution” – Yellow with black lettering. This type of flagging provides a warning that a hazard exists in the area. Yellow flagging can be crossed by Contractors other than those who installed it, but awareness of the surrounding work areas is required.
- Instead of flagging and barricades a Safety Watch may be used to prevent Contractors from entering the hazardous area, but only if the area is small enough to be easily managed and the Safety Watch remains in place until the hazard no longer exists.
- Warning signs identifying known hazards shall be posted to warn Contractors and others in the area of the specific hazard. All signs shall be constructed in a professional manner and shall meet applicable legislation and engineering standards.
- Warnings signs include, but are not limited to:
    - Directional Signs
        - Installed as required
    - No Trespassing/Open Ditch
        - The signs shall be:
            - posted at all entries to the ROW
            - face the intersecting road/highway, where construction activities are being conducted
            - display a contact telephone number for unauthorized Contractors 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 positioned in accordance with the requirements of the applicable legislation. Such signs shall be clearly visible to traffic, as appropriate to the crossing, e.g., visible from two or more directions.
    - High Pressure Testing Signs

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - Shall be posted:
    - at all entries to the ROW, public access points, while sections are under test
    - facing 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.
- Other warning signs shall be erected as required by applicable legislation or by Company to warn Contractors and/or the public of a range of potential hazards such as:
  - traffic hazards (e.g., stop, slow, curve, steep hill, noise hazards, caution, work crews ahead, suggested speed restrictions, trucks turning, work in/over navigable waters)
  - signs indicating venting in progress during any venting activities (like opening pig traps)
  - “Caution Open Hole” or similar when there is an opening
  - overhead hazards
  - respiratory hazards
  - other PPE requirements (e.g., hard hat, hearing protection, eye protection required)

Suppliers shall ensure that Contractors:

- Periodically inspect barricades to ensure protection for Contractors is adequate, and that barricades are still present and in good condition.
- Attach a flagging tag to all flagging tape. Multiple tags may be required depending on work area and hazards. The Contractor installing the tape shall complete the tag with the following information:
  - name of the person who installed the flagging
  - phone number or radio channel for contact
  - date on which the flagging was installed
  - reason for the use of flagging

6.42. Scaffolding

6.42.1. Suppliers

Suppliers shall ensure that:

- Prohibit any Contractor who has not received the required training to perform any of the tasks or activities related to scaffold erection, inspection, or dismantling.
- Load Capacity:
  - The scaffold and each of its components must be capable of supporting four (4) times the maximum intended load.

  - Scaffolds must be designed by a Qualified Person and built and loaded according to that design.
  - Avoid excessive deflection of the scaffold platform by spreading the load out, if possible.
- A Competent Person is in charge of scaffold erection according to the manufacturer's specifications.
  - Knowledgeable about proper selection, care, and use of the fall protection equipment.
  - Evaluate connection points to support loads and prevent sway.
  - Assess hazards and exercise "stop work" if unsafe conditions are detected throughout the scaffold lifecycle.
  - Perform inspections for visible defects before each work shift and after any occurrence that could affect the structural integrity of the scaffold.
  - Provide direct supervision of the dismantling of scaffolds.
  - Comply with all applicable guidelines contained in this safety section.
  - Report damaged scaffolds, accessories, and missing or lost components.
  - Immediately report any unsafe act and condition to Supplier Management.
- Scaffold work practices and rules should be based on:
  - Sound design.
  - Selecting the right scaffold for the job.
  - Assigning personnel.
  - Fall protection.
  - Guidelines for proper erection.
  - Guidelines for use.
  - Guidelines for alteration and dismantling.
  - Inspections.
  - Scaffolds must be erected, moved, altered, or dismantled only under the direction of a Qualified Person, or as requested for corrective reasons by Company.
  - When scaffolding hazards exist that cannot be eliminated, then engineering practices, administrative practices, safe work practices, PPE, and proper training regarding Scaffolds will be implemented.
  - Duties performed on or around scaffolds shall be done by experienced and trained Contractors.
- Do not erect, use, alter, dismantle, or move scaffolds close to energized power lines (see table below for minimum distances).

Minimum Scaffold Distance to Energize Power Lines

LINE VOLTAGES	MINIMUM DISTANCES
Less than 50 kV	10 ft.
50 kV or greater	10 ft. + 4 in. for each 10kV over 50 kV

  - Do not erect, use, dismantle, alter, or move scaffolds such that the scaffold or any conductive material handled while on the scaffold comes closer than 3 m (10 ft.) (lines under 50 kV) and 3 m plus 10 cm (10 ft. plus 4 in) for every 10 kV over 50 kV (lines over 50 kV).
  - If a safe distance from energized power lines cannot be maintained, call the utility company to have the source de-energized or relocated.
  - If a safe distance from energized power lines cannot be maintained, call the utility company to have the source de-energized or relocated.
  - Tag lines shall be used to hoist materials to prevent contact.
  - If electrical arc welding or other similar jobs are performed on a scaffold, the scaffold must be insulated and/or grounded.
- Do not block access to equipment, doors, and pathways used for emergencies.
- Determine the type of pedestrian, vehicle, or equipment traffic that will be in the area.
- The footing or anchorage for scaffolds must be sound, rigid, and capable of carrying the maximum intended load without settling or moving.
- Objects such as barrels, boxes, loose brick, or concrete blocks must not be used to support scaffolds or planks.
- Scaffolding more than 3 m (10 ft.) above the ground or floor must have guardrails and toe boards installed at all open sides and ends, excepting needle beam scaffolds and floats.
  - Guardrails must be made of not less than 5 x 10 cm (2 x 4-in) lumber (or other material providing equal protection) and must not be less than approximately 91 cm (36 in) or more than approximately 107 cm (42 in) high.
  - Guardrails must have a mid-rail of at least 2.5 x 15.2 cm (1 x 6-in) lumber or other material giving equal protection.
  - Supports must be at intervals not to exceed 2.4 m (8 ft.).
- Scaffolds 1.2 to 3 m (4 to 10 ft.) high and having a minimum horizontal dimension in either direction of less than 45” must have standard guardrails installed on all open sides and ends of the platform.
- Personal Fall Arrest Systems (PFAS) must be used when guardrails are not feasible, or while working on suspended scaffolds.
- Overhead protection must be provided for Contractors on a scaffold exposed to overhead hazards.
- Where tools, materials, equipment, etc., are intended to be stacked higher than the toe board, or where their falling could strike Contractors below, do one or more of the following:
  - Barricade the area with hazard warning tape, and do not permit unauthorized entry.
  - Install toe boards, screens, or canopies.
- Toe boards must be a minimum of 10 cm (4 in) in height.
  - Toe boards and guardrails shall extend along the entire opening.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Where persons are required to work or pass under a scaffold, a screen consisting of No. 18 gauge U.S. Standard wire 1.3 cm (½-in) mesh, or the equivalent, must be installed between the toe board and the guardrail covering the entire opening.
- Tubular welded frame scaffolding legs must be set on adjustable or plain bases and placed on mud sills or other foundations adequate to support the maximum rated load.
- Tubular welded frame scaffolding cross braces must be long enough to be automatically square and align vertical members.
- No welding, burning, riveting, or open flame work shall be performed on any staging suspended by means or fiber of synthetic rope.
- Only treated or protected fiber or synthetic ropes shall be used for or near any work involving the use of corrosive substances or chemicals.
- Suspension ropes shall be protected from contact with heat sources (welding, cutting, etc.) and from acids or other corrosive substances.

Suppliers shall ensure that Contractors:

- Always use a ladder or other proper means of accessing scaffolds. An access ladder or equivalent safe access must be provided.
- Never work on exterior scaffolds during severe weather/ thunderstorms.
- Never use a ladder, box, or other object to elevate your height while on scaffolds.
- Always keep three points of contact when climbing a ladder.
- Never work on a scaffold that is covered with ice or other slippery material, discontinue working on the scaffold until the hazard is alleviated.
- Keep all walkways and working surfaces clear of tools and debris.
- Never jump from one platform to another.
- Do not use cross braces to climb onto the scaffold or another level of the scaffold.
- Always place materials and tools away from the platform's edge.
- Practice good housekeeping.
- When moving manually propelled mobile scaffolds:
    - Stabilize the tower during movement.
    - Apply force as close to the base as practical, but not more than 1.5 m (5 ft.) above the supporting surface.
    - Move the scaffold on level floors and avoid areas with obstructions and openings.
    - Do not ride on mobile supported scaffolds unless the following conditions exist:
        - The floor or surface is level and free of pits, holes, or obstructions.
        - The height-to-base ratio does not exceed 2 to 1 (height is twice as long as the base is long/wide).
        - All tools and materials are secured or removed before scaffold is moved.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Contractors are not on any part of the scaffold which extends outward beyond the wheels, casters, or other supports.

6.42.2. Construction of Supported Scaffolds

- Supported scaffolds have one or more platforms that are supported by beams, brackets, poles, legs, uprights, posts, frames, or similar rigid support. All load-carrying timber members of scaffold framing shall be a minimum of 1,500 fiber (Stress Grade) construction grade lumber.
- Wire, synthetic, or fiber rope used for scaffold suspension shall be able to support at least 6 times the intended load.
- All planking must be Scaffold Grades, or equivalent, as recognized by approved grading rules for the species of wood used. The maximum permissible span for 5 x 23 cm (2 x 9-in) or wider planks is shown in the table below.

Table 22: Scaffold Planking Material Requirements

	FULL THICKNESS UNDRESSED LUMBER			NOMINAL THICKNESS LUMBER	
Working Load (psf)	25	50	75	25	50
Permissible Span (ft.)	10	8	6	8	9

- The maximum permissible span for 3.2 x 23 cm (1¼ x 9-in), or wider, plank of full thickness shall be 1.2 m (4 ft.) with medium duty loading of 50 psi.
- When erecting scaffolds, make sure the first unit of any scaffold is plumb, aligned, and level.
- Plank the platform as tightly as possible with no spaces for materials or equipment to fall through. If full planking is not possible, ensure no space is more than 2.5 cm (1 in) wide.
- The front edge (edge closest to the work) of the platform must not be more than 35.5 cm (14 in) from the face of the work unless guardrail systems are erected along the open edge and/or personal fall arrest systems are used.
- Overlap planking a minimum of 30.5 cm (12 in) and secure planks from movement.
- Scaffold plank must extend over their end supports not less than 15.2 cm (6 in).
- Each end of a platform 3 m (10 ft.) or less in length shall not extend over its support more than 30.5 cm (12 in).
- Platforms greater than 3 m (10 ft.) in length must not extend over its support more than 45.7 cm (18 in).
- Platforms and walkways must be at least 48 cm (19 in) wide unless the configuration of the application area makes this impractical and guardrails or personal fall arrest systems are used.
- Each abutted end of a plank must rest on a separate support surface.
- When a platform changes direction (e.g., turn a corner), any platform that rests on a bearer at an angle other than a right angle (90 degrees) must be laid first. Other platform planks that rest at right angles and over the same bearer will be placed second.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- The top edge height of top rails must be installed between 96.5 cm (38 in) and 114.3 cm (45 in) above the platform.
- Scaffold poles, legs, posts, frames, and uprights shall bear on base plates, mud sills, or other firm foundations.
- Never use cinder blocks, bricks, gravel, loose fill, or other means for leveling uneven surfaces or providing a foundation for the base plate.
- The entire scaffold shall be tied to and securely braced against the building or structure at intervals not to exceed 9 m (30 ft.) horizontally and 8 m (26 ft.) vertically.
- Casters and wheel stems shall be pinned or otherwise secured in scaffold legs. Casters and wheels must be positively locked if in a stationary position.
- Tube and coupler scaffolds shall be tied to and securely braced against the building at intervals not to exceed 9 m (30 ft.) horizontally and 8 m (26 ft.) vertically.

6.42.3. Inspection of Scaffolds

- Scaffolding and components shall be inspected for visible defects by a Qualified Person before each work shift and after any occurrence that could affect the structural integrity of the scaffold.
    - This includes changing weather conditions and prolonged work interruptions.
    - Footing, planking, guardrails, toe boards, connections, welds, and ladders or other access means.
    - Planks and wooden components must be free of rot, splintering, splits, and painted surfaces that could hide defects.
    - All members or parts of steel components must be straight and free of bends, cracks, dents, and rust.
    - Do not mix scaffold components from different manufacturers unless they fit together without force or modification, and the scaffold's structural integrity is maintained.
    - Do not use scaffold components made of dissimilar metals, unless approved by a Qualified Person.
    - Any defective components must not be used.
    - Immediately repair or replace damaged scaffolds or scaffold accessories.
    - Do not straighten or reuse defective parts.
    - Document inspections on scaffold inspection tag or other documentation method.

6.42.4. Dismantling Scaffolds

- Scaffolds must be dismantled under the direct supervision of a Qualified Person.
- Seat planks correctly to prevent falling when other pieces of the deck are removed.
- When a scaffold must be left partially disassembled, place barricade tape at each point of access.

- Lower all components to the ground by rope, hoist, or hand-hand.

6.43. Severe Weather

6.43.1. Suppliers

Suppliers shall ensure that:

- If potential or imminent severe weather is forecast, the Hazards due to severe weather need to be identified and controls implemented.
- Severe weather considerations include:
    - Lightning:
        - If lightning is visible or thunder is heard, initiate shut down of all outside work activities and seek shelter.
            - Outside work shall not recommence until 30 minutes after the final observation of lightning or thunder.
        - If lightning is visible or thunder is heard, the following indoor work shall be stopped:
            - all testing or grounding for mitigating induced voltage.
            - work in or around structures (e.g., tanks, side-booms, cranes, dozers, etc.)
        - Where practicable, use lightning detectors to supplement visual and auditory detection of electrical storms; use the detector's specifications to determine detection ranges and action plans. For Clarity, the use of lightning detector does not excuse Supplier's obligations as set forth immediately above.
    - Heavy Rain:
        - Avoid driving on flooded access roads or ROWs
        - Avoid crossing bridges if water level is high and fast flowing
        - Stay out of trenches, excavations and below ground level unsheltered entry points
    - Heavy Snow and Ice:
        - To prevent slips, trips, and falls, clear snow, and ice from walking surfaces as quickly as possible after a winter storm. When walking on snow or ice is unavoidable, Contractors should be trained to:
            - Wear footwear that has good traction and insulation (e.g. insulated and water-resistant boots or rubber over-shoes with good rubber treads),
            - Use traction aids where their use does not present additional hazards (e.g., hazardous locations), and
            - Take short steps and walk at a slower pace to react quickly to changes in traction.
    - Hail/Freezing Rain:
        - Take cover during hailstorms
        - Expect slippery walking and driving conditions

- Be aware of possible damage to trees and power lines due to ice buildup
- Avoid travel in these conditions

- Extreme Heat/Heat Stress:
  - Consult the climatic condition reports from your local weather service during Hazard Assessment
- High Wind:
  - When wind conditions exceed 50 km/hr. (30 mph), the Hazard Assessment shall be reviewed and adjusted to take the wind conditions into consideration, or the activity shall be suspended until wind conditions are more favorable
  - Consider other Hazards such as dust and debris, secure any loose materials
- Working after Sunset and before Sunrise:
  - Work after dusk shall not be permitted unless the following conditions are met:
    - Prior approval shall be obtained from the Company Representative,
    - There is a minimum of two (2) Contractors, or communications exist to outside areas to request assistance if required,
    - Adequate lighting is provided to illuminate the work, and
    - Regular “night shift” work shall require prior project approval.
  - Night security Contractors shall:
    - Not work alone, unless they have an adequate communication plan in place to contact other Contractors or emergency assistance as needed, and
    - Maintain communications and check in at least every two hours with Supervisor(s) familiar with the Worksite and the Emergency Response Plan for that project.

