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Site Supervisor Training Manual

Manual Overview & Introduction

Manual Name: Pengrowth Site Supervisor Training Manual

Department Responsible: Projects

Last Updated: February 10, 2009

Manual Control (manual content & revision requests): Manager, Project Engineering (Lawrence Schafers)

General Inquiries: Administrative Assistant, Projects (Candice MacLean, Calgary; Anne Schlauch, Judy Creek)

Overview

- This document outlines the **mandatory** training process required to become certified as a Pengrowth Site Supervisor. No individual shall direct work on Pengrowth's behalf without applicable training (i.e. Site Supervisor, or alternatively depending on scope: Rig Supervisor or Operations Training).
- Pengrowth Site Supervisor Training is intended to guide the trainer and trainee through a variety of Pengrowth's safety and business requirements in order to verify that the trainee possesses sufficient knowledge and experience to competently manage various worksite activities.
- The training is used in conjunction with a review of qualifications, experience, and minimum safety training required as a prerequisite to retention as a Site Supervisor.
- This review is carried out by the Pengrowth representative planning to retain the prospective Site Supervisor's services.
- Further evaluation of a Site Supervisor's qualifications is carried out on an ongoing basis through on-the-job observation and periodic audits.
- The information included in this package will be reviewed with Site Supervisors on an annual basis.

Purpose

To provide Pengrowth's Site Supervisors with Pengrowth specific training designed to supplement their knowledge, skills and safety training such that they are verified as competent to control work at the field level.

- Allows Site Supervisors to become certified to act on Pengrowth's behalf.
- Seeks to refresh Site Supervisor understanding and commitment to Pengrowth's safety training and business requirements.

Training Qualifications

Who is certified to train?

Any Pengrowth employee holding the following positions, who has previously received Site Supervisor Training, is qualified to administer Site Supervisor Training:

- **Project Engineer/Project Coordinator**

In addition, the *Lease Construction Superintendent and Environmental Coordinators* are authorized to provide training for Site Supervisors within their scope of work.

Who receives the training?

- **Any individual that will act as Pengrowth's representative in directing work on projects within our operating areas shall be trained as a Pengrowth Site Supervisor.** Further qualifications for these individuals includes adequate industry experience as well as certification in WHMIS, H2S Alive, First Aid, Ground Disturbance Level II, Confined Space Entry, and TDG, according to the demands of the work to be supervised.

Exceptions to the above requirement are Pengrowth employees that receive similar internal training and individuals directing work on well bore operations (drilling, completions and well servicing supervisors that receive Pengrowth Rig Supervisor Training).

- **All Project Engineers and Project Coordinators shall receive Site Supervisor Training.**
- Other Pengrowth staff and contractors may receive this training for instructional purposes, but will not be qualified as Site Supervisors.

Training Workflow – Workbook Submission Required for Certification

Exams & Forms

- The trainee must complete all required examinations and forms included in the workbook portion of the training package.
- Completed forms should be immediately forwarded to the appropriate Administrative Assistant, Projects. Consultants shall not be considered certified Pengrowth Site Supervisors until the completed workbook package is received.
- All trainees are required to include copies of active safety tickets when submitting their workbooks.
- Please refer to the following Business Unit chart, **effective February 13, 2009**, for appropriate personnel to which the workbooks shall be forwarded.

Area	Northern	Central	Olds	Southern	Heavy Oil	Lindbergh
Admin Assistant, Projects	Candice MacLean	Anne Schlauch	Candice MacLean	Candice MacLean	Candice MacLean	Candice MacLean
Location	Calgary	Judy Creek	Calgary	Calgary	Calgary	Calgary



Site Supervisor Standards & Expectations

February 2009

Pengrowth Site Supervisors supervise execution of a wide scope of projects completed in Pengrowth's operating areas. In order to succeed, Site Supervisors must meet Pengrowth's expectations and standards for safety, ethical behavior and project / construction management. In an effort to be clear, and to facilitate communication, a review of these standards and expectations follows.

Safety

Safety is a critical part of every project planned and implemented on Pengrowth's behalf. Pengrowth's safety program requires a positive attitude that must be displayed by everyone. In order to develop and encourage safe work habits, Pengrowth Site Supervisors are expected to foster and demonstrate a safe work attitude at all times. All indicators of non-compliant work and attitudes on the job must be immediately addressed by the Site Supervisor. In particular, focus should be placed on the following items.

Proactive Reporting (Hazard I.D.'s and Near Misses)

Every person working in Pengrowth field locations is expected to actively participate in Hazard ID and Near Miss Reporting. The Site Supervisor must track, steward and follow-up on all Hazard ID's and Near Misses submitted by contractor crews working under their supervision to ensure there is 100% participation.

Site Safety Inspections

Site Supervisors are responsible for conducting Site Safety Inspections according to targets agreed upon from time to time, ensuring that all follow-up is completed as required in a timely manner.

Manage & Maintain Safety Standards

- Pengrowth Site Supervisors must be familiar with safe work standards adopted by Pengrowth, including regulatory requirements of WCB, OH & S, ERCB, etc.
- Site Supervisors are responsible and accountable to ensure that all workers are meeting the standards pertinent to that job.
- Every Pengrowth Site Supervisor is required to participate in Emergency Response Planning (ERP) exercises, extra safety events, tailgate meetings, hazard assessments, and similar initiatives as needed. They must provide leadership in promoting effective implementation of Pengrowth's Safety & Environment Standards.
- Site Supervisors must lead by example and demonstrate that safe work processes and procedures are a non-negotiable requirement of every single project.
- Encourage participation and promotion of safety efforts.
- Where an incident occurs on a job, the Site Supervisor will take an active role in the incident investigation.

Project / Construction Management

Pengrowth Site Supervisors are required to manage each of their projects in a professional manner, from start to finish including:

- Have drawings on hand prior to starting work.
- Verify that required agreements and licenses are in place.
- Ensure necessary resources are available
- Arrange and attend pre-job meetings
- Make arrangements for manpower and equipment to be on site, on time, when required
- Cost control and reporting
- Liaison between other work groups operations, trades, etc. – schedule meetings as required to ensure job progresses smoothly
- Demonstrate the ability to handle a variety of responsibilities simultaneously and demonstrate flexibility to allow for changes in job scope, timelines, and unforeseen events (Time Management).

Standards of Ethical Behavior

All Pengrowth Site Supervisors provide their services on a contract basis and accordingly a fully executed contract between the Site Supervisor's parent company and Pengrowth's Materials & Services group is required as a pre-condition to acting as a Pengrowth Site Supervisor. This contract will contain provisions regarding requirements for ethical behavior, especially in respect to confidentiality. These contract terms must be followed strictly.

Further, Pengrowth expects that all Site Supervisors acting on Pengrowth's behalf will conduct themselves to very high ethical standards. Particular attention should be paid to ensuring that conflicts of interest are avoided or disclosed if unavoidable and that activities comply with applicable laws. Duties should be carried out with due consideration for respectful conduct, honesty & integrity.

Acknowledgement

I acknowledge that I have read and understand the above standards & expectations and that I agree that they are reasonable.

Site Supervisor:

Signature

Print Name

Training provided by :

Pengrowth Employee

Date:_____



Site Supervisor Training Check Sheet

General Requirements:

	Complete	Incomplete	N/A
Annual Site Supervisor Training Manual Review (Overall Program)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site Supervisor Standards & Expectations - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Training Requirements: (Certificate Copies Provided)

Ground Disturbance Level II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H2S Alive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WHMIS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standard First Aid / CPR "B"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confined Space Entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDG	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Health, Safety & Environment - General:

Safety & Environment Handbook Review – Acknowledgement Signed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contractor Orientations – Requirements understood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proactive & Incident Reporting – Expectations understood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site Safety Inspection Form – Expectations understood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
First Hour Emergency Response - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OH&S Legislation – web sites for legislation known	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pengrowth Critical Procedures / Policies

First Aid Transportation Plan - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safe Work Agreement Training COP & Exam - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Atmospheric Testing COP & Exam - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confined Space COP & Exam - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ground Disturbance COP - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fall Protection COP - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lock-out COP - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pengrowth Business Requirements:

Pengrowth Job Execution (Flowchart) - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site Supervisor Job Execution Requirements – Expectations understood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facilities Inspection Competency Assessment Form - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pengrowth Project Supervision Memorandums - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchasing Policy – Responsibilities understood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contract for Supervision services – In place with M&S group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OSC Usage – Requirements understood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quality Control Forms – Expectations understood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Legislative/Regulatory Requirements:

Regulatory Alerts - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regulatory Requirements (Pipelines & Facilities) - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crossings - Reviewed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The undersigned Site Supervisor acknowledges that the above materials have been reviewed as indicated and are understood. Further, the undersigned agrees to limit the scope of supervision provided according to any restrictions listed herein.

Site Supervisor: _____
Signature Print Name Date

The undersigned Pengrowth Trainer acknowledges, subject to any restrictions indicated below, that the Site Supervisor listed above is authorized to supervise construction activities on Pengrowth's behalf as directed by Pengrowth personnel.

Trainer: _____
Signature Print Name & Title Date

Restrictions on Supervision Scope: _____

CONTRACTOR ORIENTATIONS

Overview of Information to Be Covered

1. Pengrowth Health & Safety Policy (pg. 6)
 2. Pengrowth Environmental Policy (pg. 7)
 3. Petroleum Industry Guiding Principles (pg. 8)
 4. Acts & Regulations
 - a) OH&S web site <http://employment.alberta.ca>
 - b) EUB web site <http://www.eub.ca>
 - c) WCB web site <http://www.wcb.ab.ca/home>
 - d) TDG (pg. 30)
 - e) WHMIS (pg. 31)
 - f) Working Alone (pg. 45)
 5. Company Responsibility (pg. 8 Prime Contractor)
 6. Contract Owners Responsibility (pg. 11)
 7. Worker Responsibility (pg. 10)
 8. Right to Know (pg. 19)
 9. Right to Refuse (pg. 20)
 10. A & D Program (pg. 40)
 11. PPE (pg. 42)
 12. Smoking (pg. 19)
 13. Hair & Beard Policy (pg. 22)
 14. Task Hazard Assessments' (pg. 13)
 15. Hazards (typical – not all inclusive)
 - a) Chemical
 - b) Hydrocarbon / H2S
 - c) Pressure
 - d) Temperature
 - e) Electrical
 - f) Asbestos
 - g) Noise
 - h) Excavation
 - i) Confined Space
 16. Training Requirement (pgs. 50)
 17. Hours of Work (Federal Legislation)
 18. Alarms/ Evacuation (pg. 50)
 19. Incidents/ Reporting (pg. 55)
 20. Safe Work Agreements (pg. 14 - 15)
 21. Emergency Response Plans (pg. 45)
 22. Critical Procedures (pg. 32)
 23. Driving Vehicles (pg. 40)
 24. Housekeeping (pg. 60)
 25. Equipment Checks (pgs. 18 & 30)
-

Safety is very much a **shared responsibility** and commitment. Pengrowth believes that health and safety are of paramount importance and is committed to conducting its business in a way that protects the health and safety of its employees and others involved in or affected by Pengrowth's operations, including contractors and the general public.

Job hazards vary widely dependant on task, pre-task hazard assessment must be completed **always, no matter how small the job. PLEASE STOP & THINK!**

HEALTH AND SAFETY POLICY

1. Pengrowth Corporation Health & Safety A –Management...(pg. 6)

Pengrowth believes that health and safety are of paramount importance and is committed to conducting its business in a way that protects the health and safety of its employees and others involved in or affected by Pengrowth's operations, including contractors and the general public.

Pengrowth's policy:

- Employees at all levels are responsible and accountable for the company's overall safety initiatives. These responsibilities are clearly identified with in the Pengrowth Safety Program.
- Strive to prevent all accidents, injuries and occupational illness through the active participation of all employees and through continuous efforts to improve the management of health and safety risks associated with its operations.
- Management ensures that health and safety standards and legal requirements are met through the provision of adequate facilities, equipment, maintenance, procedures, training and management systems.
- All contractors, sales associates, visitors and suppliers to be responsible and accountable for their safety performance. These responsibilities are clearly identified within the Pengrowth Safety Program.
- Management will communicate with employees, governments, and with all others involved in or affected by Pengrowth's operations, including contractors and the general public, in a timely fashion on the health and safety aspects of the company's operations and products.
- Complete evaluations and performance measurements of our operations to ensure compliance with our Health and Safety Policy and applicable government regulations.
- Through constant effort by everyone we can achieve an incident free workplace.

ENVIRONMENTAL POLICY

2. Pengrowth Corporation Environmental A -Management ...(pg. 7)

Pengrowth is committed to environmental protection and the broader integration of environment and economic priorities, in all aspects of our business. We aim to ensure that recognized environmental standards and legal requirements are met.

Pengrowth's policy:

- Environmental hazards are identified, assessed and managed.
- Company environmental standards and practices are within or exceed legal requirements.
- Strive to prevent incidents that result in environmental impacts.
- Facilities are designed, operated and maintained in a way that will meet or exceed environmental standards.
- All employees and others engaged on our behalf are aware of the need, informed of the requirements and trained to protect the environment.
- Open and frequent communication with regulatory agencies to clearly understand environmental requirements and maintain positive working relationships.
- Quick and effective response to incidents resulting from our operations and co-operating with industry organizations and authorized government agencies.
- Operations and management processes, and environmental performance are audited to measure performance achievement to use as a basis for further improvement.

Petroleum Industry Guiding Principles For Worker Safety

3. Petroleum Industry Guiding Principles A -Management ...(pg. 8)

We, the members of the petroleum industry, have a responsibility to protect all workers engaged in its activities from personal injury and health hazards. To meet our responsibility we will operate under the following guiding principles:

RESPONSIBILITY

The operating company, when acting as prime contractor, is responsible for coordination and general supervision of all activities at the work site, including activities carried out by contractors, sub-contractors, service companies and suppliers. While all parties have a responsibility to promote worker safety, the operating company recognizes its leadership role in promoting worker health and safety on the basis that it has the greatest power to influence work site situations. It is the responsibility of workers and employers to refuse to perform unsafe work practices.

PRIORITY

Activities will be conducted on the basis that safety of all personnel is of vital importance, whether those personnel are employed by an operating company, a contractor, a sub-contractor, a service company or a supplier.

RECOGNITION

The process of selecting contractors, sub-contractors, service companies and suppliers, and the administration of contracts, will include recognition and support of good safety performance. Support and recognition based on good safety performance will also be provided by all employers to their employees.

IMPROVEMENT

The operating company, in cooperation with service companies within the industry, will promote methods and practices that have potential for improving safety performance.



4. Acts & Regulations C - Rules & Work Procedures (pg. 19)

These are all acts or regulations that layout guidelines on how we execute work

- OH&S - requirements on how to do job
- EUB -in AB & OGC -in BC - mainly dealing with pipelines and field facilities standards
- WCB - every company and owner needs coverage
- TDG - regulation that state what, who, and how dangerous goods can be prepared for shipment, shipped and received, re-certification is every 3 years and must be done by the employer (pg. 30)
- WHMIS - legislation that tells suppliers or owners what they have to teach employees about product on site, re-certification is done every 3 years (pg. 31)
- Working Alone - Provincial legislation that requires the employer to ensure remote workers have a means to access help in the event of an emergency (pg. 45)

5. Company Responsibility A - Management Commitment (pgs. 8)

As Prime contractor Pengrowth Corporation uses the petroleum guiding principles to manage work safely with our contract and employee workers. The OH&S Act requires the owner, as far as reasonably practicable, to ensure the health and safety of all employees. The company is required to develop a system to identify hazards and put processes or procedures in place to eliminate or minimize risk.

6. Contract Owner Responsibility H-Contractor Management (pg. 11)

Contractor will orientate their employees to their safety program, safety procedures and personal protective equipment requirements. They will supply all necessary personnel protective equipment as relating to their standards, supply equipment and tools that are in good condition to the people who require them. Reference responsibilities in the Safety Handbook.

7. Worker Responsibility A - Management Commitment (pg. 10)

Every individual on site has a responsibility to identify any hazard to the owner, follow procedures, work safety and ensure people around them work safely as well.

8. Right to Know C - Rules & Work Procedures (pg. 19)

This is legislated by OH&S that every employee should be aware of any hazards associated with their jobs. Employees should be informed of possible exposure to things like noise, chemicals etc.