6.44. Vehicle Safety

6.44.1. Suppliers

Suppliers shall follow the appropriate *Transport Canada Act*, Regulation, and or Standard:

- *Transportation of Dangerous Goods Act, 1992*
- *Motor Vehicle Safety Act (S.C. 1993, c. 16)*
- *Motor Vehicle Transport Act (R.S.C., 1985, c. 29 (3rd Supp.))*
- *Canadian Energy Regulator Act (S.C. 2019, c. 28, s. 10)*
- *Non-smokers' Health Act (R.S.C., 1985, c. 15 (4th Supp.))*
- *Department of Transport Act (R.S.C., 1985, c. T-18)*
- *Emergency Management Act (S.C. 2007, c. 15)*
- *Canada Transportation Act (S.C. 1996, c. 10)*
- *Canadian Environmental Protection Act, 1999 (S.C. 1999, c. 33)*
- *Canadian Transportation Accident Investigation and Safety Board Act (S.C. 1989, c. 3)*

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

Suppliers shall ensure that Contractors:

- Inspect the vehicle you are operating as necessary. Vehicle must be maintained in safe operating condition. Only operate properly equipped and maintained vehicles.
- Verify that the necessary documents are in the vehicle (if driving a vehicle with a gross weight rating more than 26,000 lbs.).
- Verify that the vehicle is equipped with appropriate safety equipment.
- Possess a valid driver's license for each type of vehicle they operate and have the correct license in their possession when operating a vehicle.
- Maintain a good driving record and submit driver's abstracts when required.
- Retain each vehicle's current registration and insurance information in the cab of each vehicle.
- Immediately report all Motor Vehicle Events (MVI), driver's license violations and suspensions to their Supervisor.
- All drivers must perform a complete 360° check before moving a parked vehicle. This applies to all Supplier vehicles and rental vehicles.
- When parking in a facility, in a location not designated for parking, the following precautions should be taken:
    - Note proximity to barriers, piping, equipment, vents, etc.
    - Is the vehicle parked in a Hazardous Area and need to complete a Safe Work Permit?
    - FIRST MOVE IS FORWARD
    - Set the parking brake
    - Set wheel chocks if available
    - Before entering the vehicle to leave, perform a 360° check, noting again, the location of piping and equipment
- Obey all traffic signals and posted speed limits.
- Drive slowly and with caution, as appropriate, e.g., when road or driving conditions are poor or hazardous, and/or when Contractors or other people are present.
- Properly use all the safety mechanisms installed on vehicles, including seat belts.
- Ensure that all vehicle occupants are always wearing their seat belts when the vehicle is in motion.
- Use a Spotter in the following situations:
    - When backing into a busy roadway
    - When backing a pickup, utility truck or heavy equipment in a facility
    - When the heavy equipment operator cannot clearly see the work
    - When the heavy equipment operator is moving and cannot see all parts of the machine and its path of travel

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Driver and Spotter to communicate using hand signals that are agreed upon and understood prior to moving the vehicle.
- Any time a parked vehicle is left unattended, the motor should be shut off and the parking brake set.
    - Following are some exceptions when the motor of a parked, unattended vehicle can be left running:
        - When using exhaust to warm or thaw equipment
        - When using jumper cables to start or power equipment
        - When using auxiliary equipment such as an air compressor, auto crane, etc.
        - When the motor of a parked, unattended vehicle is left running:
            - Set the parking brake
            - Set wheel chocks
- To ensure a trailer will not break away from the towing vehicle:
    - Ensure correct hitch ball size and compatibility with receiver
    - Use adequately sized tow chains
    - Securely fasten tow chains
    - Cross tow chains to prevent a hitch from contacting the ground if it becomes disconnected
- Check Heavy Equipment vehicles at the beginning of each shift to ensure that the equipment is in safe operating condition.
    - Conduct a visual pre-start up inspection / walk-around.
    - Inspect all heavy equipment at regular intervals, depending on use, for:
        - Proper adjustment of operating mechanisms
        - Excessive wear or deterioration of components
        - Cleanliness of hydraulic system
        - Accidental damage
- Inspect truck bed and trailer bed loads and secure against movement before over-the-road operation.
- Refer to the *Cargo Management Guide* for additional information on cargo securement.

6.44.2. Commercial Motor Vehicles

- Commercial Motor Vehicle (CMV) – A motor vehicle or combination of motor vehicles used in commerce to transport passengers or property if one or more of the following applies to the motor vehicle:
- Vehicle with a gross vehicle weight rating (or more, whichever is greater) of 9,920 lbs. (4,500 kg).
- Vehicles identified as commercial motor vehicles shall ensure the following are readily accessible in the event of an accident or inspection:

  - Shipping papers for transporting hazardous materials, if applicable.
  - Driver's license with the proper class and endorsements for the vehicle being operated
- Copy of the completed Driver's Vehicle Inspection Report (post-trip inspection report) if equipment problems or safety concerns were identified.
- Backup alarms will be installed on all heavy equipment and utility trucks.
- A substantial cable guard should protect the operator of winch trucks or winch tractors from the danger of flying lines.
- At a minimum, carry the following equipment in all Supplier-owned and long-term (over 6 months) leased/rented vehicles:
  - Spare tire
  - First aid kit
  - Flashlight
  - Jack
  - Fire extinguisher
  - Triangle reflectors and/or battery-operated flares
  - 18" Red Warning Flags for oversized commercial loads
  - Spare bulbs and/or fuses
- Vehicle-mounted fire extinguishers must be:
  - Secured to the vehicle with a heavy-duty bracket designed specifically for the extinguisher by the extinguisher manufacturer
  - Mounted for quick and easy access
  - Mounted in a location that will help reduce the possibility of back and muscle strain when removing the fire extinguisher from the vehicle
  - Size 5 lbs. type BC or ABC extinguisher unless:
    - Vehicle is a welding truck (carry 20 lbs type BC or ABC)
- All Non-DOT Supplier and long-term leased/rented vehicles will be inspected at least monthly, document deficiencies.
  - Keep documented Vehicle Inspection Reports filed for one year.
  - Visually inspect trailers and vehicle hitches before each trip looking for worn, bent, cracked, broken or missing parts.
- Inspection Record Keeping for Commercial Motor Vehicles
  - DOT Vehicle Inspection Report (and Post Trip Inspection).
  - Document visual inspections of trailers and hitches on the DOT – *Driver's Vehicle Inspection Report.*
  - Keep the Vehicle Inspection Reports filed onsite for one year.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Visually inspect vehicle prior to operating.
- Document any deficiencies detected.
- Use the Driver's Vehicle Inspection Report to document pre-trip inspections of motor vehicle.

- Annual Vehicle Inspection Report
  - All DOT vehicles including power units and trailers.
  - A copy of documentation shall be carried in the power unit/trailer and may include a sticker or decal. (Varies by state/province.)
- The minimum requirements for vehicle recovery straps (if available).
  - Recovery Strap Specifications:
    - Recovery straps/ropes must meet the following minimum criteria:
      - Nylon strap/rope with manufactured ends such as Cordura eyes (sewn loops) suitable for use with a clevis,
      - Minimum two clevises per strap,
      - Minimum 6 m (20 ft.) length,
      - Ensure that the rated capacity of recovery strap is adequate for the weight of the vehicle being recovered.
  - Prohibited:
    - Towing straps and chains are not designed for vehicle recovery and therefore must not be used for vehicle recovery operations.
    - Lifting slings are not designed for recovery and therefore must not be used for vehicle recovery operations.
  - Identification:
    - Vehicle recovery straps/ropes must be marked with the rated strengths and/or capacities and be identified as VEHICLE RECOVERY STRAP.

6.44.3. Alcohol and Drugs Prohibited

- Required Tests for commercial motor vehicle (CMV) operators who hold a commercial driver's license:
  - Pre-Placement Testing
  - Reasonable Cause
  - Post-Accident Testing

6.45. Working Alone

6.45.1. Suppliers

Suppliers shall ensure that:

- A Working Alone policy is established for the project as applicable.
- Assessments made regarding the risk of working alone shall, at a minimum, consider the following before making the decision to begin or continue to work:
  - Hazard(s) involved with the work (including electrical, temperature extremes, hazardous atmosphere).
  - Isolation from immediate First Aid and Emergency Medical Services; (> 20 minutes)
  - Lack of or limited ability to call for help.
  - Travelling alone.
  - Meeting with stakeholder/landowner away from their office.
  - Working in areas with known security problems; and/or
  - The effectiveness of existing safety measures.
- Contractors may not work alone under hazardous conditions. The following conditions or activities are examples when working alone is prohibited:
  - In hazardous atmosphere (i.e. >5ppm H_2S, ≥10% LEL; <18-23%< O_2; above ACGIH thresholds)
  - Confined Space Entry
  - Pipeline Section Repair
  - Purging Pipelines or Tanks
  - Hot Work, (Category 1)
  - Hot Taps or Repairing Live Valves
  - Loading or pulling pipeline pigs
  - Critical or Serious Lifts
  - Working at heights requiring fall protection equipment
  - When travelling on an ATV or snowmobile
  - Entering a building after an intrusion alarm where it is apparent that an intruder may be present
  - Dealing with potentially violent landowners or co-Contractors
  - Confronting individuals engaging in criminal or suspicious activity (break and entry).
- Lone Contractors must be checked on at a frequency which is dependent upon the job being performed. In no case should the frequency be less than once each workday.
- Working alone controls may include, but are not limited to:
  - “Man down” or lone Contractor alarm or pendant.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- "Check-ins" with a designated contact person that:
  - are visual or two-way contacts (or, a one-way system may be acceptable if it allows the Contractor to call or signal for help and will send a call for help if the Contractor does not reset the device after a predetermined interval)
  - are of a frequency determined to be acceptable based, on a hazard assessment (factoring location and activities involved)
  - activates the escalation strategy if contact cannot be made, or there are unusual delays in re-establishing contact
- Provision for emergency rescue and first aid personnel.
- Auto notification and location device (Satellite GPS Messenger) in the event of an emergency in a remote location where response is required.

- Effective means of communication include, but are not limited to:
  - portable or cell telephone
  - walkie-talkie
  - personal alarm or pager
  - periodic site visits
  - electronic methods, such as online web applications
  - check-in system and requirement for updating an individual's status while working alone
  - GPS-based communication device (e.g., SPOT Messenger) use of software or hardware to assist with communication in circumstances of poor network coverage
- A Contractor would be considered missing if they fail to respond at the designated contact time and continuing attempts to contact them over the next fifteen (15) minutes have been unsuccessful.

Suppliers shall ensure that Contractors:

- Travelling alone to or through remote locations shall inform their supervisor or designate of their travel plans. Upon arrival at the destination the Contractor shall make contact and provide an update.
  - The supervisor or designate shall log all the information regarding the Contractor's travel plans and arrival time and status. It is the responsibility of the supervisor to initiate a response in the event that communications have failed to be met.

6.46. Working on Ice or Near Water

6.46.1. Suppliers

Suppliers shall ensure that:

- Hazard assessment is performed to determine the restricted area near the water. As part of the hazard assessment, consider water: temperature, depth, and flow rate (if applicable).
- Restricted areas (control zone) shall be a minimum of 2 m (6.5 ft.) from the edge of an unguarded body of water or plastic liner of lagoon/pond/basin.
- Restricted area shall be identified by signs reflecting “Restricted Area, Permit Required, Do Not Enter”.
- The following recommendations should be considered in the hazard identification review:
    - a Personal Floatation Device (PFD)
    - a safety net or fall protection system
    - emergency equipment shall be provided and held in readiness
    - a person who is qualified to operate all the emergency equipment provided shall be available
    - if appropriate a powered boat shall be provided and held in readiness
    - written emergency procedures shall be prepared by the Supplier containing
        - a full description of the procedures to be followed and the responsibilities of all person granted access to the workplace, and
        - the location of any emergency
- Where a workplace is a wharf, dock, pier, quay or other similar structure, a ladder that extends at least two rungs below water level shall be affixed to the face of the structure every 60 m along its length.
- The following guideline (see table below) shall be followed when working on ice:
    - Develop a safe work plan and,
    - Involve an engineer to review site-specific safe work procedures when the conditions listed in the table below apply.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

Table 23: Working on Ice Guidelines

MINIMUM ICE THICKNESS FOR LOADS PARKED FOR MORE THAN 2 HOURS AND LESS THAN 7 DAYS
• To know how long a load or vehicle can remain in one place on the ice, you need to know the GVW and ice thickness.
• Load in place more than 2 hours but less than 7 days
• After two hours under a load, ice begins to sag and bend, until the ice cover fails. Greater ice thickness usually means a load can be on the ice cover longer, if it's clear, good quality ice.
• If the load in place for more than 7 days, the plan must be reviewed by a professional engineer.

LOAD PARKED OR STATIONARY >2 HRS <7 DAYS	MINIMUM ICE THICKNESS
Person standing	15 cm
Snowmobile: machine & rider < 500 kg	25 cm
Loaded vehicle: GVW 500 to 1,000 kg	32
Loaded vehicle: GVW 1,000 to 2,000 kg	41
Loaded vehicle: GVW 2,000 to 3,000 kg	46
¾–ton 4x4 vehicle: GVW up to 5,000 kg	55
Loads over 5,000 kg	Refer to Best Practice

6.47. Walking and Working Surfaces

6.47.1. Suppliers

Suppliers shall ensure that:

- Suppliers working at Company facilities and worksites within Canada are required to comply with the applicable provincial regulations for the province in which they are operating.
- Contractors receive fall protection system training as applicable to their job duties.
- Fall protection system equipment is provided for Contractor use and is used by each Contractor at all locations with fall hazards.
- All work areas have a means of access/egress (structure, stairs, ladders, scaffolding, etc.) that minimizes Contractor exposure to fall hazards.
- Walking-working surfaces are inspected, regularly and as necessary, and maintained in a safe condition.
- Immediately take measures to ensure walking/working surfaces that are not in a safe condition are barricaded, isolated and/or usage is prevented.
- Walking and working surfaces must have the strength and integrity to support Contractors and shall be kept clean, dry (where possible), and orderly.
- Every floor, workplace, and passageway shall be kept free from protruding nails, splinters, holes, or loose boards.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- All floor and wall openings, including manholes, trapdoors, pits, ladder-way floor openings, and chute openings, must be safely covered or blocked from access.
    - Barricades that are designed to prevent someone from falling into the opening must be visually noticeable and cannot have additional openings that create additional fall hazards.
    - Floor surfaces surrounding the opening shall be free of clutter and slippery material.
    - When an opening is not covered or blocked from access, a person must be assigned for constant attendance to the opening until the cover is replaced.
- Floor Openings, Wall Openings and Holes
    - Every floor opening or platform shall be guarded by a standard railing.
    - Toe boards must be installed around floor openings of floor holes and wall openings and where the potential exists for tools and other materials to fall on personnel working below.
- The floor or roof of a building shall not be overloaded with materials and/or equipment over the approved load limits. Elevated storage and other platforms shall be marked with the load bearing weight.
- Guardrail Systems
    - Guardrail systems must be surfaced to prevent injury to a Contractor from punctures or lacerations, and to prevent snagging of clothing.
    - Where material is piled to such height that a standard toe board does not provide protection, paneling from floor to intermediate rail, or to top rail must be provided.
- Stairways, Exits, Landings and Openings shall be designated and kept clear of hazards, debris, snow, and ice.
- Exposed duct banks and conduit shall not be used as walkways.
- Building exits shall be marked and shall have emergency lighting where required by Applicable Legislation.
- Other Working Surfaces – Dockboards (Bridge Plates)
    - Portable and powered dockboards must be of sufficient strength to carry the load imposed on them.
    - Portable dockboards must be secured in position by being anchored or equipped with devices that prevent slippage during use.
    - Handholds, or other effective means, shall be provided on portable dockboards to permit safe handling.

Suppliers shall ensure that Contractors:

- Inspect ladders and fall protection system equipment before using and remove any defective equipment from service. Immediately report damaged fall protection equipment, ladders, scaffolding, accessories, and missing or lost components to supervision.
- Use ladders, scaffolds and fall protection systems for their intended use and in a safe manner.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Refuse to use fall protection systems for which training has not been received.
- Immediately report non-injury and injury falls to supervision and remove from service any fall protection equipment subjected to a fall.
- Immediately take measures to barricade, isolate or prevent usage of walking/working surfaces that are not in a safe condition, and report condition to supervision.
- Fall protection equipment shall always be worn and used when working from an Elevating Work Platform (EWP).

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

7. Administrative Controls – Industrial Hygiene

7.1. General Requirements

7.1.1. Suppliers

Supplier is required to have a written Industrial Hygiene Program to protect Contractors as applicable to all work to be performed, to include (but not limited to) the following:

- Asbestos Management
- Ergonomics
- Exposure Assessment for Hazardous Substances
- Hearing Loss Prevention
- Hydrogen Sulfide
- Lead Management
- Naturally Occurring Radioactive Material (NORM)
- Radiation Safety
- Heat Stress or Cold Stress

7.2. Asbestos Management

7.2.1. Suppliers

Suppliers shall ensure that:

- ACM and potential ACM must be identified and documented (i.e., signage, inventory) and managed in accordance with the applicable Company and legal requirements, as it pertains to Suppliers work when ACM may be encountered during maintenance, repair, construction, demolition, and removal activities.
- All Contractors who face a potential exposure to asbestos must receive training applicable to their potential level of exposure based on the tasks they are expected to perform.
- At minimum, Contractors should have sufficient knowledge to identify asbestos exposure hazards that may exist in their work assignments and either know how to control these hazards or know who to contact to assist in controlling these hazards.
- Regulatory reporting (e.g., permits or notices) requirements for work involving asbestos handling or disposal must be completed as required.