9. Right to Refuse C - Rules & Work Procedures (pg. 20)

It is every person's legislated right to refuse to perform work if:

- a) They feel it is unsafe to carry out the work
- b) They do not understand how to do the job
- c) Do not have the necessary tools or equipment to safely carry out the work

10. A & D Program C - Rules & Work Procedures (pg. 40)

All workers on site are expected to arrive at work fit for duty, without levels of performance altering drugs or alcohol in their system.

Testing Categories

1. Reasonable Cause Testing

- Anyone who gives reasonable cause to suspect he or she is impaired or incapable of performing his or her job safely.
- 2. Post Incident Testing
- 3. Any person involved in a workplace incident or accident resulting in death or injury to any other person, or damage to company property or equipment, will be required to undergo testing. The only exception will be if the company reasonably believes consumption or use of drugs or alcohol was not a factor in the incident or accident. Failure to submit to a test is classed as a positive test leading to suspension and possible termination pending investigation.

11. Personal Protective Equipment (PPE)) C - Rules & Work ... (pg. 42)

For Pengrowth sites it is safety boots, hard hats, fire resistant clothing, and gloves. Safety glasses are to be worn and hearing protection are to be on the person in case the risk of a particular job requires them to be worn.

12. Smoking Policy C - Rules & Work Procedures (pg. 19)

No smoking within facilities or offices. Designated smoking areas are parking lots, smoke rooms and off lease at field sites. Single action lighters and strike anywhere matches should not be carried on the person within any facility.

13. Hair & Beard Policy) C - Rules & Work Procedures (pg. 22)

Any head hair must not extend past top of shoulder or else it needs to be tied back or covered by a hair net. Side burns must not extend past the mid point of the ear. Beards of any description are not acceptable. Clean shaven daily. Mustaches must be trimmed to the corner of the mouth.

14. Task Hazard Assessments B - Hazard Identification (pgs. 13)

All work that is done or planned requires some form of hazard assessment. It may be as simple as a Stop & Think process for low risk work this only takes seconds to complete. Other hazard assessments will be done with multiple contractors on site, or a full work crew for higher risk work. All employers must implement hazard assessments and training for their workers. Some of the tools that Pengrowth uses to do hazard assessments are, Safe Work Agreement / Hazards Assessments, Proactive reports, site hazard loss inspections (site inspections), daily checks and walkabouts. All workers must be involved in analyzing the hazards of their job site and the tasks they are performing. Contractors are encouraged to use the tools they are trained on, they may be in the form a Tailgate meetings, or specific check lists that help the worker to go through a thorough pre-job hazard check

15. Site Hazards (typical but not all inclusive)

- a) Chemicals - oxygen scavengers, lube oils, glycol's, etc. are typical to site. WHMIS labels are on storage containers and pumps.
- b) Hydrocarbon / H₂S - are present in much of our piping, vessels and tanks. Possible exposure to toxic or explosive mixtures.
- c) Pressure - high pressure associated with gas streams
- d) Temperatures - possibility of extreme high temperatures and streams of extremely cold within the various processes or the plants.
- e) Electrical - lots of high voltage overhead transmission lines, cable trays and breaker panels. Electricians do all electrical work.
- f) Asbestos - some asbestos on site. Currently it is mainly labeled and totally encapsulated in tin or tar sealed. Insulators are required to remove any asbestos.

- g) Noise - all areas that are over the occupational exposure limits, are labeled to wear hearing protection. Wear either ear muffs, ear plugs or both if you choose.
- h) Excavations - when completing excavations do so in accordance with OH&S legislation. Do NOT enter an excavation if it does not comply. Before doing any excavations review the ground disturbance procedure.
- i) Confined Space - confined space is much more than a tank or vessel. The definition of a confined space says where ever the atmosphere is unknown or hazardous. Where there is restricted access, egress or hazardous design, or construction. E.g. Excavations, Tank Berms, Some Basements and crawl spaces etc. To work in a confined space you must be trained in Entry of a Confined Space and have a safe work agreement in place.
- j) Cathodic Protection - Prior to removal of any piping have the power source to cathodic rectifier shut off if possible. Ensure bonding cable is in place whenever you remove any piping section to ensure no sparking occurs.

16. Training Requirements H-Contract Management (pgs. 50)

This section is applicable to the work being done. As a minimum everyone should have WHMIS, First Aid, H2S Alive, the Pengrowth orientation and the skills to complete the job they are being asked to complete. Then you look at requirements like confined space entry and first aid as a requirement based on a number of people onsite and the job being completed. As well you should understand the need for any specific trade's certification requirements.

17. Hours of Work

Federal regulations are in place that require employers to consider the hours of work of their employees. This legislation attempts to deal with the safety hazards of “fatigue” and worker “fit for duty” as they apply to the worker. Employers that are sending workers long distances to get to the worksite may have to deal with this legislation as they plan the job with the prime contractor. Hours of work legislation must be considered.

18. Alarms / Evacuation C - Rules & Procedures (pg. 50)

Play audio tape of alarms at this point. Explain where evacuation points are for each facility they will be working at. If no audio tape is available explain alarms or demonstrate if possible.

19. Incidents / Reporting F -Incident Reporting (pg. 55)

All incident or near incidents should be reported to your immediate supervisor and Pengrowth representative. These need to be reported to ensure proof of injury should something show up at a later date that is a Workers Compensation Board claim. The investigation and follow up of all incidents or near incidents help to prevent further occurrences. If you see something that may be a safety or environmental concern, please inform Pengrowth immediately. Your awareness may save the environment or ensure others safety.

20. Safe Work Agreements B - Hazard Identification (pgs. 14 & 15)

No work will be started without first obtaining a safe work agreement. A Safework Agreement is a communication tool to ensure there is a clear understanding between the **issuer** and **receiver** of **what** is to be done, **where** they will be, contact person in event of an **emergency**, what the hazards are and what the **controls** are (hazard mitigation). Agreements are either hot, cold or critical hot or critical cold. These distinctions are based on risk. There is a process to exempt fulltime contract personnel.

21. Emergency Response Plan C - Rules & Work Procedures (pg. 45)

During tailgate and pre-job meetings, ERP's and provisions must be in place and documented. E.g.

- Emergency phone numbers
- Emergency muster points
- Site location or GPS coordinates
- Appropriate First Aid equipment and First Aid Personnel

22. Critical Procedures C - Rules & Work Procedures (pg. 32)

Procedures that have been developed to allow higher risk jobs to be completed safely. Before performing these jobs the individual must be checked out on the procedure and be competent or else supervised 100% of the time.

23. Driving & Operating Vehicles C - Rules & Work Procedures (pg. 40)

All vehicles must be maintained in good mechanical condition (be road worthy). When driving, speed limits must be followed or slow down to compensate for bad road conditions. Seat belts must be worn and headlights on, to improve visibility. One of our greatest hazards for a normal day is our travel on public highways.

24. Housekeeping C - Rules & (pg. 23) also G - Environment (pg. 60)

Trucks and work sites should be kept clean and organized. Do not allow tripping hazards to exist, clean up spills to prevent slips or fire hazards and ensure tools are returned to their appropriate place.

25. Equipment Checks B - Hazard Identification (pgs. 18 & 30)

Prior to using mobile equipment, do necessary start up checks and function test. Hand tools and other equipment should be inspected for wear or physical damage. Repair, replace or tag "out of service" as necessary. **Do not use or leave unsafe equipment for others to use.**



General Environmental Guidelines for Site Supervisors

Pengrowth Site Supervisors can directly affect our environmental performance in a number of areas, including: Housekeeping, Incident Reporting & Proactive Reporting, Waste Management, Spill Clean-up, Surface Water Run Off, Vegetation Management, and Flaring & Venting. This guideline is intended as a brief summary of some of the key points in each area. If further detail or clarification is required, the Site Supervisor should contact the local Environmental Coordinator (listed below) for further discussion.

Housekeeping

Maintenance of a clean and well organized work site, free of litter and debris, contributes to a favorable public perception of Pengrowth while preventing waste from blowing off of the work site and eliminating potential safety hazards. In this area of environmental stewardship, Site Supervisors have a daily impact on our environmental performance. Good performance will be assured by following these three recommendations:

- Keep the work area neat and tidy
- Clean-up any releases immediately
- Use proper waste storage bins (oilfield waste does not go into domestic garbage!)

Incident Reporting & Proactive Reporting

In cases where an environmental incident occurs, it is crucial that consequences are mitigated as quickly as possible. Certain strict reporting requirements must also be met in a timely fashion to avoid regulatory non-compliance. Contact your Pengrowth Project Engineer / Coordinator and / or local Environmental Coordinator immediately when the following occurs:

- Any release off lease
- Any incident related to a pipeline
- Refined fluid released is greater than 5 litres
- Unrefined fluid released is greater than 20 litres
- Any release of odours off lease
- Any fires associated with Pengrowth facilities

Utilize the proactive reporting process if you identify a less significant environmental or regulatory non-compliance – remedy the situation immediately if possible prior to reporting, but it is still important to report environmental near misses and hazard IDs. Pengrowth is committed to maintaining the environment and the proactive reporting process allows us to follow up on issues as they are identified and to identify focus areas for broad improvement to our operations.

Waste Management

When waste is generated during the course of our operations, it is important to note that strict requirements apply for the handling of waste generated by oilfield operations. Site Supervisors must be aware of and comply with the following guidelines.

- ALL waste must be tracked... no exception.
- At this time ERCB Waste Manifests are used for tracking all waste (DOW or NON-DOW).
- Manifest books are located at most field locations as well as with the local Environmental Coordinator.
- When in doubt ask the local Environmental Coordinator.

One particular type of waste frequently generated during our construction activities is hydro-vac fluid. Hydro-vac fluid disposal must meet the following criteria.

- Contaminated material must be directed to an approved waste management facility.
- Non-contaminated material can be offloaded on lease and then spread around. It **MUST** not be an eyesore and **MUST** be confined to a Pengrowth surface lease, without exception.
- Suspected contaminated material should be treated like it is contaminated until it can be proven otherwise.
- Hydro-vac materials cannot be released unless they meet the Surface Water Discharge Criteria:
 - pH between 6.0 --> 9.0 (pH Strip)
 - Chloride below 500 ppm (Quantabs)
 - No Visible Hydrocarbon Sheen
 - No known contamination present

Spill Clean-up

Occasionally, Site Supervisors must clean-up or are otherwise involved in a spill, either associated with operations or construction activities. The following steps should be taken to ensure that the spill is handled correctly.

- Isolate and contain the spill the best you can immediately.
- Start clean-up.
- Notify a Pengrowth Representative and the local Environmental Coordinator.
- During the course of clean-up, ensure that known contaminated soil is stored on a liner system. In an emergency situation, this liner may consist of polyethylene unrolled over an area that may include berms as required. The seams should be suitably overlapped to ensure that the ground below is protected from contamination.

Surface Water Run-off

When water accumulates on a Pengrowth work site and it must be removed, caution must be used to ensure that environmental regulations are complied with. The local Environmental Coordinator may be contacted to clarify any of the associated requirements and to direct the Site Supervisor on

obtaining suitable testing equipment and on reporting requirements. The following criteria must be followed:

- chloride content: 500 mg/L maximum, (e.g. test strips);
- pH: 6.0 to 9.0, (e.g. test strips and/or meter readings);
- no visible hydrocarbon sheen;
- no other chemical contamination;
- **landowner consent must be obtained**
- surface water discharge may not flow directly into any watercourse; and
- Record the release including the results of the above tests

Vegetation Control

In cases where a construction site that is infested with weeds is encountered, the local Environmental Coordinator should be contacted to assist in developing a vegetation control strategy. In dealing with less serious weed control issues, Site Supervisors are reminded that herbicides should not be considered the first choice and that residual chemicals should not be used.

Construction operations, when not properly conducted, can lead to spread of weeds and soil borne diseases. It is crucial that in all cases, Site Supervisors

- Ensure all equipment is clean before starting the job (clubroot, noxious weeds, etc.)

Clubroot in Alberta:

Clubroot is a serious soil-borne disease that attacks crops like canola and severely impacts agricultural operations. To date, it has primarily been confined to the Edmonton Area but is spreading to other areas. Most counties in Alberta now have specific Clubroot policies in place. It is important to understand that Clubroot spores are easily spread on equipment that has been in contact with it. Specific requirements associated with Clubroot include:

- Pengrowth's Clubroot policy requires all equipment moved from an impacted area be washed and disinfected
- Daily logs of equipment movement and cleaning operations are required from contractors.
- A detailed review of the Pengrowth policy will be required when working in known impacted areas or when landowners raise specific concerns.

Flaring & Venting

The ERCB is focusing on reducing flaring & venting in Alberta through measures outlined in Directive 60. Site Supervisors must consider the following factors in situations requiring flaring or venting, although the list is general in nature. For further information, contact the Project Engineer / Coordinator or the local Environmental Coordinator.

- Large volume flaring (>4hrs) at facilities & pipelines requires ERCB & resident notification – contact Environmental Coordinator if in doubt, sometimes there are further requirements.
- When planning flaring or venting of pipelines, we must consider alternatives to flaring and venting or assess potential reductions in volumes.

- For Gas Gathering pipelines – gas > 5 ppm H₂S must be flared, and gas > 5% H₂S requires a temporary flaring permit
- All flares must meet ERCB performance criteria – contact the Project Engineer / Coordinator for details.
- Venting is not considered an acceptable alternative to flaring.
- Temporary, short term venting of facilities & pipelines is allowed if: the gas is sweet, the gas contains no free hydrocarbon liquid, all liquid is separated and contained in accordance with Directive 55, total gas volume < 2000 m³ (2 decs), notification requirements are met if duration > 4 hrs, spacing requirements are met (distance from combustion sources)
- Venting may not be conducted within 500 metres of a residence without permission
- Gas > 1% H₂S may not be vented, but if any gas containing lower concentrations of H₂S is vented there must not be off lease odor. Essentially, don't vent gas containing H₂S.

Summary

Perhaps the best guidance for Site Supervisors with regards to the environment is, "Get to know the Environmental Coordinator in your area." Environmental legislation is often vague, so if there is any uncertainty in how to proceed, call the Environmental Group for assistance. If further information is required, copies of the relevant environmental policies are available upon request.

Environmental Coordinators

Blake Reid – Olds / Southwest

Olds Office

Ph: (403) 556-5354

Cell: (403) 559-8656

E-mail: blake.reid@pengrowth.com

Sheldon Scyrup – Eastern

Jenner Office

Ph: (403) 898-3777 Ext. 828

Cell: (403) 376-8927

E-mail: sheldon.scyrup@pengrowth.com

Carolyn Thomas – Central

Judy Creek Office

Ph: (780) 333-7152

Cell: (780) 706-5558

E-mail: carolyn.thomas@pengrowth.com

Nolan Steinwand – Northern

Fort St John Office

Ph: (250) 261-2013

Cell: (250) 262-5442

E-mail: nolan.steinwand@pengrowth.com

Dean Soucy – Calgary

Calgary Office

Ph: (403) 213-3687

Cell: (403) 512-6855

E-mail: dean.soucy@pengrowth.com

SITE SAFETY INSPECTION REPORT

Site Location: _____ Inspection Date: _____

Contractor Company/Name: _____

Pengrowth Representative: _____

1.0 POLICY and PROCEDURES		
1.1 Permit System	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>
a. Safe work agreements on site		
b. Conditions outlined and followed		
c. Safety work plans available		
d. Content of permit(s) discussed with all workers every day		
e. Hazard Assessment forms completed		
f. Emergency Response Plan on site & all workers know its location and contents		
g. Daily tailgate meetings held		
h. Workers properly orientated to Pengrowth standard		
i. Ground Disturbance Procedures followed (form complete)		
j. Working Alone Policy understood & followed		
1.2 Hazard Identification	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>
a. Emergency showers / eyewash available if required		
b. MSDS on site for all chemicals		
c. Noise hazard areas posted and/or communicated		
d. Vision hazard areas posted and/or communicated		
e. WHMIS labels in place		
f. Work site labels on site and used		
g. Respiratory hazards identified/posted		
h. Gas detection used where required		
i. Barricades/signs used for radiography		
j. Handling/storage/disposal of hazardous materials adequate		
k. Adequate signs that are clear and well placed		
1.3 Personal Protective Equipment	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>
a. Proper equipment selected and used		
b. Hard hats used		
c. Eye protection used		
d. Respiratory protection used where required		
e. Safety belts used where required		
f. Clothing policy on site established & followed		