7.3. Benzene Management

The Benzene Management Program is designed to ensure compliance with federal regulation as well as applicable Provincial regulations such as those set by WorkSafeBC. The program provides documentation to support compliance with specific provincial occupational health and safety regulations, including:

- an “exposure control plan” (ECP) under BC OHS Regulations 5.54
- a “code of practice” under Alberta OHS Code, Part 4

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

The requirements outlined in this program apply specifically to operational areas where there is a potential risk of exposure to benzene as well as other related volatile organic compounds (VOCs), such as toluene, ethylbenzene and xylene.

Benzene Exposure Limits

Occupational exposure limits for benzene are established to protect workers from harmful health effects. The **Time-Weighted Average (TWA)** represents the average concentration a worker can be exposed to over an 8-hour workday. The **Short-Term Exposure Limit (STEL)** is the maximum concentration permitted over a 15-minute period. Additionally, a **Skin Notation** indicates that benzene can be significantly absorbed through the skin, contributing to overall exposure.

Regulatory Jurisdiction	TWA (8-hr)	STEL (15-min)	Skin Notation
WorkSafeBC	0.5 ppm	2.5 ppm	Yes
Federal CANADA	0.02 ppm	N/A	Yes

**Exposure limits for benzene related volatile organic compounds like toluene, ethylbenzene and xylene referenced in Exposure Assessments to Hazardous Substances.*

Workers should participate in Occupational Hygiene medical surveillance testing if they meet any of the following criteria:

- They are exposed to benzene at or above the action level as an 8-hour time-weighted average (TWA) for 30 or more days per year.
- ~~They are exposed to benzene at or above 10 ppm for any duration, including short-term or emergency exposures.~~
- They are involved in an emergency exposure event involving benzene without adequate PPE or respiratory protection.

Suppliers shall ensure that the program prioritizes the elimination or minimization of exposure through engineering and administrative controls before relying on respiratory protection or other PPE. To manage exposure effectively, assess the risk level and apply appropriate control measures using the hierarchy of controls:

- **Elimination or Substitution**: replacing benzene-containing products with less hazardous alternatives whenever possible
- **Engineering Controls:** the use of local exhaust ventilation, enclosed systems, or vapor recovery units to lower airborne concentrations
- **Administrative Controls:** limit how long and how often workers are exposed or rotating job assignments to reduce individual risk
- **Personal Protective Equipment**: PPE should be used as a last resort when other means of control are impractical. A hazard analysis must be done to determine appropriate personal protective equipment for the task (i.e. respiratory protection, chemical-resistant gloves and clothing, and eye protection).
- Complete and maintain applicable benzene hazard awareness training as determined by

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

site-specific exposure risks and job responsibilities.

- Be quantitatively fit tested for the respirator to be used at the worksite.
- Be trained in the instrument(s) they will use for sampling.
- Understand and follow any procedures designed to minimize exposure to benzene, including area isolation, signage, ventilation requirements, and the proper use of respiratory protection and other personal protective equipment (PPE).
- Immediately report any suspected or known benzene exposure risks to their People Leader

Respiratory Protection

Selection of respirator protection, including respirator type and cartridge, is based on airborne benzene concentration levels (ppm) and must comply with applicable regulatory standards. A regular cartridge change-out schedule must be established in accordance with the manufacturer's recommendations. All cartridges must be discarded after one work shift. However, at elevated benzene concentrations, cartridges may reach their end-of-service life before end of the shift and must be replaced sooner to ensure continued protection.

Table 2: Respiratory Protection

Benzene Concentration	WorkSafeBC
< 0.5 ppm	Respiratory protection optional (below OEL)
0.5 – 5 ppm	Full-facepiece respirator with organic vapor cartridges
5 – 20 ppm	Supplied-air respirator or full-facepiece APR
> 25 ppm	SCBA or SAR with escape bottle (positive pressure)

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

7.4. Ergonomics

7.4.1 Suppliers

Supplier shall be required to meet the general duties of Section 125(t) of the *Canada Labour Code Part II* and Article*19 (Part XIX – Hazard Prevention) of the Canada Occupational Health and Safety Regulations.*

Suppliers shall ensure that:

- Identify and assess all ergonomic-related hazards, considering the nature of the hazard, Contractor exposure to the hazard and its effects, preventive measures, and event data.
- In the case of ergonomics-related hazards, specific consideration shall be made for:
    - the physical demands of the work activities, the work environment, the work procedures, the organization of the work and the circumstances in which the work activities are performed, and
    - the characteristics of materials, goods, persons, things and workspaces and the features of tools and equipment.
- Preventive measures taken to address the assessed ergonomic hazard must be made in the following order of priority:
    - elimination of the hazard by way of engineering controls which may involve mechanical aids, equipment design or redesign that consider the physical attributes of the Contractor,
    - the reduction of the hazard, including isolating it,
    - the provision of PPE, clothing, devices, or materials, and
    - administrative procedures, such as the management of hazard exposure and recovery periods and the management of work patterns and methods.
    - where appropriate, those controls established to address ergonomic hazards shall be routinely evaluated as part of a preventive maintenance program.
- No preventive measure shall create a hazard.
- The preventive measures shall include steps to address ergonomics-related hazards that are identified when planning implementation of change to the work environment or to work duties, equipment, practices, or processes.
- The effectiveness of the ergonomics hazard prevention program shall be reviewed annually or:
    - whenever there is a change in conditions in respect of the hazards; and
    - whenever new hazard information in respect of a hazard in the workplace becomes available to the employer.
- The evaluation of the effectiveness of the prevention program shall be based on event/injury data, program audits, workplace inspections, Contractor interviews and document assessments.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

7.5. Exposure Assessment for Hazardous Substances

7.5.1 Suppliers

Suppliers shall ensure that:

- An up-to-date record of all hazardous substances that exist in the workplace is kept and maintained.
- All hazardous substance investigation reports completed by a qualified person shall be kept and maintained for 30 years.
- Quantitative assessments of hazardous substance exposure shall be kept for a minimum of 3 years.
- Training records associated with hazardous substance control shall be kept for two years.
- If a Contractor has the potential to be exposed to a hazardous substance, Supplier will ensure an assessment is completed, that:
    - characterizes the hazardous substance(s) based on properties.
    - identifies possible pathways and routes of exposure.
    - reviews potential acute and chronic health effects.
    - assesses exposure and risk potential using qualitative methods and, if required, quantitative methods in accordance with ACGIH/NIOSH or other accepted methods.
    - evaluates exposure based on thresholds for acceptable exposure found in the ACGIH TLV Indices, Safety Codes, ANSI, CSA, or other references as deemed appropriate by the Qualified Person.
    - recommends controls as appropriate including elimination, substitution, engineering controls (e.g. ventilation), administrative controls, and/or PPE.
- Frequency of assessment is based on normal operating conditions and may be adjusted, or sampling may occur at the request of a Contractor, health care provider (based on potential illness), Workplace Committee or regulator.
- Where an assessment recommends medical examination, a physician shall be consulted to confirm the need for assessment.
- All medical examinations shall result in a report of
    - fit to work; or
    - fit to work with restriction(s).
- Where an investigation recommends controls, HS Support shall be consulted in the development of:
    - signage and warnings.
    - Contractors education.
    - process isolation procedures where hazardous exposures are expected.
    - access to SDS and other hazard specific information.
- Ventilation plans shall consider *Part 6* of the *National Building Code, ACGIH Industrial Ventilation, and ANSI Z9.2-1979* as amended.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- HVAC inspections, tests and maintenance shall be established and conducted by a Qualified Person.
- Where practical, automated warning systems are used to monitor and alarm if dangerous levels of a hazardous substance is detected.

- All controlled products used in Canada must be approved by Company.
  - An up-to-date Safety Data Sheet (SDS) shall always be accessible for controlled products via the SDS database.
  - Each controlled product container must have either a:
    - supplier label that complies with the *Hazardous Product Act* requirements; or
    - workplace label that includes product identifier, hazard information and reference to SDS availability.
  - Where a controlled product is hazardous waste, a label or sign shall be used to communicate the hazard.
  - Controlled products shall be stored in accordance with the *National Fire Code* requirements for:
    - maximum volumes, control of ignition sources, ambient conditions, housekeeping, storage arrangements, separation from other hazardous substances, corrosion protection, flooring, fire suppression, smoke venting, spill control, fire department access, labels, placards, training, authorized access control, storage of combustibles and oxidizers.
    - indoor storage of compressed gases, poisonous, corrosive, or oxidizing gases.
    - outdoor storage including storage areas, clearance, separation, training, general safety precautions.
    - compressed gas storage and handling.
    - flammable liquids and combustible liquids storage and handling.

Table 24: Western Canada Hazardous Substances Exposure Monitoring List

OCCUPATIONAL EXPOSURE	FREQUENCY OF ASSESSMENT	EXPOSURE LIMIT		
Naturally Occurring Radioactive Materials (NORMs) or Radiation Sources	Initial, 3 years, on request and prior to a confined space entry, or other associated maintenance activities	Affected Group	Annual Effective Dose Limit (mSv)	Five Year Cumulative Dose Limit (mSv)
		Occupationally Exposed Contractors	20	100
		Eventally Exposed Contractors	1	5
		General Public	0.3	5
Radiation – Gamma Radiation Derived Working Limits		Incremental Gamma Dose Range (nSv / hr)	Recommended Control	
		<150	No Action Required	

OCCUPATIONAL EXPOSURE	FREQUENCY OF ASSESSMENT	EXPOSURE LIMIT	
		150-500	NORM Management Plan (Eventally Exposed Contractors)
		>500	Dose Management Plan (Occupationally Exposed Contractors)
Asbestos	Initial, 3 years, or upon request or prior to associated maintenance activities	8-hour OEL [f/cc]	
		0.1	
Benzene	Initial, 3 years, on request or prior to a confined space entry, or other associated maintenance activities	8-Hour OEL [ppm]	12-hour Adjusted OEL [ppm]
		0.5 0.02 (Federal)	0.25
Coal tar pitch volatiles	On request or prior to potential exposure associated with maintenance activities	8-hour OEL [mg/m^3]	
		0.2	
Hydrogen sulfide	Fixed detection systems, and post event involving exposures.	8-Hour OEL [ppm]	Ceiling Occupational Exposure Limit [ppm]
		1	5
Sulphur Dioxide	Fixed detection systems, and post event involving exposures.	Short Term Exposure Limit [ppm]	
		0.25	
Carbon Dioxide	Fixed detection systems, and post event involving exposures.	8-Hour OEL [ppm]	
		5000	
Carbon Monoxide	Fixed detection systems, and post event involving exposures.	8-Hour OEL [ppm]	
		25	
Lead and lead compounds	Initial, or prior associated maintenance activities	Risk level	Potential airborne lead concentration [mg/m^3]
		Low	<0.05
		Low-moderate	0.05-0.50
		Moderate	>0.50-1.25
		Moderate-high	<1.25-2.50
		High	>2.50
Silica-crystalline, respirable	On request or prior to associated maintenance activities	8-hour OEL [mg/m^3]	
		0.025	
Butane	On request or prior to associated maintenance activities, or post event investigation	8-hour OEL [ppm]	
		1000	
Ethyl Benzene	On request or prior to associated maintenance activities, or post event investigation	8-Hour OEL [ppm]	12-hour Adjusted OEL [ppm]
		20	10

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

OCCUPATIONAL EXPOSURE	FREQUENCY OF ASSESSMENT	EXPOSURE LIMIT	
Toluene	On request or prior to associated maintenance activities, or post event investigation	8-Hour OEL [ppm]	12-hour Adjusted OEL [ppm]
		20	10
Xylene	On request or prior to associated maintenance activities, or post event investigation	8-Hour OEL [ppm]	12-hour Adjusted OEL [ppm]
		100	50
Amines Monoisopropanolamine (MIPA)	On request or prior to associated maintenance activities or post event investigation.	8-Hour OEL [ppm]	12-hour Adjusted OEL [ppm]
		2	1
Amines Diisopropanolamine (DIPA)	On request or prior to associated maintenance activities or post event investigation.	8-Hour OEL [ppm]	12-hour Adjusted OEL [ppm]
		10	5
Amines Sulfolane	On request or prior to associated maintenance activities or post event investigation.	8-Hour OEL [ppm]	12-hour Adjusted OEL [ppm]
		0.37	0.185

Suppliers shall ensure that Contractors:

- Identify hazardous substance exposures to Management
- Participate in the assessment of exposure and development of controls
- Comply with policies/practices developed to establish exposure control
- Provide immediate feedback regarding health symptoms identified and participate in Supplier programs for medical monitoring

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

7.6. Hearing Loss Prevention

Hearing protection measures and hearing loss prevention programs are mandated by *OHS* regulators.

7.5.1. Suppliers

Suppliers shall ensure that:

- A Hearing Loss Prevention program is implemented if they have a potential noise hazard that exceed the following regulated thresholds:
    - This includes any facility or operation where Contractor noise exposures reach or exceed 82 dBA Lex,8 (normalized noise exposure level over an 8-hour period).
- Management must ensure sound level surveys are performed to identify work areas and job descriptions that must be subject to the Suppliers Hearing Loss Prevention program.
- Contractors that meet these thresholds and have job descriptions that expose them to these noise levels must participate in audiometric testing (hearing test) requirements in the Suppliers Hearing Loss Prevention programs.
    - Audiometric testing results are recorded and linked to long term monitoring programs including programs that track and record suspected industrial hearing loss in individual Contractors.
- Supplier must provide the following control measures to reduce Contractor noise exposure to within regulated limits:
    - Engineering controls such as:
        - modification or maintenance of equipment to reduce generated noise levels.
        - enclosure of noise generating equipment.
    - Administrative controls such as:
        - Alterations in work scheduling to reduce Contractor exposure to excessive noise levels.
        - Signage to mark areas with high noise levels and required hearing protection PPE if working under noise in these areas.
        - Training and education on noise hazards and the proper use and maintenance of hearing protection devices.
    - Supplying and enforcing the use of personal hearing protection include earplugs and earmuffs (or both).

Suppliers shall ensure that Contractors:

- Wear properly fitted hearing protectors per the manufacturer's recommendations, in all posted high noise areas at the time of exposure and around tasks that produce noise.
- Store and maintain hearing protectors in a clean, dry (sanitary) environment.
- Report noise hazards and hearing protector problems to their Supervisor.
- Participate in audiometric testing and hearing loss monitoring programs as required.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

7.7. Hydrogen Sulfide

7.6.1. Suppliers

Suppliers shall ensure that:

- Suppliers H_2S program is designed to ensure full compliance with federal *OHS* regulations (*Canada Occupational Health and Safety Regulations*) as well as provide documentation that meets the following provincial regulatory requirements:
- An “exposure control plan” (ECP) under *BC OHS Regulations, Part 5, section 5.54*
- a “code of practice” under Alberta *OHS Code, Part 4, section 26(1) and (2)*
- The H_2S program requirements are applicable to those Company areas and facilities that present a risk of H_2S exposure above the ACGIH limits (i.e., the facility or operating area must process, store, or transport a gas or liquid product that could produce with any type of loss of containment a Contractor’s breathing zone exposure to a TLV-TWA above 1 ppm; or a TLV-STEL averaged over 15 minutes above 5 ppm not more than four times per day with at least 60 minutes between successive exposures).
- Basic information on H_2S exposure hazards needs to be readily available and regularly reviewed (e.g., annually or prior to operation with H_2S exposure risk) with Contractors on any sites subject to an H_2S Program, including:
- Properties, symptoms, and consequences of H_2S exposure.
- Mandated Asset Area or local procedures, including personal gas monitor requirements that are critical preventing H_2S exposure risk are communicated.
- Emergency response procedures, including the importance of knowing wind direction, muster points, and rescue requirements are communicated.
- Visitors to sites with H_2S exposure hazards must be informed of the hazard, basic emergency response, and escorted in areas with H_2S exposure hazard by an authorized person unless an employee or Supplier is already familiar with H_2S related procedures and local H_2S hazards.