SITE SAFETY INSPECTION REPORT

g. Safety footwear where required		
h. Protective clothing used where required		
i. Hearing protection used where required		
j. Contaminated equipment disposed of or cleaned properly		
k. Chainsaw pants/gloves/shield where required		
<u>2.0 REGULATORY REQUIREMENTS</u>		
<u>2.1 Rigging and Hoisting</u>	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>
a. Approved rigging design in place as required		
b. Area cleared for overhead hoisting		
c. Slings and ropes in good condition		
d. Load properly fastened		
e. Outriggers extended		
f. Hand lines (tag lines) in use		
g. Designated signal person with vest, standard signals used		
h. Safe distance from power lines		
i. Proper radius for loads and vertical lifts		
j. Area roped off as required		
k. Wire rope lubricated and in good condition		
l. Safety latch on hoisting hooks in good condition		
m. At least 5 wraps on drum at all times		
<u>2.2 Excavation/Trenching</u>	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>
a. Line locating completed for identification of buried lines		
b. Hand excavated within 60cm of buried structure		
c. Excavation flagged, lit and barricaded, as needed		
d. Excavation properly back-sloped (45°)		
e. Egress ladders or ramp provided		
f. Shored as required		
g. Spoil pile back 1m from edge		
<u>2.3 Work Environment/Training</u>	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>
a. Conflicting work activities identified		
b. Clear work directions provided		
c. Adequate manpower provided		
d. Worker job experience and confidence ensured		
e. Workers have all required certificates of training (WHMIS, TDG, Confined Space, H2S, First Aid, etc)		

SITE SAFETY INSPECTION REPORT

3.0 MATERIALS AND EQUIPMENT		
3.1 Material Storage	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>
a. Racks and shelves provided (if required)		
b. Storage areas orderly and secured		
c. Pallets stacked securely		
d. Stacked material secured		
e. Chemicals properly WHMIS labelled and properly stored		
f. Appropriate security measures in place		
g. Sensitive materials protected from weather		
3.2 Equipment Lockout and Isolation	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>
a. Lockout of electrical systems completed as required		
b. Lockout and blanking of pressure system completed		
c. Lockout of mechanical devices completed		
d. Tags in place		
e. Double locked and tagged where required		
3.3 Tools and Equipment	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>
a. General condition of tools acceptable		
b. Guards in place and serviceable		
c. Electrical tools grounded or double insulated		
d. Tools being used and stored properly		
3.4 Electrical	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>
a. Electrical system and cords grounded		
b. Cords and cables in good condition		
c. Extension cords of adequate size		
d. Distribution boxes closed and secured		
e. Explosion-proof fixtures, if required		
f. Modifications carried out by qualified personnel		
g. Portable power plant grounded to ground rod		
3.5 Vehicles and Mobile Equipment	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>
a. Qualified or licensed personnel operating		
b. Warning devices operative		
c. Speed limits observed		
d. General mechanical inspections up to date as required (Inspection Report available upon request)		
e. Mobile equipment used in proper manner		

SITE SAFETY INSPECTION REPORT

f. Extinguishers installed and operable (check expiry date)			
g. First Aid Kits/additional emergency equipment as required			
h. Rollover devices/seat belts installed and used			
i. Headlights used			
j. Positive air shut off air intake functioning			
4.0 EMERGENCY RESPONSE PLANNING			
4.1 Fire Prevention	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>	
a. Water suppression equipment available during fire season			
b. NO SMOKING (other than designated areas)			
c. Combustible materials properly stored and disposed of			
d. Welding areas kept free of combustible material			
e. Sewers covered for hot work			
4.2 Health Controls and Services	<u>Y/N/NA</u>	<u>Comment/Action Item#</u>	
a. Sufficient First Aiders on site			
b. Sufficient first aid kits on site			
c. Medical evacuation plan on hand & understood by first aiders			
d. Appropriate municipal or other ambulance aware of pickup or meeting place			
e. Emergency telephone numbers posted			
f. First Aiders identified to all workers			
<u>Action #</u>	<u>Action</u>	<u>Follow Up (name)</u>	<u>Completion Date</u>
<u>Action #</u>	<u>Action</u>	<u>Follow Up (name)</u>	<u>Completion Date</u>

SITE SAFETY INSPECTION REPORT

Other Notes:			

Pengrowth Representative

Date

Site Supervisor

Date

Contract Worker

Date



Internal Review (for Office use only - not to be released to third parties) *(To be completed for all reportable incidents within 48 hrs)* - 1 -

Date of Incident: (Day / Month / Year)	Time: <input type="checkbox"/> am <input type="checkbox"/> pm	Location of WHERE Incident Occurred: (Address or Legal Survey Description)	
Reporting Level of Incident: <input type="checkbox"/> Critical <input type="checkbox"/> Serious <input type="checkbox"/> Moderate <input type="checkbox"/> Minor *Refer to the 'Incident Reporting Timeline & Investigation' Card located on the backside of 'Risk Assessment' Matrix card			
Incident Classification <input type="checkbox"/> Fatality <input type="checkbox"/> Medical Aid <input type="checkbox"/> First Aid <input type="checkbox"/> Lost Time <input type="checkbox"/> Restricted Work <input type="checkbox"/> Equipment Damage <input type="checkbox"/> Property Damage <input type="checkbox"/> Fire <input type="checkbox"/> Business Interruption <input type="checkbox"/> Security/Trespass/Theft <input type="checkbox"/> Mobile Equipment Damage <input type="checkbox"/> Material Loss <input type="checkbox"/> Other _____ <input type="checkbox"/> Vehicle (PVI) <input type="checkbox"/> Vehicle (NPVI) <input type="checkbox"/> Vehicle (VI-Minor) – Refer to Vehicle Incident Classification flowchart on the Insider			
Contractor Incident: <input type="checkbox"/> Yes <input type="checkbox"/> No			
Report Prepared by: _____ (Name and Occupation) Signature:_____ Date: _____		Supervisor's Name: _____ Tel. No. _____ Date: _____	
Name (Facility/Field name etc.)			
Location:	LSD:	Business Unit:	Equipment/Facility:
Estimate of Costs	\$		
DESCRIPTION OF INCIDENT (Clearly describe what, when, why, who and how. Complete diagram on reverse, if applicable.) _____ _____ _____ _____ _____			
INJURY INFORMATION			
If a Pengrowth employee, have you completed Provincial Workers' Compensation Board form? Yes <input type="checkbox"/> No <input type="checkbox"/>			
Name:		Address:	
Type of Injury:	Number of days lost:	Injury Cause:	
Body part Injured:	Number of days on Restricted Work:		
Was injured person(s) taken to hospital? Yes <input type="checkbox"/> No <input type="checkbox"/> Injury Agent: _____ (Name of the Hospital, City & Province)			
Authorization for collection of personal information. In accordance with the Insurance Act and PIPA this information is being collected in order to provide information to the insurers of Pengrowth. Inquiries may be directed to the Treasurer.			
Internal Notifications		External Notifications	
Pengrowth Corporation <input type="checkbox"/> Regional Manager <input type="checkbox"/> Safety Coordinator <input type="checkbox"/> Superintendent <input type="checkbox"/> Foreman <input type="checkbox"/> Integrity Group <input type="checkbox"/> Legal <input type="checkbox"/> Public & Government Affairs		Regulatory Agency(s) & Stakeholders <input type="checkbox"/> OH & S <input type="checkbox"/> WCB <input type="checkbox"/> ABSA <input type="checkbox"/> ERCB <input type="checkbox"/> OGC <input type="checkbox"/> SIR <input type="checkbox"/> PEP <input type="checkbox"/> LANDOWNER – Name: _____	
WITNESSES			
Name	Address	Phone Number	
Vehicle Information	"Pengrowth " Information	"Other Party" Information	
Unit Number			
Year, Make & Model			
Serial Number			
Licence Plate Number & Province			



Internal Review (for Office use only - not to be released to third parties) (To be completed for all reportable incidents **within 48 hrs**)

- 2 -

Vehicle Information Cont'd	“Pengrowth “ Information Cont'd	“Other Party” Information Cont'd		
Driver's Name				
Driver's Address	N/A			
Driver's Phone number				
Driver's Licence No.				
Name of Insurance Company	N/A			
Policy No.	N/A			
<p>Were police notified? Yes <input type="checkbox"/> No <input type="checkbox"/> Station/Detachment: _____</p> <p>Name of Police Officer _____ Badge No. _____</p>				
<table style="width:100%;"> <tr> <td style="width:50%; vertical-align: top;"> Pengrowth Employee Cell phone being used <input type="radio"/> Yes <input type="radio"/> No Seat Belt Done Up <input type="radio"/> Yes <input type="radio"/> No </td> <td style="width:50%; vertical-align: top;"> Other Party Cell phone being used <input type="radio"/> Yes <input type="radio"/> No Seat Belt Done Up <input type="radio"/> Yes <input type="radio"/> No </td> </tr> </table>			Pengrowth Employee Cell phone being used <input type="radio"/> Yes <input type="radio"/> No Seat Belt Done Up <input type="radio"/> Yes <input type="radio"/> No	Other Party Cell phone being used <input type="radio"/> Yes <input type="radio"/> No Seat Belt Done Up <input type="radio"/> Yes <input type="radio"/> No
Pengrowth Employee Cell phone being used <input type="radio"/> Yes <input type="radio"/> No Seat Belt Done Up <input type="radio"/> Yes <input type="radio"/> No	Other Party Cell phone being used <input type="radio"/> Yes <input type="radio"/> No Seat Belt Done Up <input type="radio"/> Yes <input type="radio"/> No			
<p>Road Surface: Asphalt <input type="checkbox"/> Concrete <input type="checkbox"/> Dirt <input type="checkbox"/> Gravel <input type="checkbox"/> Parking Lot <input type="checkbox"/> Weather: Clear <input type="checkbox"/> Dark <input type="checkbox"/> Rain <input type="checkbox"/> Snow <input type="checkbox"/></p> <p>Road conditions: Dry <input type="checkbox"/> Gravel <input type="checkbox"/> Wet <input type="checkbox"/> Icy <input type="checkbox"/> Visibility: Artificial Light <input type="checkbox"/> Dark <input type="checkbox"/> Dawn <input type="checkbox"/> Daylight <input type="checkbox"/> Dusk <input type="checkbox"/></p>				
<p>Direction: Pengrowth vehicle: _____ Other vehicle: _____</p> <p>Speed: Pengrowth vehicle: _____ Other vehicle: _____</p> <p>Lights (On, off, dim, bright) _____ Lights: (On, off, dim, bright) _____</p> <p>Warning signs: _____ Warning signs: _____</p>				
<p>Driver Event Type: Backing <input type="checkbox"/> Single Vehicle Damage <input type="checkbox"/> Struck Against <input type="checkbox"/> Struck By <input type="checkbox"/> Vehicle Backing Damage</p>				
Cause	Code	Description		
Direct Cause:				
Indirect Cause:				
System Needs:				
<p>Could the individual involved in this incident have reasonably prevented it? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>				
Evaluation of Risk – Refer to Risk Assessment Matrix				
<table style="width:100%;"> <tr> <td style="width:50%; vertical-align: top;"> Potential Consequences <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV </td> <td style="width:50%; vertical-align: top;"> Probability <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E </td> </tr> </table>			Potential Consequences <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV	Probability <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E
Potential Consequences <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV	Probability <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E			

Task:	Assigned to:	Due Date:

Management 1:	Signature:	Date:
Management 1:	Signature:	Date:
HSE :	Signature:	Date:



***Near Miss** = Any situation which under slightly different circumstances could have resulted in injury or loss.

***Hazard ID** = An opportunity to recognize and correct a potential hazard before it results in injury or loss.

NEAR MISS/HAZARD ID CATEGORY:

☐ **OFF THE JOB**

(Indicate NM or HID)

☐ **NEAR MISS**

☐ **HAZARD ID**

Incident # _____

(Administration Use Only).

INCIDENT TYPE

☐ **Driving**

☐ **Slips, Trips & Falls**

☐ **Environment**

☐ **Pressure**

☐ **Lifting**

☐ **Housekeeping**

☐ **Mechanical Failure**

☐ **Equipment**

☐ **Bad Design**

☐ **Other:** _____

mm/dd/yyyy

Incident Date:

**Business
Unit:**

Reported By:

**Site/Work
Location**

Equipment

Description:

**Preventative/
Corrective
Action Taken**

EVALUATION OF RISK

Potential Consequence

I

☐

II

☐

III

☐

IV

☐

Probability

A

☐

B

☐

C

☐

D

☐

E

☐

"High Potential or Significant" Near Miss and Hazard Identification (ID) reports that have a Potential Consequence ranking in the **Black** must be further investigated with corrective action implemented immediately. Refer to the Risk Assessment Framework for determination.

****FORWARD PROACTIVE REPORT TO YOUR DIRECT SUPERVISOR FOR REVIEW and SIGN OFF****

Person Responsible for Follow up		Management 1 Sign-Off	
Target Date to Complete		Management 2 Sign-Off	
Actual Completion Date		Safety/Environmental Coordinator Sign-Off	

SAFETY INCIDENT CAUSE CODE TABLE

What were the DIRECT CAUSES of the Incident?

SUBSTANDARD PRACTICES	SUBSTANDARD CONDITIONS
101 Operating equipment without authority / failure to secure or warn	111 Inadequate guards/barriers/warning systems
102 Operating or working at improper speed	112 Congested or restricted movement
103 Removing or making safety devices inoperable	113 Fire/explosion hazard
104 Using defective/improper equipment	114 Poor housekeeping
105 Failure to use proper attire or personal protective devices	115 Defective tools, equipment or material
106 Improper lifting, loading, placing, mixing, etc.	116 Combustible/poisonous gas present
107 Improper position or posture for task	117 Temperature extremes
108 Working on moving or dangerous equipment	118 Noise exposure
109 Horseplay	119 Radiation exposure
110 Failure to follow procedures	120 Hazardous arrangement
146 Insufficient emphasis on work procedures	121 Hazardous environment
147 Act of an outsider/damage by others	122 Improper illumination/lighting
150 Poor communication	123 Improper ventilation
181 Other....Any other Substandard Practices contributing to the incident	124 Substandard dress or apparel
	125 Construction damage
	126 Corrosion – internal
	127 Corrosion – external
	128 Mechanical Failure/Stress
	129 Wildlife
	149 Lack of Security
	152 Poor road conditions
	153 Uncontrollable environmental condition/earth movement
	154 Inadequate information
	157 Slippery surface
	158 Pipe/Weld Failure
	159 Fitting/Joint Failure
	182 Other....Any other Substandard Conditions contributing to the incident

What were the INDIRECT CAUSES of the Incident?

PERSONAL FACTORS	JOB/SYSTEM FACTORS
130 Inadequate capability/skill	135 Inadequate supervision/leadership
131 Inadequate knowledge	136 Inadequate engineering/design/construction
132 Inadequate training	137 Inadequate purchasing
133 Stress/improper motivation	138 Inadequate maintenance
134 Worker fatigue/preoccupied	139 Inadequate tools, equipment or materials
145 Disregard for instruction	140 Safe work procedure not developed
148 Failure to report	141 Safe work procedure used/not enforced
155 Existing health problems	142 Safety equipment not provided
156 Other....Any other Personal Factors contributing to the incident	143 Hazards not recognized
	144 Lack of a lockout system or systems not enforced
	151 Lack of regular/planned inspections
	183 Other....Any other job/system factors contributing to the incident

What is the System Need(s) related to the Incident?

160 Management commitment and involvement	170 Accident/incident analysis
161 Hazard assessment and control	171 Legislative/industry standards
162 Planned inspections	172 Purchasing controls
163 Accident/incident investigation	173 Safety/group meetings
164 Company rules / Policies	174 Hiring and placement
165 Safe work procedures	175 Engineering controls
166 Employee training	176 Administrative controls
167 Personal Protective equipment	177 Personal communications
168 Management training	178 Program evaluation
169 Emergency response	179 Health/Hygiene controls
184 Other....Management System Needs which may prevent the incident	180 Contractor Management

Injury Type		Body Party Injured		Product	Terrain	Contacts	
Abrasion	Amputation	Abdomen	Ankle	Air	Agricultural	Absorption	Caught Between
Burn	Bruise	Back	Chest	Black Smoke	Air	Caught In	Caught On
Contusion	Cut & Avulsion	Ears	Elbow	Chemical	Clay	Cut By	Electrical Shock
Demetrious	Dislocation	Eye(s)	Face	Condensate	Forest	Equipment Operation	Explosives
Fatality	Foreign Body	Feet	Fingers	Crude Oil	Muskeg	Extreme Cold	Extreme Heat
Fracture	Hernia	Forearm	Groin	Diesel	On Lease	Fall on Ground	Fall on Same Level
Poisoning	Puncture Wound	Hand	Hips	Emulsion	Water	Ingestion	Inhalation
Strain	Sprain	Knee	Legs	Fresh Water	Other	Jumping Between Levels	Lifting
Unconsciousness	Other	Mouth	Neck	Gasoline		Physical Condition	Pulling
		Scalp	Shoulder	Glycol		Slipping	Struck Against
		Skull	Teeth	H ₂ S		Stuck by Falling Object	Struck by Flying Object
		Thigh	Thumb	Lube Oil		Tripping	Not Applicable
		Toes	Upper	Methanol		Other	
		Arms	Produced				
		Wrist	Other	Water			
		S02					
			Other				