Suppliers shall ensure that Contractors:

- Remain aware of where and how they may encounter H_2S exposure risk within the operating area or facility in which they are working.
- Know and follow any procedures designed to manage H_2S exposure risk.
- Know and follow pre-determined emergency response procedures for H_2S release events.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

7.8. Lead Management

7.7.1. Suppliers

Suppliers shall ensure that:

- Suppliers Lead Management Program ensures full compliance with federal *OHS* regulations (Canada Occupational Health and Safety Regulations) as well as provide documentation that meets the following provincial regulatory requirements:
    - An “exposure control plan” (ECP) under BC *OHS Regulations, Part 5, section5.54*
    - a “code of practice” under Alberta *OHS Code, Part 4, section 26(1) and (2)*
- Supplier has verified which areas or facilities associated with the project have lead containing paints and coatings on structures or equipment.
- Know (or review when applicable) the Suppliers Lead Management Program elements, procedures, and practices that must be followed during any activities that may disturb lead containing (or possibly lead containing) paints or coatings.
- Supplier supervisor must ensure they are sufficiently aware of paints and coatings that contain lead or may contain lead to ensure Lead Management Program requirements are met if work activities will involve disturbing these lead-containing paints or coatings.
    - Contractors regularly working in areas with lead-based paints or coatings should be informed of this hazard.
    - In Canadian facilities and operating areas, lead paints and coatings must be physically identified with signs and labels.
- All Contractors should be made aware of lead hazards if their work will involve potentially disturbing or working around activities that are disturbing lead paints or coatings.
    - This may be managed through a variety of communication channels including general training on hazardous substances and in pre-job hazard assessment and control activities.
- Any activity that may involve disturbing, removing, disposing, or otherwise handling paint or coatings that contain lead needs to be conducted in accordance with the applicable Lead Management Program.
    - Different types of activities create higher or lower levels of risk and control measures are mandated based on the type of activity and the potential exposure to lead that could come from that activity.

Suppliers shall ensure that Contractors:

- Complete and maintain applicable lead hazard awareness or management training as mandated, based on site exposure risks and job description.
- Report any potential lead exposure risks, known lead exposure risks, or any known lead exposure immediately to their Supervisor.
- Know and follow any procedures designed to minimize exposure to lead, including as required area isolation, signage, and/or ventilation, respiratory protection, and other PPE requirements.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

7.9. Naturally Occurring Radioactive Material (Norm)

7.8.1. Suppliers

Suppliers shall ensure that:

- Supplier NORM Program ensures full compliance with the Canadian NORM Program (and US NORM Program where applicable) exist to ensure activities related to the detection, control, decontamination, and/or disposal of materials or equipment contaminated at Company sites/facilities are conducted as required and personnel conducting these activities do so safely.
- NORMs management practices will vary between jurisdiction based on local requirements. All programs, however, will provide the following elements:
    - identifying equipment and areas that carry a risk of NORM exposure (based on a NORM survey).
    - signage for any equipment found to exceed regulatory radiation limits.
    - PPE and personal hygiene practices required if there is potential of handling NORMs contaminated material or equipment.
    - training requirements (at various levels depending on role in NORM program).
    - storage and disposal requirements for NORMs and NORMs containing or contaminated equipment.

Suppliers shall ensure that Contractors:

- Complete and maintain applicable NORMs training as mandated, based on site exposure risks and job description.
- Know and follow any procedures designed to minimize exposure to NORMs and reduce overall NORMs exposure when conducting activities with a NORMs exposure risk.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

7.10. Radiation Safety

The use of nuclear gauges on **Western Canada** worksites requires Company to be licensed with the Canadian Nuclear Safety Commission and follow the requirements of the General Nuclear Safety and Control Regulations.

As such, the Radiation Safety program is only applicable to the Western Canada worksites with these radioactive sources.

7.9.1. Suppliers

Suppliers shall not handle or work with nuclear gauges unless:

- specifically hire to perform servicing work on the nuclear gauge
- possess a valid CNSC license to perform the work
- is escorted by the RSO or designate

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

7.11. Heat Stress or Cold Stress

7.10.1. Suppliers

Suppliers shall ensure that:

- Preventative measures are implemented when extreme weather conditions are anticipated
- Routinely assess the risks associated for personnel working in cold or hot climates
- Adequate work schedules are developed to allow for modified rest periods during the extreme weather
- Re-allocate or rotate staff duties to reduce individual Contractor exposure to extreme heat or cold conditions
- Workload and work activities are arranged to better fit the climate exposures
- Schedule hot jobs to cooler times of the day and cold jobs to warmer times of the day, if possible
- That water and/or replacement liquids are available to prevent dehydration during extreme thermal weather conditions
- Reduce the physical demands of work tasks with mechanical devices (e.g., use hoists, lift-tables, etc.)
- Provide climate conditioned rest areas for cold and heat extremes, such as radiant heaters to warm Contractors or air conditioning to cool them
- In areas where heat stress is likely, Suppliers shall have a heat stress plan to protect Contractors
- Reduce the temperature and humidity through air cooling
- Increase air movement by providing fans for spot cooling
- Use insulating and reflective barriers to control heat as practical
- Extreme Heat Guidelines:
    - Assess the demands of all jobs, have monitoring, and control strategies in place for hot days
    - Obtain the Humidex values by measuring temperature (dry bulb) and relative humidity and factoring them into the Humidex table
    - Obtaining heat index from a reliable weather service forecast may also be used as a point of reference
    - Determine the amount of cloud cover, the exertion level of the work being conducted, and the type of clothing being worn to calculate the correction factor
    - Apply the correction factor
    - Repeat the Hazard Assessment process whenever climatic conditions change more than +/- 5 ^{o}F or ~+/-3 ^{o}C
    - Additional controls to be applied:
        - reduce the physical demands of work (e.g., excessive lifting, digging with heavy objects)

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

  - provide recovery areas (e.g., air-conditioned enclosures, rooms for rehydration)
  - use shifts (e.g., early morning, cool part of the day, night work)
  - use relief Contractors
  - use Contractor pacing
  - take steps to protect Contractors from exposure to UV radiation such as sunscreen, PPE, and clothing with UV protection and wide brims
  - assign extra Contractors and limit Contractor occupancy or the number of Contractors present, especially in confined or Enclosed Spaces
  - train Contractors to recognize the signs and symptoms of heat stress; and to know and follow heat stress prevention measures
  - provide water nearby on the Worksite (Contractors should drink about one cup of water every 20 to 30 minutes, even if they are not thirsty)
  - consult the Occupational Hygienist for addition actions to consider

- Extreme Cold Guidelines:
  - Wear layers of warm clothing and cover as much exposed skin as possible
  - Train Contractors to recognize signs and symptoms of cold related conditions in other Contractors
  - Increase the frequency and length of rest breaks as needed
- Contractors have adequate personal protection from thermal extremes including clothing and work location.
- Shielding work areas from drafts or wind will reduce the wind chill in extremely cold environments.

Suppliers shall ensure that Contractors:

- Follow the rest or work break schedules during extreme weather conditions
- Increase liquid intake to stay hydrated during extreme hot or cold weather conditions
- Monitor each other for signs of overexposure to thermal extremes
- All Contractors should be aware of signs and symptoms in co-Contractors
- Drink plenty of water, fruit juices, and, in hot environments, electrolyte replacement beverages. In cold weather, drink warm non-caffeinated beverages such as cider or herbal teas
- Train Contractors to recognize the signs and symptoms of thermal stress caused by heat-related or cold related conditions.
- PPE for Hot Weather Conditions:
  - Wear light, summer clothing meeting the minimum PPE clothing requirements
  - If working outside, apply sunscreen with a sun protection factor (SPF) of at least 15
  - For very hot environments, consider air, water or ice cooled insulated specialty vest worn with normal clothing.
- PPE for Cold Weather Conditions:

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Wearing appropriate clothing and being aware of how your body is reacting to the cold are important to preventing cold stress.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

8. Administrative Controls – Abnormal

8.1. Emergency Management

8.1.1. Suppliers

Suppliers shall ensure that:

- The Supplier Emergency Response Plan conforms to the requirements set forth by regulatory agencies and Company Emergency Management Program requirements.
- A site-specific emergency plan is developed and readily available for all locations.
- Emergency evacuation maps, phone contacts and other support documents are posted in prominent locations or available at each site.
- The emergency contact list shall be reviewed quarterly to confirm the accuracy of the emergency response phone numbers and accuracy of individual names.
- A current list of Contractors trained in first aid and cardiopulmonary resuscitation (CPR) shall be maintained and posted at each site.
- At least one first aid trained Contractor shall be assigned to each shift and with each field group working on Company facilities.
- All emergency equipment must be inspected per *Emergency Equipment Inspection section*.
- First Aid equipment shall be inspected as per the appropriate *First Aid Equipment section.*
- Fire Extinguishers shall be inspected in accordance with the *Fire Extinguishers section*.

8.2. Emergency Eyewash and Shower Stations

8.2.1. Suppliers

Suppliers shall ensure that:

- All Contractors who may need the emergency eyewash and shower equipment are trained on their location and use as per appropriate to the project.
- Adequate quantities of eyewash stations are provided based on the type and quantity of chemicals present on the Worksite, and in accordance with the information or directions on the applicable SDSs, plus the Hazard Assessment for that project.
- For self-contained eyewash stations and unsealed portable eyewashes, change the flushing fluids quarterly, or as specified by the manufacturer. If using water, add a preservative to maintain freshness; there are commercial additives that can help prevent freezing and micro-organism build-up.
- At isolated or remote work areas, at least one portable eyewash (squeeze bottle) shall be available anywhere there is a potential Hazard from chemicals.
- Locate squeeze bottles close to the chemical Hazard and protect each bottle from the elements (e.g., prevent freezing).
- When working with single or small number of batteries with liquid electrolyte (i.e., meter stations), portable eyewash bottles that equal one gallon of solution is appropriate.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- When working with sealed batteries that are non-spilling, portable eyewash is not needed unless visual inspection shows that a case is damaged and contact with internal components is possible.
- During inspection, ensure the eyewash equipment is clean with nozzles protected from airborne contaminants; placed in its designated location. Also ensure sufficient eyewash fluid is available. When inspecting portable eyewashes, ensure the seal is not broken or past the expiry date. If expired, replace immediately or as soon as possible.

8.3. First Aid Requirements

This section applies to all federally regulated workplaces in **Canada** where there are six or more occupants, at remote sites where there are two or more Contractors working, or for work involving high voltage hazards.

8.3.1. Supplier

Suppliers shall ensure that:

- Contractors receive the proper training in first aid.
- An adequate level of first aid attendants and equipment as required by the provincial jurisdiction of each project are provided. Supplier First Aid Training Guidance Table (Operational Work – does not include office work) and Supplier First Aid Supplies and Equipment Requirements provides the minimum requirements for First Aid Services on these sites.
- On a worksite with six (6) or more Contractors at any time, a first aid attendant shall:
    - be assigned.
    - be readily available and accessible to Contractors during working hours.
    - render first aid to injured/ill Contractors.
    - accompany Contractors to a medical treatment facility as required.
    - oversee providing care for injured/ill Contractors until they are under the care of an equally or more qualified caregiver.
    - not be assigned duties that interfere with the prompt and adequate rendering of First Aid.
- At least one first aid station shall be provided for every workplace, including vehicles where Contractors perform work. First aid stations shall be:
    - clearly identified by a conspicuous sign and readily available during all working hours.
    - inspected monthly to verify that contents are clean and dry.
    - where a First Aid Room or medical treatment facility is located at a worksite, a First Aid Station is not required.
- A posting should be made in a conspicuous location (e.g., workplace safety bulletin board and first aid station) to identify Attendants, location(s) of first aid stations, emergency contacts, and basic instruction that align with First Aid training.
- All first aid supplies and equipment shall be checked and logged on an inspection form. The requirements for first aid supplies and equipment are based on the number of Employees at

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

the worksite. These are listed in Section 16.7 of the *Canada Occupational Health and Safety Regulations (COHSR)* as well as applicable provincial OHS Regulations (Alberta, British Columbia, New Brunswick, and Nova Scotia). For the purposes of consistency across Canada First Aid Supplies and Equipment will be maintained to the COHS requirements unless the facility is under provincial jurisdiction. If the federal requirements do not meet the level of expectation that the provincial jurisdiction requires; then the provincial requirements will also be addressed. C*OHSR – Western Canada First Aid Supplies, Equipment, Facilities and Attendants Requirements* and the *COHSR Specific First Aid Kit Requirements* outlines the federal requirements for first aid.

- All AEDs shall be checked annually and must be:
    - approved for sale as medical devices by *Health Canada, Medical Devices Bureau (MDB)*. The manufacturer is required to license the AED. Labels must state indications and conditions for AED use including a requirement that they are used only by Qualified Persons.
- A Contractor using an AED must be adequately qualified through training received in Emergency, Standard or CPR/AED First Aid courses.
    - if a Contractor requires an AED for first aid, ensure that the Contractor is removed from a potentially flammable atmosphere prior to using the AED. An AED should not be used in a flammable atmosphere.
- Resources are assigned to confirm that all First Aid equipment is inspected, compliant and that records of inspection are maintained.
- That occupational injuries and/or illnesses are reported to the Company immediately upon notification of a workplace event, complete the required Contractors compensation board report.
- Promptly provide Contractors with Short Term Disability paperwork when notified of a non-occupational injury or illness involving lost time from work. Complete Contractor Notification on-line for submission to the Third-Party Administrator.
- Provide Offer of Modified Work and the Modified Work Form to the Contractor before they visit their doctor (as required) on same day of event.
- Contractor is aware of the Return to Work process.
- Maintain regular contact with Contractor during their absence from work and monitor their progress upon they return to work.
- Identify and arrange and offer reasonable modified work opportunities to accommodate Contractors who are disabled due to injury or illness.
- Monitor the progress of Contractors in modified work programs and meet with them regularly to ensure they will be successful in achieving their return to work goal.
- Any Contractor that is expected to regularly work or travel alone is required to train and maintain Emergency or Level 1 First Aid level certification as a minimum.

Suppliers shall ensure that Contractors:

First Aid Attendant shall:

- Assess injury and treat to level of knowledge.

- The Occupational First Aid Attendant (OFAA) informs Contractors supervisor of workplace injury.
- Start the injury treatment and arrange for transport to home or hospital as appropriate.
- Complete the first aid record and provide a copy to Contractor, physician, and Company.
- A copy of all redacted First Aid records and documents will be provided to the Company.
- All first aid treatment provided to an ill or injured Contractor will be documented. If First Aid is rendered, the First Aid Attendant who renders the first aid shall create a first aid record that includes:
    - date and time of the report.
    - name of injured/ill Contractor.
    - date and time of occurrence.
    - brief description of injury/illness.
    - brief description of first aid rendered.
    - brief description of arrangements made for transportation.
    - names of witnesses.
- Persons with access to first aid information shall keep the information confidential.
- If an OFFA is available, Contractor reports directly to OFAA for immediate assessment and possible treatment.
- If an OFAA is not available, immediately and before leaving the site, inform your supervisor and the Company face-to-face or by phone call and email.
- Report any occupational injury/illness immediately to Supplier Manager/Team Lead or designate.
- Seek medical attention from a Qualified Health Practitioner and have the Modified Work Form filled out by the Qualified Health Practitioner.
- Advise Supplier Manager/Team Lead or designate immediately and Inform Qualified Health Practitioner that return to work opportunities are available in the workplace to accommodate their limitations and restrictions and provide a copy of the offer of modified work letter and modified work form.
- Return the completed, signed Modified Work Form to the Supplier.
- Cooperate and perform the assigned work tasks in a safe manner consistent with the Modified Work Plan.
- Inform Supplier of any concerns or changes in their condition.
- Communicate regularly with Supplier Manager/Team Lead or designate through their recovery period and cooperate with the company in finding suitable return to work opportunities.
- Comply with treatment recommendations; attend all medical and rehabilitation appointments.
- Report any concerns with the Modified Work Plan to the Supplier Manager/Team Lead.
- Refer to the Supplier policy for the appropriate primary contact for any Return to Work concerns and updates of their progress.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Attend and actively participate in any scheduled Return to Work progress meetings.
- Obtain and provide an updated Modified Work Form as outlined in the Modified Work Plan and/or as requested by Manager/Team Lead or designate.
- Participate in a Functional Abilities Evaluation (FAE) or Independent Medical Examination (IME) as per Supplier Policy
- British Columbia – Complete the Contractors Report of Injury Form 6A and provide copy to Supplier, physician, and Company.

8.3.2. Contractors within an Operating Facility

- Contractors designated as first responders, are required to train, and maintain Standard First Aid level or Level 1 certification as a minimum.
- First Aid training is also required in the following situations:
    - new hires or transfers into an area where First Aid training is required, as defined by Contactor Policies must have training if they do not have a current certification.
    - retraining is also necessary if there are changes in the workplace or in the legislation rendering previous training obsolete, and
    - individuals who are required to fulfill the following roles outside of their normal position:
        - ***Electrical Safety Person*** – a electrician who is immediately available and in line of sight of a Contractor conducting work on high voltage electrical components.
        - ***Confined Space Attendant/Safety Watch*** – a person who is assigned to monitor the wellbeing of an individual within a confined space and provide immediate assistance in the event of a medical emergency.
        - ***Confined Space Rescue Person*** – a person assigned the role to conduct rescues for personnel within a confined space.