EMERGENCY RESPONSE TELEPHONE DIRECTORY

PENGROWTH EMERGENCY RESPONSE TELEPHONE DIRECTORY

- **Pengrowth Corporate Contacts & Office Locations**
- **Emergency Response Contacts Summaries by Area**
 - **Central Operations**
 - ⇒ [Judy Creek/Carson Creek/Deer Mountain](#)
 - **Conventional Operations – Northern Alberta**
 - ⇒ [McLeod River /Kaybob/Goose River](#)
 - ⇒ [Red Earth/Nipisi/Harry Hill/Woodland](#)
 - **Conventional Operations – Northeast British Columbia (NEBC)**
 - ⇒ [Fort St. John](#)
 - **Conventional Operations – Southern Alberta**
 - ⇒ [SE Alberta - Shallow Oil & Gas](#)
([Enchant](#), [Winnifred](#), [Lethbridge](#), [Parkland](#), [Blackstone](#), [Ricinus](#), [Ferrybank](#) & [Hays](#))
 - ⇒ [Greater Berry](#)
 - **Southern Alberta Operations**
 - ⇒ [Greater Jenner – Shallow Oil & Gas](#) ([Jenner](#), [Princess](#), [Bantry](#))
 - ⇒ [Three Hills – Oil & Gas](#) ([Mikwan/Pine Lake](#), [Twining](#), [Equity](#))
 - ⇒ [Fenn Big Valley](#) ([Fenn](#), [Ewing Lake/Lousana](#))
 - **Eastern Operations**
 - ⇒ [Bodo](#)
 - ⇒ [Cactus Lake](#)
 - ⇒ [Plover](#)
 - **Olds Operations**
 - ⇒ [Olds](#)
 - **Lindberg Oilsands Project**
 - ⇒ [Lindbergh](#)
 - **Montney Gas Development**
 - ⇒ [Groundbirch](#)

PENGROWTH OFFICES

Incident Command Centre – Calgary	(403)	806-3276
Pengrowth 24 Hour Emergency Number	1(888)	488-7190
Bantry Field Office	(403)	362-8643
Bodo Field Office	(780)	753-2160
Cactus Lake Field Office	(306)	753-2906
Carson Creek Field Office	(780)	778-7451
Deer Mountain Field Office	(780)	333-5283
Enchant Field Office	(403)	654-2076
Fenn Big Valley Field Office	(403)	876-2352
Fort St. John Field Office	(250)	787-7974
Goose River Plant Office	(780)	524-2331
Groundbirch Plant Office	(780)	524-2331
Hairy Hills Field Office	(780)	763-3544
Jenner Gas Plant	(403)	898-3777
Judy Creek Field Office	(780)	333-7100
Kaybob (Contract Operated)	(780)	622-9495
Lethbridge – Airport Office	(403)	329-8942
Lindbergh Plant Office	(780)	724-2704
Livingston Place – Calgary Corporate	(403)	233-0224
McLeod River Field Office	(780)	693-2211
Nipisi Plant Office	(780)	849-0124
Olds Gas Plant	(403)	556-3424
Plover Field Office	(306)	372-4896
Princess Field Office	(403)	898-3944
Sherwood Park Field Office	(780)	417-7021
Three Hills Field Office	(403)	443-7120
Woodland Field Office	(780)	656-0271

CALGARY

NAME	POSITION	HOME	WORK	CELL
Jim Causgrove	Vice President, Operations	(403) 244-0507	(403) 508-3609	(403) 701-8630
Kevin Matieshin	Director, HS&E & Technical Services	(403) 256-0939	(403) 508-8957	(403) 999-2694
Wassem Khalil (#1)	Investor Relations Manager	(403) 455-4700	(403) 213-3764	(403) 630-0820
Jody Alexander (#2)	Public Affairs Advisor	(403) 229-3087	(403) 213-6847	(403) 680-5857
Hugo Potts	Legal Counsel	(403) 284-4492	(403) 508-8965	(403) 771-3569
Bobbi-Jo Reain	Surface Land Manager	(403) 475-7129	(403) 213-3762	(403) 370-3128
Russell Watts	Chief Inspector (Vessels & Tanks)	(403) 274-6093	(403) 508-3637	(403) 809-1055
Shane Tiessen	Integrity Specialist (Pipelines)	(403) 601-2524	(403) 269-5067	(403) 809-9092
Matt Lema (alternate contact)	Team Lead, Integrity (Pipelines, Vessels & Tanks)	(403) 226-1464	(403) 269-5042	(403) 801-6234
Tom Morin (#1)	Electrical & Automation Advisor	(403) 685-0290	(403) 508-3576	(403) 863-0842
Bert Gano (#2)	Team Lead, Electrical	(403) 256-5137	(403) 806-3417	(403) 998-4098

PRODUCTION AND OPERATIONS

NAME	POSITION	HOME	WORK	CELL
Rod Machula	General Manager, Conventional Operations	(780) 778-8587	(403) 804-3261	(403) 808-5842
Brent Denoncourt	Manager, Conventional Operations	(403) 474-1134	(403) 806-3414	(403) 968-9301
Nauman Rasheed	Manager, Olds Operations	(403) 242-6536	(403) 213-3797	(403) 651-0211
Ron Shannon	Manager, Southern & Eastern	(403) 938-7173	(403) 269-5065	(403) 804-0775
Randy Steele	Manager, Central Operations	(403) 995-4463	(403) 269-5097	(403) 826-5257
Kevin Matieshin	Lindbergh Oilsands Operations	(403) 256-0939	(403) 508-8957	(403) 999-2694
Diane Shirra	VP, Montney Gas Development	(403) 246-9097	(403) 213-3706	(403) 471-7883

PROJECTS TEAM

NAME	POSITION	HOME	WORK	CELL
Lawrence Schafers	Manager, Project Engineering	(403) 851-0848	(403) 508-3551	(403) 710-5779

SAFETY DEPARTMENT

NAME	POSITION	HOME	WORK	CELL
Phil Goldsney	Manager, Safety	(403) 945-1868	(403) 508-3630	(403) 801-3967
Justin Kraft	Safety Coordinator	(403) 580-1885	(403) 898-3777	(403) 952-9165
Ryan Sloan	Safety Coordinator	(403) 337-2830	(403) 213-3780	(403) 875-4583
Tracey Ells	Safety Administrator	(403) 969-4712	(403) 266-8352	(403) 969-4712

ENVIRONMENTAL DEPARTMENT

NAME	POSITION	HOME	WORK	CELL
Randy Fuglerud	Manager, Environmental & Regulatory Compliance	(403) 205-2920	(403) 269-5071	(403) 669-6473
Dean Soucy	Environmental Team Lead	(403) 532-9229	(403) 213-3687	(403) 512-6855
Sheldon Scyrup	Environmental Coordinator	(403) 488-8513	(403) 898-3777	(403) 376-8927
Nolan Steinwand	Environmental Coordinator	(403) 374-3324	(403) 508-3571	(250) 262-5442
Blake Reid	Environmental Coordinator	(403) 337-2609	(403) 556-5354	(403) 559-8656
Carolyn Thomas	Environmental Coordinator	(780) 779-2502	(780) 333-7152	(780) 706-5558

DRILLING & COMPLETIONS DEPARTMENT

NAME	POSITION	HOME	WORK	CELL
Brent Defosse	VP, Drilling & Completions	(403) 374-1820	(403) 508-8941	(403) 804-7317
Barry Ahlstrom	Manager, Completions	(403) 254-2384	(403) 213-3653	(403) 828-8937
Derrick Kosiorek	Construction Superintendent	(403) 938-2618	(403) 266-8363	(403) 863-6516
Mike Krooshoop	Drilling Superintendent	(403) 932-3938	(403) 213-3771	(403) 370-7002
Ron Weber	Completions Superintendent	(403) 337-3711	(403) 508-8993	(403) 968-1000