8.3.3. Contractors within Western Canada Offices

The number of Contractors designated as first aiders shall comply with *COHSR Part 16* or the numbers defined by the emergency response planned determined within the building's management company emergency response plan. First aiders will initially be chosen from volunteers; based on their likelihood of being in the office on a regular basis.

9. Contractor Safety Management

9.1. General

Company will communicate safety requirements to Suppliers through ISNetworld and the Company Construction Safety Manual as well as project specific scope documentation and pre-job meetings.

9.1.1. Supplier

Suppliers shall ensure that:

- Hazards are identified, assessed, and controlled.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Supplier Personnel report all events, unsafe conditions, and near misses to the Supervising Company Representative.
- Suppliers Personnel operate equipment only with proper training and authorization.
- Suppliers Personnel are fit for duty.
- All personnel under the Supplier direction are adequately trained for the services being performed.
- Subcontractor is held to the same standards as the Supplier.
- Every employer (the Supplier) is required to ensure that all Contractors are made aware of known, identified, foreseeable and potential H&S hazards to which they are likely to be exposed by their work.
- Supplier's management and supervisors shall provide active assistance and support for the Company in the following ways:
    - Act as the point of contact for communication of work direction from the company.
    - Ensure that all responsibilities of the Supplier, and Supplier Personnel, are performed.
    - Stop all unsafe work immediately.
    - Provide Subject Matter Expert (SME) input into Pre-Job Meeting and Site-Specific Orientation materials (as required).
    - Ensure attendance of personnel at the Pre-Job Meeting.
    - Ensure Supplier Personnel complete orientation requirements prior to work.
    - Participate in inspections (as appropriate).
    - Organize and provide leadership for required hazard management activities including meetings, SWPs, JHAs, FLHAs, or equivalent hazard assessment documents.
    - Serve as Permit receiver when leading or working with a group of Contractors in each task.
    - Provide support to the FAN audit process if completed on their worksite.

Suppliers shall ensure that Contractors:

- Comply with Company H&S requirements.
- Comply with all applicable legislation.
- Participate in premobilization meetings.
- Follow hazard identification, assessment, and control procedures.
- Ensure Contractors report all events, unsafe conditions, and near misses to the Person in Charge (PIC) / Authorized Representative or Designate
- Subcontractor Personnel shall:
    - Comply with Company H&S requirements.
    - Comply with all applicable legislation.
    - Participate in premobilization meetings and hazard assessments.
    - Report all events, unsafe conditions, and near misses to the Person in Charge / Authorized Enbridge Representative or Designate

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

9.1.2. Subcontractor Safety Management

- Suppliers that will be using Subcontractor must ensure and demonstrate that its Subcontractor meet, comply, or exceed Company's minimum Safety pre-qualifications criteria.
- The Supplier will document and be able to provide such documentation upon request to the Company as evidence that each Subcontractor has been pre-qualified utilizing the appropriate Company form.
- If a Subcontractor does not meet the Safety pre-qualification requirements, the Supplier will provide documentation to the Company.
    - on the appropriate Company form,
    - documenting the areas that they don't meet the criterial, and
    - what the Supplier's corrective actions and or additional safety control measures for managing the Subcontractor for the intended work will be.
- Applicable Company Representative will accept or reject the usage of all Subcontractor.
- Supplier shall, at the request of Company, provide validation of its qualifications and records of training for all Supplier personnel performing Work. Supplier shall keep current training records readily available for review by Company at its request.
- Suppliers must provide evidence of training and qualification records to the Company at the worksite for verification.

9.1.3. Supplier Safety Representatives:

- The degree of Supplier-supplied safety representation required will be determined, by Company, in advance of mobilization to site, prior to award and identified in the bid documents.
- Regardless of the degree of Supplier safety representation required, the accountability of Supplier safety performance rests with the Supplier's supervision.
- There are two levels of representation required by Company:
    - A combined Supervisor or Contractor/Safety Representative is required to have, at a minimum, safety leadership training or approved equivalent training on projects with 15 or less people on site within 5 years of the start date of their scope of work.
    - Level 2:
        - A minimum of one full time Safety Representative with NO OTHER field construction duties is required for any project with 16 or more people on site (or equivalent).
        - In addition, Company may approve other comparable qualifications after a review of the person's combination of training and experience.
        - The Supplier's Safety Representative's resume of qualifications and experience shall be submitted prior to work for approval by the respective Company Safety Coordinator.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- Additional Supplier Safety Representatives will be required when the workforce exceeds 51 personnel and at every interval of 50 after that. Additional safety personnel may be required as specified in the bid documents. For Mainline construction work one senior safety person, two field safety representatives and one safety administrator for a sizeable pipeline spread.
- Company reserves the right, at its sole discretion, to change the number of required Supplier Safety Representatives assigned to the Work, accept or reject the suitability of any Supplier Safety Representative, and where making a change or rejecting a Supplier Safety Representative, Company will provide the Supplier with written justification of that decision.
- The Supplier Safety Representative shall coordinate the requirements of the Supplier's H&S Procedure and the Enbridge GTM Construction Safety Manual and advise the Supplier on matters related to OHS.

9.1.4. Event Reporting and Investigation

- Contractors will immediately report to the Person in Charge (PIC) / Enbridge Authorized Representative or Designate all events, including subcontractor work related injuries and illnesses, vehicle, property damage, Near Misses, spills & releases, fires or explosions arising from the Suppliers execution of work.
- Examples include:
  - injuries and illnesses including minor First Aids
  - damage to company and Supplier property
  - fires, explosions, blowouts, ruptures
  - overpressures
  - abnormal events
  - vehicle events including heavy equipment that occur on company property, ROW, or projects
  - unauthorized releases to air, land, and water
  - security threats
  - workplace violence
  - theft
  - all public and landowner complaints,
  - all contact with government agencies and public officials concerning the project or any work activities.
- The Supplier shall provide an initial written report to the Company of its investigation of the event within 24 hours. Within seven days a final report is required and shall include the following information:
  - who reported the event?
  - date reported

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

- worksite location
- date and time the event occurred
- indicate the event type:
  - injury/illness
  - environmental
  - property damage
  - vehicle
  - complaint
  - security
  - near Misses
- description of the Event including any immediate actions
- the final determination of cause of event and corrective actions

- The Supplier may be asked to participate in the company event investigation and will implement all agreed to corrective actions.
- The Company can request that all Supplier personal with direct involvement in the event be drug and or alcohol tested at the Supplier's expense.
- The Supplier shall comply with any event reporting requirements set out by the government authority having jurisdiction over the Supplier such as a provincial occupational health and safety regulator.

9.1.5. Site Safety Management Processes

- Daily shift work requires the following hazard management steps:
  - Tailgate Meeting
    - This is a daily meeting held and led by the Supplier for all Contractors who will work on a given job at a worksite.
    - This meeting should include a discussion of actual and potential hazards and controls of the work to be performed and at the worksite.
    - In certain circumstances, where a pre-work walk through of the worksite is performed, this meeting may also be used to develop, or review a JHA, discuss an issued SWP, or complete an FLHA.
    - Attendance records must be created for all tailgate meetings.
  - Safe Work Permit (SWP) and/or specialized permits
    - The Supplier's Enbridge Representative that will participate in/directly oversee other Contractors on a joint task is the Permit receiver.
  - Immediately prior to work, Contractors must complete a Field Level Hazard Assessment (FLHA) or equivalent to identify and address any immediate area hazards arising that were not anticipated in previous hazard management activities.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

9.1.6. Pre-Work Activities, Mobilization and/or Kick-off Meetings

- All Contract Personnel involved in the performance of work on the worksite and/or the management and supervision of the performance of work on the worksite must attend/complete:
    - A Pre-Job Meeting prior to engaging in work on the worksite.
    - Company H&S Orientation – Annual Contractor Orientation
        - This must be completed prior to engaging in work on any Company worksite.
        - Once complete, the Company H&S Orientation is valid for a year for any Company worksite.
        - Proof of completion must be provided to Company
    - A Site-specific Orientation
        - This needs to be completed prior to engaging in work at a specific operation or facility for the first time and subsequently if there are significant changes in local conditions since a previous visit that necessitate a new site-specific orientation.
        - Attendance records are kept for any pre-job meetings.
        - The pre-job meeting must include communication of the applicable safety requirements.
- The Company People Leader may request Supplier participation in a safety observation section.
- Supplier Personnel must return SWPs to the permit issuer for sign off and JHAs, FLHAs (or equivalent) as applicable for archiving purposes.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

10. Management of Change

10.1. General

Supplier shall verify that they comply with all of the Company's Management of Change requirements.

11. Training and Competency

11.1. Competency Assurance

"Competent Person" means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to Contractors, and who has authorization to take prompt corrective measures to eliminate them. *(CFR 1926.32[f])*

Further to the above description, 'competent' means adequately qualified, suitably trained and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

11.1.1. Suppliers

Suppliers shall ensure that:

- Provide Contractors that are competent to safely perform the work they are assigned.
    - Suppliers must provide evidence demonstrating the competency of their Contractors.
- Contractors must be deemed competent by their Supervisor in an assigned task to be allowed to perform this task independently.
    - Contractors not yet deemed competent may only perform this task under the supervision of another Contractor who is deemed competent.
- Supervisors assess the H&S competency of Contractors under their control. This should include activities such as:
    - confirming existing qualifications, training, and experience through the onboarding process for new or transferring Contractors.
- Supervisors should also proactively work with Contractors to ensure any necessary qualification or certification for their work does not expire.
    - participating in and/or reviewing spot checks, inspections, or audits of Hazard and Risk Management activities, for example through reviews of JHAs, Safe Work Permits, FLHAs, or other hazard management activities.
    - conducting regular worksite visits and/or inspections to allow for firsthand observation of Contractor competency.

Suppliers shall ensure that Contractors:

- Report to their Supervisor any concerns regarding competency issues, especially if they believe they may not be sufficiently qualified or experienced for an assigned task and the hazards it represents or if a required qualification has or is about to expire.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

11.2. Health and Safety Training

11.2.1. Suppliers

Suppliers shall ensure that:

- Contractors under their direction are assigned and complete the H&S Training that is:
  - required based on the type of work they do or where they do their work.
- Training is completed before the Contractor is exposed to a specific hazard (e.g., asbestos handling course prior to doing this work or confined space entry training prior to participating in a confined space entry).
- All completed H&S Training by a Contractor must be documented and made available to Company upon request.

Suppliers shall ensure that Contractors:

- Alert Supervisors if they believe their training on a specific workplace hazard or topic is insufficient for the work they do.

11.3. Health and Safety Orientations

11.3.1. Suppliers

Suppliers shall ensure that:

- Contractors under their direction complete all applicable Company H&S Orientation requirements.
  - this requires ensuring sufficient time for the orientation to be completed prior to beginning work duties.
  - this includes Contractors new to Supplier or Contractors new to a facility or operating area.

11.4. Safety Observation Program

11.4.1. Suppliers

Suppliers shall ensure that:

- Company will be granted access to the site at all times to observe the Work.
  - Observation and inspection will be conducted throughout the course of the Project.
- Contractors participate in observations program as per Company requirements.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

12. Documents and Records Management

12.1. Document Control

Supplier shall have a records retention policy in place to ensure that all documents or records used, prepared, created or produced by the Supplier in the performance of the work on behalf of Company are maintained and preserved by the Supplier for durations of time that are not less than the limitation periods prescribed in the applicable statutes of limitations or limitation of actions legislation in force in the jurisdictions the Supplier operates. Supplier will keep any such records/documents for a longer period of time if requested to do so by the Company.

Notwithstanding the foregoing, Supplier's copy of all work permits, and hazards assessments must be kept and preserved by Supplier in accordance with Company's Records Retention Schedule pursuant to Company's Records Management Policy.

For records/documents that may be relevant or material to litigation or anticipated litigation, Supplier shall ensure a legal hold is implemented immediately once Supplier becomes aware of any litigation or anticipated litigation and such records/or documents subject to the legal hold shall be preserved and not be destroyed until such time the legal hold is lifted by the Company.

12.2. Records Management

The Company will audit SWP, JSA, and safety observations for compliance and quality assurance.

- SWP:
    - All required sections complete
    - Work scope/description contains sufficient detail
    - Is it documented that required PPE has been identified and communicated
    - It is documented that operational and/or site-specific hazards have been reviewed and discussed
    - Attached permits/documentation/work order # are identified
    - Gas testing/monitoring results are in permissible exposure limit
    - Issuer and receiver have signed
- JHA:
    - All sections requiring information are filled out
    - Job description aligns with the SWP
    - Job site matches the SWP job site
    - Supplier company identified
    - Each task assigned to an individual
    - Hazards and controls are identified
    - A person (or position) has been identified to put the controls in place for each hazard identified

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

12.2.1. Suppliers

Suppliers shall ensure that:

- An H&S Filing System Directory is established to document the system for orderly documentation in accordance to Supplier's retention requirement.
- For records marked "Confidential" and/or "Privileged", secure such records separately from other H&S records. These records should be in locked storage cabinet or room with limited access to only those who are authorized to access such records to fulfill their employment duties these documents include but are not limited to:
    - solicitor/client privileged information, such as legal advice/correspondence from the Legal department or outside counsel.
    - attorney work product, such as research or audits prepared at the direction of the Legal department.
    - confidential information or work products, such as those generated during internal or self-audits.
    - event investigation documentation/records prepared under privilege.
    - records that contain personal information of a Contractor.

Access to Contractor Exposure

- Each Contractor has the right to access:
    - Records which measure or monitor the amount of possible exposure to chemicals or physical agents in the work area.
- Each analysis using exposure concerning the Contractor's working conditions or workplace.
- Upon written request, the Supplier will provide the information pertaining to exposure, analysis to the Contractor.
- Any Contractor who wishes to access exposure should contact their supervisor for further instructions.
- New Contractor shall be informed during orientation and annually thereafter of:
    - The existence, location, and availability of any exposure.
    - The person responsible for maintaining and providing access to exposure.
    - Each Contractor rights of access to exposure records.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

13. Health and Safety Assurance

13.1. Event Reporting, Investigation and Learning

Suppliers shall ensure that they immediately report to Company all EHS events including work related injuries and illnesses, vehicle, property damage, Near Misses, spills and releases, fires, or explosions arising from the Supplier's execution of work.

Reportable Event: An event is an unplanned occurrence that interrupts a work activity.

- Reportable events include:
  - People:
    - Injuries or illnesses to Contractors or Visitors
  - Environment:
    - Unauthorized or unplanned releases or
    - Impacts to air, land, water, or wildlife
  - Property Damage:
    - Ruptures, fires, or explosions
    - Motor Vehicle, aircraft, or watercraft events involving Contractors
    - Damage to Company, Supplier, or third-party property or
    - Theft or vandalism
  - Regulatory and Other:
    - Government agency visits or contact
    - Permit / license contraventions
    - Unauthorized activity on ROW
    - Landowner / public complaints or
    - Security Threats
  - Near Misses involving any of the above
- The Supplier shall provide an initial written report to the Company of its investigation of the event within 24 hours. Within seven days a final report is required.
- The following process steps apply for all investigations associated with Company work:
  - Identify and report the event
  - Secure the scene
  - Determine Severity
  - Identify Lead Investigator and investigation team
  - Conduct investigation and complete investigation report
  - Create recommendations for Corrective and Preventative Actions
  - Share Lessons Learned
  - Event Close Out Review
- Supplier shall have a process to share event investigations, lessons learned and corrective action items with Contractors.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

13.2. Internal Health and Safety Inspections

13.2.1. Suppliers

Suppliers shall ensure that:

- Company will be granted access to the worksite at all times to observe the Work.
    - Observation and inspection will be conducted throughout the course of the Project.
- Company H&S inspections can be conducted by any member of the Company; management team, supervisors, operators, technicians, committees, EHS personnel, or consultants for Company.

13.3. General Facility Safety Inspection

13.3.1. Suppliers

Suppliers shall ensure that:

- Monthly inspections are completed
- See that deficiencies reported on the monthly inspections are corrected in a timely manner
- ***Formal Inspection*** – A scheduled inspection of equipment or a work area that will require a written record
- ***Informal Inspection*** – A random visual inspection of equipment or a work area that may require a written record
- Informal Inspections should be conducted on Work Areas, Life Safety equipment (e.g. Fire Extinguishers)
    - Walking and working surfaces above 1.2 m (4 ft.) must be properly guarded with handrails and toe boards or other barriers
        - Work platforms shall be properly constructed around elevated operating valves.
        - All walking and working surface must be free of tripping hazards.
    - Eyewash bottles and self-contained emergency eyewash units shall be inspected regularly to ensure they are ready for service.
    - Fire protection equipment is formally inspected monthly (by using Form HSF-068 Monthly Emergency Equipment Inspections or equivalent form.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

13.4. Management of Regulatory Inspections

Regulatory agencies are authorized to visit or inspect worksites to assess compliance with standards issued by the agency. Regulatory inspections can occur post event, in response to a complaint, as part of a planned inspection program. Inspections can be announced or unannounced.

13.4.1. Suppliers

Suppliers shall immediately report to the Company the arrival of a regulatory official at a facility or location to the Company.

13.5. Corrective and Preventive Actions

13.5.1. Suppliers

Suppliers shall ensure that:

- Report identified H&S program non-conformances to the Company.
- Generate a CAPA from planned or unplanned assurance activity such as:
    - Event trends (or recurrence) of minor non-conformances
    - Recurring problems with procedures
    - Previous corrective or preventive actions are no longer effective
    - Audit findings
    - Inspection findings
    - Event Investigation learning
    - Contractor concern

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

14. Stakeholder Engagement

14.1. Internal Communications

14.1.1. Suppliers

Suppliers shall ensure that:

- The following types of work shall have a specific pre-job meeting with Contractors involved in the task to discuss the specific Hazards associated with the job:
  - High Voltage Electrical work
  - Serious and Critical lifts
  - Confined Space Entry
  - Excavation and Trenching
  - Work around overhead power lines
  - Open systems work
  - Pigging
  - Tie-ins
  - Specific one-off jobs that are hazardous
- Pre-job meetings must include all work groups involved in job planning and job execution.
- At a minimum, Suppliers shall conduct and document:
  - a daily “tailgate” safety meeting; to review work permits and H&S issues associated with the day’s work, and/or in some cases, prior to a specific high-risk task.
  - a weekly (or once per work rotation), formal safety meeting to review all H&S issues; the Supplier shall provide a copy of the written minutes of this meeting to the Company Representative.

14.2. Post Event Leadership Review (PILR)

The purpose of the Post Event Leadership Review (PILR) is to provide a structured approach for both Company and Supplier Leadership to address the “lack of control” issues identified in investigation reports and to further identify organizational learnings to continually improve the effectiveness of the Safety Management Program.

The primary goal of the PILR therefore is to validate the investigation report root cause analysis, confirm that the corrective actions taken prevent recurrence of the same event event and events with similar characteristics across all Business Units Enterprise wide.

The PILR described in this Guideline is process-driven and outlines the minimum requirements to prepare for and facilitate an effective meeting to advance our safety culture.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

14.3. Regulated Workplace Committees

14.3.1. Suppliers

Suppliers shall ensure that Canadian federally required workplace committees have been established to ensure that there is structured and open dialogue between Contractors and Management on all EHS issues as required.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

Appendix A – Acronyms

Table 26: Acronyms

ACRONYM	DESCRIPTION
ACGIH	American Conference of Governmental Hygienists
ACM	Asbestos Containing Material
AED	Automated External Defibrillator
AFFF	Aqueous Film-Forming Foam Concentrate
ALARA	As Low as Reasonably Achievable
ANSI	American National Standards Institute
API	American Petroleum Institute
APR	Air Purifying Respirator
ATPV	Arc Thermal Protection Value
ATV	All-Terrain Vehicle
AWP	Aerial Work Platform
CAPA	Corrective and Preventive Actions
CBT	Computer Based Training
CFR	Code of Federal Regulations
CMV	Commercial Motor Vehicle
CPR	Cardiopulmonary Resuscitation
CSA	Canadian Standards Association
DOT	Department of Transportation
EAM	Enterprise Asset Management
E&C	Engineering and Construction
EHS	Environment, Health and Safety
FAE	Functional Abilities Evaluation
FAN	Field Audit Network
FLHA	Field Level Hazard Assessment
FFFP	Film Forming Fluoroprotein Foam
FMCSA	Federal Motor Carrier Safety Administration
FRC	Flame Resistant Clothing
GDL	Governance Documents Library
GHS	Global Harmonized System
GTM	Gas, Transmission & Midstream
HAZCOM	Hazard Communication
HAZMAT	Hazardous Materials Transportation
HAZOPS	Hazard and Operability Studies
HEPA	High Efficiency Particulate Air
H&S (HS)	Health and Safety
HVSA	High Visibility Safety Apparel
IDLH	Immediately Dangerous to Life or Health Concentrations
IME	Independent Medical Examination

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

ACRONYM	DESCRIPTION
IMS	Integrated Management System
ISN	ISNetworld
LEL	Lower Explosive Limit
LFL	Lower Flammable Limit
LOTO	Lockout/Tagout
MCR	Management Committee Review
MOC	Management of Change
MVI	Motor Vehicle Event
NFPA	National Fire Protection Association
NGL	Natural Gas Liquids
NIOSH	National Institute of Occupational Safety and Health
NOV	Notice of Violation
OEL	Occupational Exposure Limit
OEM	Original Equipment Manufacturers
OFAA	Occupational First Aid Attendant
OHS	Occupational Health and Safety
OPIM	Other Potentially Infectious Material
OQ	Operator Qualification
PEL	Permissible Exposure Limit
PFAS	Personal Fall Arrest System
PFRS	Personal Fall Restraint System
PFD	Personal Floatation Device
PHA	Process Hazard Analysis
PHMSA	Pipeline and Hazardous Materials Safety Administration
PIC	Person in Charge
PLHCP	Physician or Other Licensed Health Care Professional
PLM	Pipeline Maintenance
PPE	Personal Protective Equipment
RPE	Respiratory Protective Equipment
ROPS	Roll-Over Protective Structures
ROW	Right-of-Way
RSO	Radiation Safety Officer
SAR	Supplied-Air Respirator
SABA	Supplied Air Breathing Apparatus
SCBA	Self-Contained Breathing Apparatus
SDS	Safety Data Sheet
SME	Subject Matter Expert
SRL	Self-Retracting Lifeline (or Self-Retracting Lanyard)
STEL	Short Term Exposure Limit
SWL	Safe Working Load
SWP	Safe Work Permit

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

ACRONYM	DESCRIPTION
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value (ACGIH)
TWA	Time Weighted Average
UAS	Unmanned Aircraft Systems
UAV	Unmanned Aircraft Vehicle
USCG	United States Coast Guard
UTV	Utility Terrain Vehicle
WHMIS	Workplace Hazardous Material Information System
WLL	Working Load Limit
WMP	Waste Management Plan

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

Appendix B – Terms and Definitions

Table 27: Terms and Definitions

DEFINITION	DESCRIPTION
Abnormal Event	An abnormal event is defined as an occurrence or change of specific circumstances related to the malfunction of a component or deviation from normal operations that may: (a) Indicate a condition exceeding design limit; or (b) Result in a threat(s) to persons, property, or the environment.
Abnormal Operating Condition	A condition identified by the operator that may indicate a malfunction of a component or deviation from normal operations that may: (a) indicate a condition exceeding design limit; or (b) result in a threat(s) to people, property, or the environment.
Acclimatization	The physiological adjustment process that occurs when a healthy Contractor accustomed to a temperate environment begins to work in a hot or cold environment. These adjustments should take place over a period of days (up to 1-2 weeks), during which time spent may be gradually increased safely.
Air Purifying Respirator (APR)	A respirator with an air purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air purifying element. OSHA 1910.134 CSA Z94.4-11
All-Terrain Vehicle (ATV)	Also known as a quad, quad bike, or four-wheeler. A vehicle that travels on low-pressure tires, with a seat that is straddled by the operator, along with handlebars for steering control. Any off-road vehicle that does not have factory equipped roll-overprotective structures (ROPS) and seatbelts is considered for purposes of this Manual to be an ATV.
Anomaly	A possible deviation in the properties of the pipe or a discontinuity in the material of the pipe, typically reported by non-destructive examination.
Appurtenances	All attachments to piping (e.g., valves, plugs, fittings, stopple fittings, welded fittings, flanges, vents, branch piping, known abandoned Below Grade Facilities, etc.)
Aqueous Film-Forming Foam Concentrate (AFFF)	A substance that is based on fluorinated foam surfactants plus foam stabilizers and usually diluted with water to a 3% or 6% foam solution. The foam solution acts as a barrier that excludes air or oxygen and develops an aqueous film on the fuel surface capable of suppressing the evolution of fuel vapors. The foam solution is suitable for combined use with dry chemicals.
As Low as Reasonably Achievable (ALARA)	The point at which the cost and resources required to reduce risk any further is disproportionate to the benefit gained.
Assigned Protection Factor	The workplace level of respiratory protection that a respirator or class of respirators is expected to provide to Employees when the employer implements a continuing, effective respiratory protection section.
Atmospheric Monitoring	Atmospheric Monitoring that continuously monitors atmospheric content and results are typically determined in real-time (e.g. use of a handheld instrument).
Authorized Contractor	A Qualified Contractor authorized by Enbridge to perform a specific task (i.e. LOTO of a machine/equipment to perform maintenance on that machine/equipment).
Automated External Defibrillator (AED)	A device that, once activated, automatically performs an analysis the heart rhythm and, if it detects a problem that may respond to an electrical shock, it permits a shock to be delivered to restore normal heart rhythm.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
Below Grade Facility	Refers to existing below grade or underground operating facilities, utilities, structures and supports, such as pipelines, cables, conduits, casings, concrete piles, or concrete foundations.
Benching or Benching System	A method of protecting Contractors 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.
Bleed	A drain or a vent.
Blind	A solid plate installed through the cross section of a pipe, usually at a flanged connection. (i.e. Spectacle blinds, Spades, Spacers)
Blind Flange	A solid plate installed at the end of a pipe on a flange which has been physically disconnected from a piping system at that point.
Block Valve	Gate, plug, or ball valve that blocks flow and isolates pressure to the downstream side when in a closed position. It could be single or double seated and either unidirectional or bidirectional.
Blood	Includes human blood, human blood components, and products made from human blood.
Bloodborne Pathogen	Viruses, bacteria, and other microorganisms in human blood or other potentially infectious materials that can cause disease in persons who are exposed to blood or other potentially infectious materials containing the pathogens. These microorganisms can cause diseases such as Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Human Immunodeficiency Virus (HIV), and many others.
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.
Brace	With reference to scaffolding, a brace is a tie that holds one scaffold member in a fixed position with respect to another member. Brace also means a rigid type of connection holding a scaffold to a building or structure.
Breathing Zone	Volume surrounding a Contractor's nose and mouth from which they breathe air over the course of a work period. This zone can be pictured by inscribing a sphere with a radius about 25 cm (10 in.) centered at the Contractor's nose.
Brownfield	Any existing Enbridge Operational Facility (Including processing equipment and underground pipelines), where operations has care, custody and control accountabilities, operations can delegate accountabilities to the projects group when formally agreed to i.e. activities inside or adjacent (within 3m (10ft.)) of an operational location.
Cardiopulmonary Resuscitation (CPR)	The emergency substitution of heart and lung action to restore life to someone who appears not to have breathing capability
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.
Ceiling Occupational Exposure Limit	An Exposure Limit which should not be exceeded at any time.
Choppy Seas	Seas forming large waves 1.9-2.7 m (6-9 ft.) high that are irregular and broken with an increased frequency making it difficult to maintain balance on a flat surface.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
CO_2 System	A type of fixed fire extinguishing system that releases carbon dioxide from cylinders into an enclosed space. Operation is triggered automatically or manually.
Cold Stress	A general term applied to strain on the body caused by prolonged exposure to cold air or water, or by a short-term exposure to extremely cold air or water.
Cold Work	Any work activity or process that is unlikely to ignite flammable vapors (e.g., does not involve a spark, an open flame, or a hot surface).
Combustible Liquids	Liquids that can burn, classified by a flashpoint ≥37.8°C (100°F) and <93.3°C 200°F). Combustible Liquids can burn at temperatures that are usually above working temperatures. Any liquid having a flashpoint at or above 100°F (37.8°C). OSHA 1910.106(a)(18)
Competency	The ability for an individual to demonstrate of both the knowledge and practical skills and training to consistently perform a given task to a pre-determined standard.
Conduction	The transfer of heat between materials that contact each other. Heat passes from the warmer material to the cooler material. For example, a Contractor's skin can transfer heat to a contacting surface if that surface is cooler, and vice versa.
Conductor	Cable, bus or any conductive material or piece of electrical equipment.
Confined Space	An enclosed or partially enclosed area that meets all of the following: is not designed or intended for continuous Contractor occupancy (e.g., tanks, pipes). has restricted means of entry and exit that may compromise the provision of first aid, evacuation, rescue, or other emergency response (e.g., manholes, electrical vaults, boreholes, pits, sump tanks, vertical and horizontal culverts); and is large enough so that a Contractor's entire body can enter the space
Confined Space Entry	Occurs when any part of a Contractor's body enters a Confined Space.
Contingent Contractor	• Provides services that allow the company to meet short-term, temporary, and other staffing needs to assist with various projects and specialized tasks • Execute work as directed by an Enbridge People Leader. • Adheres to all H&S training requirements.
Contingency Plan	• A plan that sets out the steps to be taken in the event that existing hazard and risk controls fail and an Abnormal Event occurs. A formal, documented Contingency Plan is created when it is determined that an unacceptable residual risk of an Abnormal Event due to planned work remains despite the application of existing hazard and risk controls.
Contractor(s)	• Contractors employed by a Supplier performing activities to perform a scope of work. • Executes the Scope of Work. • Has the responsibility to stop work when they are unfamiliar with Hazards or are concerned about the control of a hazard that is applicable to their scope of work
Contractor Management	Systematic Process(s), which define requirements for coordinating and controlling operational activities of a Contractor that enable them to perform the Scope(s) of Work in a manner that is safe, ensures the security of the facility and protects the environment.
Supplier Prequalification Variance Request	Form used to document Suppliers safety prequalification deficiencies, required mitigation plan and Management approval to use a deficient Supplier with either a Yellow or Red grade in ISN.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
Control	A mechanism or process that minimizes the risk of the hazard becoming actual, so it protects people, property, or the environment from the identified hazard.
Convection	The transfer of heat in a moving fluid. Air flowing past the body can cool the body if the air temperature is cool. On the other hand, air that exceeds 35°C (95°F) can increase the heat load on the body.
Corrective Action	A reactive process to address concerns or issues after they have occurred. It assumes that a non-conformance or problem has been identified and has been reported by Employees of the organization or by other stakeholders.
Coupler	With reference to scaffolding, a coupler is a device for locking together the component tubes of a tube and coupler scaffold.
De-energized	Disconnected or otherwise isolated from all energy sources and not containing residual or stored energy.
Dismounted	When the operator of an industrial truck is dismounted and within 25 ft. of the truck still in view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement.
Double Block and Bleed	An isolation system that separates a single pressure source by closing two in-line block valves and by opening a drain or vent valve in the line between the two closed block valves.
Downstream	The side of the valve with lower or no pressure.
Enbridge	A generic term used for Enbridge Gas Transmission & Midstream applying to design, construction, commissioning, operations, maintenance and decommissioning, and other legal entities under the control of Gas Transmission & Midstream.
Enbridge Employee	Individuals filling full or part-time positions that have been established for an undefined period of continuous employment. Individuals filling temporary or casual full time or part time positions that are established for a limited, predetermined period, usually less than one year in length.
Enbridge Locations	All Enbridge sites, workplaces, worksites, facilities, terminals, stations, and administrative and project offices.
Enbridge Operations Representative	A generic term that refers to the Employee responsible for the location (e.g. Site Supervisor, PLM Coordinator/Supervisor, Technician, Terminal Supervisor) or designate.
Enbridge Representative	An Enbridge Employee or third-party hire representing Enbridge for specific Contractor work or project.
Enbridge Inspector	An Enbridge Employee or any third-party hire overseeing Enbridge projects on behalf of Enbridge and who is responsible for the inspection of work. May include trade specific Inspectors.
Enbridge Workforce	See Workforce.
Enclosed Space	Enclosed or partly enclosed area that is not designed nor intended for frequent and lengthy occupancy, has unrestricted means of entry and exit (e.g. pump shelters and densitometer, instrument, and sample buildings), and that may aggravate ordinary job hazards.
Energized	Connected to an energy source or contains residual or stored energy.
Energized Equipment	Conductors and conductive parts of electrical equipment that are not locked out and verified energy free. High-voltage equipment is considered energized until grounded.
Energy Isolation Device	Mechanical device that physically prevents the transmission or release of energy.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
Energy Source	Any origin of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other force.
Ergonomics	Scientific study of people and the work they perform with the goal of minimizing risk of injury/illness through improved workstation design; reducing non-value-added motions and improving Contractor moral, productivity, and product quality.
Evaporative Cooling	Takes place when sweat evaporates from the skin. High humidity reduces the rate of evaporation and thus reduces the effectiveness of the body's primary cooling mechanism.
Excavation	Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.
Excavation Area	The area in which any type of excavation is expected to occur. The perimeter of the Excavation Area is to be demarcated with pink and white striped flagging.
Exposure Limit	Workplace standard below which is believed that nearly all normal and healthy Contractors may be repeatedly exposed, day after day, for working lifetime without adverse health effects.
Extinguishing Agent	A substance (e.g., dry chemical powder, foam) that interrupts the chemical chain reaction that produces fire by removing heat, removing fuel and/or removing or diluting oxygen (i.e., a substance that can put out a fire).
Facility	Any above or below grade 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
Fall Hazard	Any potential fall distance of: • 1.2 m (4 ft.) or more above a lower level from a *Permanent* walking/working surface (horizontal and vertical surface) or • 1.8 m (6 ft.) or more above a lower level from a *Temporary* walking/working surface (includes construction activities) or • Any fall where there is an unusual possibility of injury (e.g., falling through an opening in a work surface)
Fall Protection	Protection devices used at elevations that would allow a fall of a short distance (uses an anchorage point).
Fatigue	Weariness or exhaustion due to extended periods of physical and/or mental exertion or illness.
Field Level Hazard Assessment (FLHA)	A form used just prior to the start of work to identify, assess and control the field-based hazards of the work being performed, and site or environmental conditions that may adversely affect the work (e.g. icy conditions, simultaneous operations, pedestrians).
First aid (CAN)	First aid refers to medical attention that is usually administered immediately after the injury occurs and at the location where it occurred. It often consists of a one-time, short-term treatment and requires little technology or training to administer. First Aid can include: • initial response to a medical emergency, • cleaning minor cuts, scrapes, or scratches, • treating a minor burn, • applying bandages or dressings, • applying a cold compress, cold pack, or ice bag,

DEFINITION	DESCRIPTION
	• applying a splint, • changing a bandage or dressing after a follow-up observation visit.
First aid (US)	First aid refers to medical attention that is usually administered immediately after the injury occurs and at the location where it occurred. It often consists of a one-time, short-term treatment and requires little technology or training to administer. First aid can include cleaning minor cuts, scrapes, or scratches; treating a minor burn; applying bandages and dressings; the use of non-prescription medicine; draining blisters; removing debris from the eyes; massage; and drinking fluids to relieve heat stress. OSHA's revised recordkeeping rule, which went into effect January 1, 2002, does not require first aid cases to be documented. For example: A Contractor goes to the first-aid room and has a dressing applied to a minor cut by a registered nurse. Although the registered nurse is a health care professional, the employer does not have to report the accident because the Contractor simply received first aid (OSHA Website).
First aid attendant (CAN)	A holder of a valid first aid certificate (emergency or level 1 or standard or level 2). Sometimes referred to as the OFAA.
First aid station	A place, other than a first aid room, at which first aid supplies or equipment is stored.
Flagging Tape	Colored, non-adhesive ribbon used for tagging, roping off, or other marking applications
Flame Resistant Clothing	Clothing made from material with flame resistance properties, i.e. combustion of the clothing is prevented, terminated, or inhibited (slowed). Also known as FRC
Flammable Liquids	Liquids that can burn, classified by a flashpoint below 37.8°C (100°F). Any liquid having a flashpoint at or below 199.4° F (23°C). Flammable liquids are divided into four categories: • Category 1: Include liquids with a flashpoint <73.4° F (23° C) and a boiling point ≤ 95° F (35° C). • Category 2: include liquids with a flashpoint <73.4° F (23° C) and a boiling point >95° F (35° C). • Category 3: include liquids with a flashpoint ≥73.4° F (23° C) and ≤140° F (60° C). When a Category 3 Liquid with a flash point ≥ 100° F (37.8° C) is heated for use to within 30° F (16.7° C) of its flashpoint, it shall be handled as if it was a Category 3 Liquid with a flashpoint <100° F (37.8° C). • Category 4: include liquids with a flashpoint >140° F (60° C) and ≤199.4° F (93° C). When a Category 4 Liquid is heated for use to within 30° F (16.7° C) of its flashpoint, it shall be handled as if it was a Category 3 Liquid with a flashpoint <100° F (37.8° C). When a liquid with a flashpoint >199.4 °F (93 °C) is heated for use to within 30 °F (16.7 °C) of its flashpoint, it shall be handled as if it was a Category 4 flammable liquid.
Floor Hole	An opening measuring less than 30.5 cm (12 in) but more than 2.5 cm (1 in) in its least dimension, in any floor, platform, pavement, or yard, through which materials but not individuals may fall; such as a belt hole, pipe opening, or slot opening.
Floor Opening	An opening measuring 30.5 cm (12 in) or more in its least dimension, in any floor, platform, pavement, or yard through which individuals may fall, such as a hatchway, stair or ladder opening, pit, or large manhole.
Frost Bite	Caused when the fluid surrounding the cells becomes frozen when exposed to extremely low temperatures. The nose, ears, fingers, toes, and cheeks are most vulnerable. Symptoms: loss of color, hardness of tissues, numbness.

DEFINITION	DESCRIPTION
Gas	A compressible, formless material that will completely occupy an enclosure irrespective to its quantity. It is a physical state that be changed to a solid or liquid state only by increasing pressure or reducing temperature, or both (e.g., H_2S).
Greenfield	Areas within the confines of project boundaries that contain no above or below ground facilities.
Ground	In relation to electrical work a ground is a conductor that provides an electrical path for the flow of current into the earth.
Ground Disturbance	**Only**: Any work, operation or activity that results in a disturbance of the earth, including without limitation, surveying, excavating, digging, trenching, plowing, drilling, tunneling, auguring, blasting, backfilling, topsoil stripping, land leveling, peat removing, quarrying, clearing, grading, hydrovacing and fencing. Note: It is not a ground disturbance when: • Adding material to the undisturbed ground surface • Agricultural cultivation to a depth of less than 45 cm below the ground surface; or Any other activity to a depth of less than 30 cm and that does not result in a reduction of the depth of earth cover over the pipeline less than that provided when the pipeline was constructed. **Only**: Any work, operation or activity that results in penetration of the earth (e.g., excavating, digging, trenching, plowing, tunneling, auguring, boring, drilling, backfilling, blasting, cultivation, topsoil stripping/leveling, stumping, peat removal, quarrying, fencing, clearing/grading, hydrovac) with the following exceptions: • survey staking, line locating and marking, • disturbance less than 30 cm (12 in.) in depth provided the location and original depth of cover for all facilities is known.
Halon	A material used to extinguish fires, typically used in fixed extinguishing systems to release halon from cylinders into an Enclosed Space. Operation is triggered automatically or manually.
Handrail	A single bar or pipe supported on brackets from a wall or partition, as on a stairway or ramp, to furnish individuals with a handhold in case of tripping.
Hazard	Source or situation with a potential for harm in terms of injury, ill health, damage to property, damage to workplace and environment, or any other definitions as set out by regulations and codes.
Hazard Assessment	Methodology used to identify, assess, and control hazards in order to eliminate or reduce risk to an acceptable level. Includes FLHA, Process Hazard Assessment (or Analysis), HAZOPS, Job Safety Analysis, Facility Hazard Assessments, etc.
Hazardous Area	An area in which there is significant potential for a flammable or toxic atmosphere to be present or develop.
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 of 10% or greater of its lower explosive limit (LEL)

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
	• 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 Safety Data Sheet (SDS) • Any atmosphere which is recognized as Immediately Dangerous to Life and Health (IDLH).
Hazardous Energy	Any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, or kinetic energy source that if released uncontrolled, could cause injury or loss.
Hazardous Locations	This any location where an explosive gas atmosphere is present, or may be present, in the air in quantities that require special precautions to control ignition sources. More specifically, this includes: • Any building or area that is classified as a Class 1, Division 2 or Class 1, Zone 2 or higher hazardous location based in the *Canadian Electric Code*, Section 18 or *OSHA 29 CFR 1910.307* Hazardous (classified) locations (i.e., Class 1, Division 2 or Class 1, Zone 2 or higher).
Hazardous Material	A material, other than hazardous waste, that because of its quantity, concentration and physical or chemical characteristics, either individually or in combination with other substances is or poses a threat to the environment, humans, or other living organisms.
Hazardous Waste	A substance or material which is no longer used for its original purpose and requires disposal, and by reason of its properties is considered a potential or existing hazard to human health or the environment and therefore, requires special management. The specific classification of a hazardous waste in Canada varies by province/territory.
Heat Cramps	Painful cramping of the legs, arms, or stomach muscles, often occurring when relaxing after work. Caused by a loss of salts through sweating. Symptoms: sudden onset; hot, moist skin; normal pulse; normal to slightly high body temperature.
Heat Exhaustion	Extreme fatigue caused by a loss of body fluids and minerals. Symptoms: heavy sweating; intense thirst from dehydration; cool, moist skin (clammy and pale); weak and rapid pulse (120-200); low to normal blood pressure; fatigue; weakness or loss of coordination.
Heat Stress	General term applied to the strain placed on the body when its cooling system must work too hard.
Heat Stroke	A serious medical emergency caused by a complete breakdown of the body's cooling system. Victim's temperature rises to dangerously high levels. Symptoms: high body temperature (above 103° Fahrenheit); absence of sweating (in most cases); hot, red (flushed), dry skin; rapid pulse; difficult breathing; constricted pupils; high blood pressure; headache or dizziness; confusion or delirium; bizarre behavior; weakness; nausea or vomiting. Advanced symptoms: seizure or convulsions; collapse; loss of consciousness; deep coma; no detectable pulse; body temperature over 108 °F (Fahrenheit).

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
Hierarchy of Controls	A system used to implement controls based on the level of effectiveness to minimize or eliminate exposure to hazards. Elimination of the hazard or risk is the most effective form of control. 1. Elimination 2. Substitution 3. Engineering 4. Administrative (e.g., work practices) 5. Personal Protective Equipment
High / Medium Risk Suppliers	Determined on the Suppliers Risk Classification List.
High Efficiency Particulate Air (HEPA) Filter	A filter that is at least 99.97% efficient in removing mono-disperse particles of 0.3 micrometers in diameter. Including filters used for personal respiratory protection, vacuum cleaners, or heating/ventilation/air conditioning systems.
High Voltage	 600 Volts Over 750 Volts
High Winds	Sustained winds greater than 50 km/hr. (30 mph).
Hot Work	Any process that can be a source of ignition when flammable material is present or can be a fire hazard regardless of the presence of flammable material.
Hydrovac	The use of pressurized water or air to loosen soil, then the use of a vacuum to extract the loosened soil. This includes all activities performed by a vacuum truck including but not limited to “hydrovac,” “shot gunning,” “day lighting,” “potholing,” “water washing.” It is sometimes referred to as vacuum excavation.
Hypothermia	Lowering of the body’s core temperature caused by prolonged exposure to low temperatures. As the body temperature gets lower, the metabolic functions of the body slow down, causing shivering, incoherence, memory lapse, and drowsiness. Severe hypothermia may lead to death.
Immediately Dangerous to Life or Health Concentrations (IDLH)	An atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous/hazardous atmosphere.
Imminent Hazard	Any hazard, condition or activity that could reasonably be expected to be an imminent or serious threat to the life or health of a person exposed to it before the hazard or condition can be corrected or the activity altered.
Incident	An unplanned activity or situation that resulted in or had the potential to result in, an adverse or undesirable environmental, health, safety, or business consequence.
ISNetworld (ISN)	A Supplier informational database used to manage, evaluate, verify, and standardize Supplier safety prequalification information. Suppliers upload safety program information, statistical data, and records of compliance with regulatory requirements for review and verification into the ISNetworld database.
Isolated	Sources of energy have been disconnected or controlled.
Isolation	Pre-defined system for securing one or more isolation points to stop or prevent flow of energy.
Isolation Point	Location where the energy isolation device is installed.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
Journey Management	A plan and systematic strategy to reduce transportation-related risks within a company's operations. Trip management is one component of journey management.
Lifting Device	Supplementary device used to handle certain types of loads (i.e., hook, sling, clevis). The weight of lifting devices is considered part of the rated load.
Load	Total weight of an object plus the weight of the rigging equipment.
Lock	a device used to secure an isolation device in the appropriate position to prevent accidental energizing or startup of the machine/equipment.
Lockout	Physical placement of a lock on an energy-isolating device to ensure the equipment being controlled cannot be Energized until the lock is removed.
Low Risk Suppliers	as determined on the Suppliers Risk Classification List.
Low Voltage	 30 to 600 Volts 30 to 750 Volts
Lower Explosive Limit (LEL)	The lowest concentration (percentage) of a gas or a vapor in air capable of producing a flash of fire in presence of an ignition source (arc, flame, heat). At a concentration in air below the LEL there is not enough fuel to continue an explosion. Concentrations lower than the LEL are "too lean" to explode but may still burn with great heat and light. Exact values can be found on product's SDS. Also referred to as LFL (Lower Flammable Limit).
Lower Flammable Limit (LFL)	See Lower Explosive Limit (LEL).
Document/Management of Change (D/MOC)	A systematic approach to ensuring proposed changes are rigorously assessed for risk and impact, and that change is effectively managed prior to implementation to achieve targeted results
Medical treatment facility	means a hospital, medical clinic, or physician's office, at which emergency medical treatment can be dispensed.
Modified Work	Any work-related injury or illness that prevents a Contractor's ability to perform their regularly assigned duties, but are medically able to perform alternate, modified, or restricted work.
Near Miss	Any event, which under slightly different circumstances, may have resulted in injury or ill health of people, or damage or loss to property, plant, materials, or the environment.
Negative Pressure Regulator	A regulator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.
Non-classified Area	An area where flammable or toxic atmosphere is unlikely to develop or exist.
Non-Permit Required Confined Space	A Confined Space that has been checked, inspected and its atmosphere has been monitored and is being continuously monitored to ensure it does not have (or does not have the potential to have) any of the characteristics required to be classified as a permit required Confined Space.
One-Call (First Call)	A One-Call is a notice given to a local One-Call Centre/authority that an excavation will be taking place. Legislation varies by location, but anyone performing an excavation is typically legally obligated to contact the One-Call Centre/authority 2-5 days prior to commencing excavation. The One-Call Centre/authority notifies its

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
	members (owner/operators) that their Below Grade Facilities are near the excavation.
One-Call Member	A Facility Owner/ operator who subscribes to the One-Call Centre/authority and is notified when a One-Call is placed if the Excavation Area is near the members Below Grade Facilities.
Open System	Any part of the pipeline system open to the atmosphere that has been isolated.
Operations Employee	Generic term used to refer to all Operations Employees, including Technicians.
Operations Management	Regional Managers, Team Leaders, and designates.
Operator Qualification (OQ)	A set of programs that qualify an operator for specific tasks. e.g.: Technical training (e.g., occupational skills training, equipment specific training, etc.)
Overseeing	To watch over, observe and manage Enbridge requirements of the Supplier.
Oxygen Deficient Atmosphere	An atmosphere with oxygen content below 19.5% by volume.
Partition	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).
People Leader	Anyone who has direct report(s).
Permissible Exposure Limit (PEL)	An occupational health standard instituted to safeguard Contractors against exposure to toxic material in the workplace
Permit Required Confined Space	A Confined Space that is hazardous or that may become hazardous due to one or more of the following: • work activity would cause adverse health effects (e.g., fiber glassing, abrasive blasting, welding), • contains or has the potential to contain a hazardous atmosphere (e.g., H_2S, LEL or O_2), • contains a material that has the potential for drowning or suffocating a Contractor (e.g., liquid), • has an internal configuration such that a Contractor could become trapped or asphyxiated, and/or contains any other safety or health hazard which is recognized as immediately dangerous to life and health (IDLH) (e.g., energy sources, visibility).

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
Person in Charge (PIC) /Authorized Enbridge Representative(s) or Designate	A qualified Representative authorized by Enbridge to: • Ensure Enbridge's Health and Safety requirements are administered and followed • Provides contractor performance management, which includes oversight, monitoring of activities, quality of work, and contractor evaluation / feedback ○ Responsible for oversight of activities including but not limited to: Confined Space, Lock Out Tag Out (LOTO), Isolation, Hot Work, and Critical Lifts. • Must be competent to oversee performance of work • Have a clear understanding of their responsibilities, the scope of their duties and the understanding of authority • Confirms contractors' applicable certificates for covered tasks. (Westcoast Transmission) i.e. Trade Certificate • Confirms applicable Contractor OQ Plan Covered Task verifications • Communicates with the Supplier related to all items within the SOW (i.e. Hazards, risks, controls, qualification expectations) • Has Stop Work Authority • Awareness to the contract details, Scope of Work and Procedures.
Personal Fall Arrest System (PFAS)	Commonly used PFAS include a body harness, lanyard, and anchor point. Fall Arrest relates to stopping a falling Contractor before striking a lower level/object.
Personal Fall Restraint System (PFRS)	Commonly used PFRS include a body harness, self-retracting lifeline (SRL) or lanyard, and anchor point. Fall Restraint relates to preventing a fall from occurring in the first place.
Planner / Project Manager or Designate	Receives the initial information provided and develops the details required to facilitate the development of the Scope of Work (SOW) to complete a Supply Change Management (SCM) requisition. Ensures a completed Service Requisition is provided to SCM. Receives communication of award with selected Supplier. Ensures the contract is aligned to SOW and procedures.
Platform	A working space for individuals, elevated above the surrounding floor or ground, such as a balcony or platform for the operation of machinery and equipment.
Positively Identify	To visually locate (daylight) the location, depth, and size of Below Grade Facility by using either water washing (hydrovac, as an example) or hand digging. This includes elevation or alignment changes that can alter the depth/direction of the pipe (i.e. 90 and 45-degree elbows), fittings, plugs, weldolets, flanges, branch piping, known abandoned facilities, etc.
Pressure Demand Regulator	A positive pressure regulator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.
Preventive Action	A proactive process and is initiated to stop a potential problem from occurring or from becoming too severe. Preventive action focuses on identifying negative trends and addressing them before they become significant.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
Process Hazard Analysis (PHA)	A detailed examination of a process, equipment or facility design that will assist in identifying hazards and required controls. PHA's are used to evaluate hazards in new designs as well as existing facilities.
Qualified	One who, by possession of a recognized degree, certificate, or professional standing, or who by knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project
Qualified Electrical Contractor	A Contractor who has the knowledge, training, and experience to perform electrical work, including Enbridge electricians, contract journeymen electricians, and Contractor electricians working under the direct supervision of contract journeymen electricians.
Radiation	Emission of atomic particles or electromagnetic energy from the nucleus of an atom. This emission is caused by the natural decay of radioisotopes (nuclides) and/or x-rays produced by electrical means from portable or fixed static equipment.
Radiation Safety Officer (RSO)	Designated individual who has received specific radiation safety training and who oversees the operations of the radiation safety program.
Radiation Source	Apparatus or material emitting or capable of emitting ionizing radiation.
Remote Worksite (CAN)	A worksite that has road access, is located on an existing Facility / Right-Of-Way (ROW) or has a defined site footprint with ambulance response time of more than two hours.
Restricted Area	Any area in which there is a potential for a flammable or toxic atmosphere to develop, or that may contain other hazards.
Risk	The combination of the likelihood and consequence of an unexpected positive or negative deviation from the expected outcome.
Roll Overprotective Structures (ROPS)	Engineered protection structures on heavy equipment and All-Terrain Vehicles meant to protect the operator and passenger(s) in the event the equipment rolls over.
Root Cause	Include personal factors and job factors from which substandard acts and conditions originate. These factors are the reasons why the immediate/direct causes exist, and the identification of such factors permits meaningful management control. Root Causes are often also referred to as basic causes or indirect causes.
Runway	A passageway for individuals elevated above the surrounding floor or ground level, such as a foot-walk along shafting or a walkway between buildings.
Safe Work Permit (SWP)	An agreement between the Permit Issuer and receiver that is used to authorize work for a specific time and location and to ensure a safe area of work for the working group.
Safe Work Permit Issuer (may be designated as Person in Charge)	• Responsible for verification, of contractor safety qualifications/certifications i.e., fall protection, confined space entry. • Responsible for review of SOW, Hazards & Risks, and associated hazard control documentation (JHA, JSA, etc.). Controls must be agreed to by both Contractor and Safe Work Permit Issuer.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
	• Responsible to stop work and have the authority to initiate the stop work process. • Issue Safe Work Permits. • May be designated as Person in Charge.
Safe Working Load	Commonly understood to be the load which a given lifting device or lifting arrangement can safely lift, suspend, or lower
Safety Data Sheet (SDS)	A Safety Data Sheet (SDS), previously called a Material Safety Data Sheet (MSDS), is a document that provides information on the properties of hazardous chemicals and how they affect H&S in the workplace.
Safety Watch	A qualified Contractor responsible for monitoring work activities to ensure safe work practices are followed, to identify hazards, to alert Contractors of hazardous conditions and to initiate emergency response procedures.
Self-Contained Breathing Apparatus (SCBA)	A respirator that has a portable supply of breathing air and is independent of the ambient atmosphere. The breathing air source is designed to be carried by the user.
Severity Rating	The rating as determined using the Enbridge Actual & Potential Event Severity Guidance Document from ESOR and the current Severity Matrix.
Shall	Indicates mandatory; no deviation is permitted without authorization from the appropriate vice-president
Shoring	Shoring is a temporary installation, which “shores” up or supports trench or excavation walls to prevent movement of soil, underground utilities, roadways, and foundations.
Short Term Exposure Limit (STEL)	A 15-minute Time Weighted Average (TWA) exposure limit that should not be exceeded at any time during a workday even if the overall 8-hour TWA is within limits, and it should not occur more than 4 times per day. There should be at least 1 hour between successive exposures.
Should	Used where an action is recommended.
Signaler/Spotter	A competent Contractor 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 shall have the ability to clearly communicate to the Contractors under their care and site supervision as required.
Single Block and Bleed	An isolation system utilizing one block valve to separate one pressure source with a bleed downstream of the sealing surface.
Site	See Worksite.
Site Supervisor	See Enbridge Operations Representative.
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.
Softener	Material used to prevent loads from slipping and to protect cable or rope from damage.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
Spoil Pile	A pile of material that was removed from an excavation, trench, or borehole.
Standard	Approved Enbridge practice.
Standard first aid certificate or Level 1 (CAN)	Means the certificate issued by either a qualified person or the organization that developed the training, as the case may be, for successful completion of a two-day first aid course.
Standard Precaution	Administrative controls based on the premise that all blood and bodily fluids are considered infectious and are treated as such (also known as universal precautions).
Standard Railing	A vertical barrier erected along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent falls of individuals.
Standard Strength and Construction Railing	Any construction of railings, covers, or other guards that meets the requirements of *29 CFR 1910.23*.
Static Electricity	An accumulation of electric charge on an insulated body.
Station Site	Fenced-in pump stations, valve stations, terminals, etc.
Stop Work Authority	The special authority or power vested in a designated person on a worksite to stop and subsequently restart some or all work activities on that worksite. In the context of a GTM worksite, this authority automatically rests with the Safe Work Permit Issuer (who has a formalized process for initiating, suspending, restarting, or cancelling work activities) and the Person in Charge. This authority may be exercise when a hazard arises that requires further controls before work continues or when a work activity is not being conducted in accordance with the Safe Work Permit, the GTM Health and Safety Manual or GTM Construction Safety Manual. The Stop Work Authority is not to be confused with the general right to stop work by any person on a worksite in response to a hazard arising. Any Contractor may stop their work as per the Stop Work, Imminent Hazard, and Right to Refuse Unsafe Work process.
Subcontractor	Any person, firm or corporation contracting with the Supplier to perform part of the work and shall include partners and associates in a joint venture.
Subcontractor Contractors	Any person performing work on behalf of the Supplier.
Subject Matter Expert (SME)	A person with experience or expertise in a specific aspect or topic. i.e. a Process Safety Engineer
Supplied-Air Respirator (SAR) or Supplied Air Breathing Apparatus (SABA)	An atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.
Supplier	Hires and trains its own Contractor(s) (contractors), assigns Contractor(s) to job duties, and provides day-to-day work direction to those Contractor(s). Responsible to deliver a competent Contractor (contractor) to complete the Scope of Work on behalf of the Supplier. To be aware of what controls/permits are being proposed for the SOW. To be aware of what equipment/materials are required of the Supplier and associated equipment certifications.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
	Communicate to their Contractors the controls, equipment, and materials required for the SOW. Communicate to their Contractors the identification of equipment certification requirements for the SOW. Can provide Sub-Contractor Contractor(s) to complete the Scope of Work assigned. Sub-Contractor Contractors are required to adhere to the contractual obligations of the Supplier. Communicate what equipment/materials that will be used and how the equipment is certified, and materials meet SOW requirements
Tagout	Placement of a perforated tag on an energy-isolating device to indicate that the device and machine/equipment being controlled shall not be operated until the tag is removed.
Threshold Limit Value (TLV)	Occupational exposure limit set by the American Conference of Governmental Industrial Hygienists (ACGIH) under which it is believed that nearly all Contractors may be repeatedly exposed, day after day, over a working lifetime, without adverse health effects.
Tight Fitting Respirator	A respirator that is designed to form a complete seal with the face or neck.
Time Weighted Average (TWA) Exposure Limit	The average exposure a contaminant for an individual over a given working period determined by sampling at given times during the period. Unless otherwise mentioned, TWA is the concentration of contaminants measured over an 8-hour period.
Toe board	A vertical barrier at floor level erected along exposed edges of a floor opening, wall opening, platform, runway, or ramp to prevent falls of materials.
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 Contractors against cave-ins.
Trench Foot	A condition caused by long, continuous exposure to above freezing cold temperatures, while in contact with dampness or water. The affliction is characterized by swelling, tingling, itching, and severe pain, followed by tissue death, and ulceration.
Unattended	A powered industrial truck is unattended when the operator is 25 ft. or more away from the vehicle which remains in view, or whenever the operator leaves the vehicle and it is not in view.
Upstream	The side of the valve that maintains pressure.
Utility Terrain Vehicle (UTV)	Also known as a side by side. For purposes of this Manual is defined as a small 2-person or up to 6-person four-wheel drive, off-road vehicle, factory-equipped with roll-over protective structures (ROPS) and seatbelts. This includes: Recreational Off-Highway Vehicles (ROHVs) and Multipurpose Off-Highway Utility Vehicle (MOHUV), as defined by ANSI Off-Highway Utility Vehicle (MOHUV), as defined by ANSI.
Vapor	Gaseous form of substances that are normally in liquid or solid state; it can be changed to solid or liquid by increasing pressure, decreasing temperature, or both. Evaporation may create vapors.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

DEFINITION	DESCRIPTION
Vendor	Any person, firm, or corporation with whom Enbridge may enter into an agreement for the provision of engineered and/or fabricated equipment.
Verification	Confirmation that the machine/equipment is in a zero-energy state.
Visitor	Any Enbridge or non-Enbridge individual that is not performing any assigned work activity on an Enbridge worksite (i.e. facility, right-of-way, or construction site). An example of a visitor is any individual or group on a tour of an Enbridge worksite.
Wall Hole	An opening less than 76 cm (30 in) but more than 2.5 cm (1 in) high, of unrestricted width, in any wall or partition, such as a ventilation hole or drainage scupper.
Wall opening	An opening at least 76 cm (30 in) high and 46 cm (18 in) wide, in any wall or partition, through which individuals may fall, such as a yard-arm doorway or chute opening.
Waste Management Plan	A written document designed to assist Enbridge Personnel and Contractors with the identification project man of appropriate waste management practices for each waste type generated by Enbridge operations.
Wilderness Worksite (CAN)	A worksite that does not have road access, is not located on an existing Facility/ Right-Of-Way (ROW) or does not have a defined site footprint. (e.g., Survey, Environmental Studies, Geotechnical/Geophysical).
Work Authorization Issuer	An Enbridge Operations Representative who shall be familiar with the operational and/or site-specific hazards covered by the Work Authorization being issued.
Work Load	Level of heat produced by the body based on type of work being done. Workload may be divided into three categories based on type of operation or by estimating the metabolic rate of the Contractors in kilocalories per hour (kcal/hr) burned by the body. The three categories are: Light work (up to 200 kcal/hr), for example: sitting or standing to control machines, performing light hand or arm work. Moderate work (200-350 kcal/hr), for example: walking about with moderate lifting and pushing. Heavy work (350-500 kcal/hr), for example: pick and shovel work.
Work Restraint	Protection devices used at elevations that will not permit a Contractor to travel beyond a certain point.
Contractors	Term used to refer to Employees and Contractors cumulatively.
Workplace	See Worksite.
Worksite	Entire work area required for the work, including station property, right-of-way, temporary working space, and all right-of-way storage areas as required by Enbridge.
Zero Energy	Pertaining to the control of hazardous energy (LOTO) Zero Energy is when all energy and potential or stored energy is removed or controlled and verified.

© Enbridge Gas Transmission and Midstream | Manual
INTERNAL INFORMATION – Uncontrolled Copy if Printed or Downloaded.

Appendix C – Stop Work, Imminent Hazard, Right to Refuse Unsafe Work Process Flow Contractors

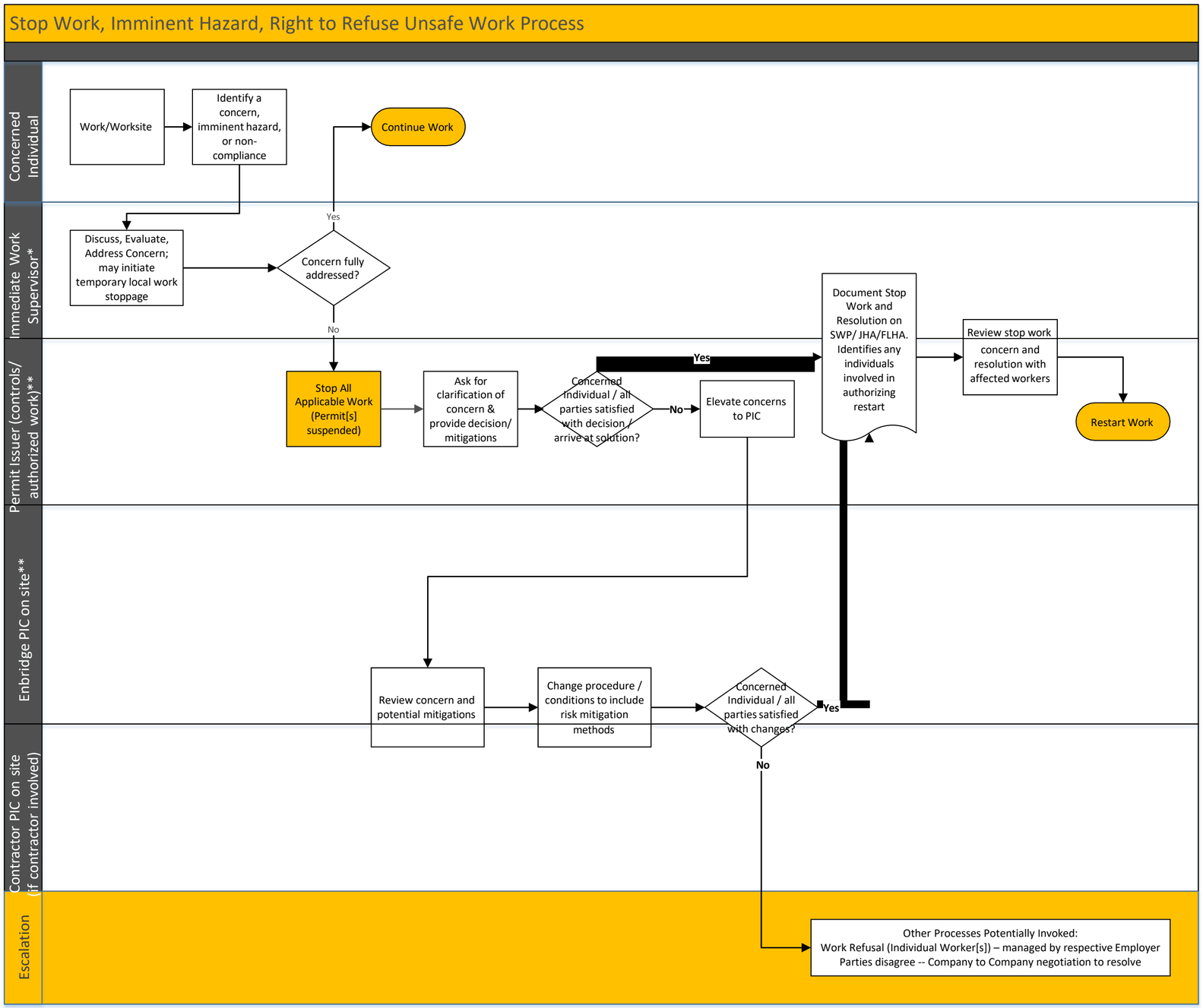


Figure 13: Stop Work, Imminent Hazard, Right to Refuse Unsafe Work Process Flow Contractors