EMERGENCY RESPONSE CONTACT SUMMARY BY AREAS

CENTRAL OPERATIONS JUDY CREEK/CARSON CREEK/DEER MOUNTAIN

INTERNAL CONTACTS							
PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190							
On-Site / Area Command Centre Judy Creek Production Complex Office: (780) 333-7100; Area Command Centre: (780) 333-7111 Judy Creek Gas Plant Office: (780) 333-7304; Area Command Centre: (780) 333-7303 Carson Creek Field Office: (780) 778-7451; Area Command Centre: (780) 778-7473 Deer Mountain Field Office: (780) 333-5283 Reception Centre: Hillcrest Motel, Swan Hills, AB (780) 333-2851							
#1) JCPC Control Room	Work	(780)	333-7189	#8) Randy Steele	Work	(403)	269-5097
				Ops Mgr, Central	Home	(403)	995-4463
					Cellular	(403)	826-5257
#2) Dale Babiak	Work	(780)	333-7176				
Area Superintendent	Home	(780)	778-1906	#9) Craig Johnson	Work	(780)	333-7165
Central - Operations	Cellular	(780)	779-3064	Superintendent	Home	(780)	333-2153
				Central – New Development	Cellular	(780)	333-5743
#3) Jim Greer	Work	(780)	333-7130				
Superintendent	Home	(780)	706-2240	#10)	Work	(780)	333-7182
Central - Maintenance	Cellular	(780)	778-0564	Safety Coordinator	Home	(780)	
					Cellular	(780)	333-1501
#4) Darren Tetlock	Work	(780)	333-7131				
Operations Foreman	Home	(780)	778-6205	#11) Carolyn Thomas	Work	(780)	333-7152
(Judy Creek Gas Plant, Gas Gathering & Deer Mtn.)	Cellular	(780)	396-9121	Environment Coordinator	Home	(780)	779-2502
					Cellular	(780)	706-5558
#5) John Hestermann	Work	(780)	333-7120				
Operations Senior Foreman	Home	(780)	333-4358				
(Judy Creek PC & Field)	Cellular	(780)	333-5731				
#6) Ken Suchan	Work	(780)	333-7183				
Operations Foreman	Home	(780)	778-3561				
(Carson Creek & Goose)	Cellular	(780)	778-1069				
#7) Ken Workman	Work	(780)	333-7169				
Senior Mechanical Foreman	Home	(780)	778-3305				
	Cellular	(780)	779-3833				

SUPPORT SERVICES			
Ambulance		Fire & Safety Services	
STARS Emergency Link	911 or	Fire Power	Prov-wide 1-800-463-3187
Cellular /Globalstar Satellite Phone	1-888-888-4567 or	Fire Master	Prov-wide 1-403-342-7500
	#4567	Safety Boss	Prov-wide 1-800-882-4967
Hospital		Western Canadian Spill Co-op	
Swan Hills	(780) 333-7000	Co-op Area "W"	
Whitcourt	(780) 778-2285	Smiley's Trucking	(780) 778-1997
RCMP		Regulatory Agencies	
Swan Hills	(780) 333-4459	ERCB – St. Albert	(780) 460-3800
SRD	310-FIRE (3473)	Alberta Environment	1-800-222-6514
Alberta One Call	1-800-242-3447	OHS	1-866-415-8690

#) Name: Denotes Caller Priority Sequence for PDL

CONVENTIONAL OPERATIONS – NORTHERN ALBERTA

MCLEOD RIVER/KAYBOB/GOOSE RIVER

INTERNAL CONTACTS			
PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190			
On-Site / Area Command Centre (Contract Operator) McLeod River Plant Office: (780) 693-2211 Kaybob (Contract Operator) (780) 622-9495 (cellular) Reception Centre: Royal Oak Inn, Whitecourt, AB (780) 778-4004 Goose River Plant Office (780) 524-2331 Reception Centre: Fox Creek Inn, Fox Creek, AB (780) 622-3821			
#1) Luc Fortin Senior Ops. Foreman	Work Home Cellular	(780) (780) (780)	410-8190 922-9220 446-9637
#2) Brent Denoncourt Manager, Field Ops.	Work Home Cellular	(403) (403) (403)	806-3414 474-1134 968-9301
#3) Rod Machula General Manager, Conventional Ops.	Work Home Cellular	(403) (780) (403)	804-3261 778-8587 808-5842
#4) Phil Goldsney Safety Coordinator	Work Home Cellular	(403) (403) (403)	508-3630 945-1868 801-3967
#5) Nolan Steinwand Environment Coordinator	Work Home Cellular	(403) (403) (250)	508-3571 374-3324 262-5442

SUPPORT SERVICES			
Ambulance		Fire & Safety Services	
STARS Emergency Link		Fire Power	Prov-wide 1-800-463-3187
Cellular /Globalstar Satellite Phone #4567		Fire Master	Prov-wide 1-403-342-7500
Hospital		Western Canadian Spill Co-op	
Whitecourt	(780) 778-2285	Co-op Area "W" (McLeod)	
Edson	(780) 723-3331	Smiley's Trucking	(780) 778-1997
Fox Creek	(780) 622-3545	Co-op Area "E" (Goose River & Kaybob)	
RCMP		Apache	(780) 524-3341
Edson	(780) 723-8800	Regulatory Agencies	
Fox Creek	(780) 622-3740	ERCB – Drayton Valley	(780) 542-5182
Alberta One Call	1-800-242-3447	Alberta Environment	1-800-222-6514
SRD	310-FIRE (3473)	OHS	1-866-415-8690

#) Name: Denotes Caller Priority Sequence for PDL

CONVENTIONAL OPERATIONS – NORTHERN ALBERTA

RED EARTH/NIPISI/HAIRY HILL/WOODLAND

INTERNAL CONTACTS

PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190

On-Site / Area Command Centre

Sherwood Park Field Office (780) 417-7021

Reception Centre: Red Earth Inn, Red Earth Creek, AB (780) 649-3750

Nipisi Reception Centre: Super 8 Motel, Slave Lake, AB (780) 805-3100

Hairy Hills Operations

Contact: Fred Potts (780) 763-3544

Woodland Operations

Contact: Barry Cernichan (780) 656-0271

#1) Luc Fortin	Work	(780)	410-8190
Senior Operations Foreman	Home	(780)	922-9220
	Cellular	(780)	446-9637
#2) Dennis Paleck	Work	(780)	649-1304
Production Lead	Home	(780)	849-3294
	Cellular	(780)	649-4252
#3) Brent Denoncourt	Work	(403)	806-3414
Manager, Northern	Home	(403)	474-1134
	Cellular	(403)	968-9301
#4) Rod Machula	Work	(403)	804-3261
General Manager, Conventional Ops.	Home	(780)	778-8587
	Cellular	(403)	808-5842
#5) Phil Goldsney	Work	(403)	508-3630
Safety Coordinator	Home	(403)	945-1868
	Cellular	(403)	801-3967
#6) Nolan Steinwand	Work	(403)	508-3571
Environment Coordinator	Home	(403)	374-3324
	Cellular	(250)	262-5442

SUPPORT SERVICES

Ambulance		911 or	Fire & Safety Services	
STARS Emergency Link		1-888-888-4567 or	Fire Power	Prov-wide 1-800-463-3187
Cellular /Globalstar Satellite Phone #4567			Inferno Safety	Prov-wide 1-877-357-3130
Hospital			HSE	Prov-wide 1-888-346-8260
Slave Lake	(780)	805-3500	Integrated	
Air Service (Amb.)	(780)	746-2657	Western Canadian Spill Co-op	
RCMP	911		Area "D" & Area "VR-1" (Hairy Hill)	
Red Earth	(780)	649-3990/649-3992	Slave Lake Specialties (24hr)	(780) 849-3863
Slave Lake	(780)	849-3045	Regulatory Agencies	
B.C. One Call	1-800-474-6886		ERCB – St. Albert	(780) 460-3800
			Alberta Environment	1-800-222-6514
			OHS	1-866-415-8690

#) Name: Denotes Caller Priority Sequence for PDL

CONVENTIONAL OPERATIONS – NORTHEAST BRITISH COLUMBIA (NEBC) FORT ST. JOHN

INTERNAL CONTACTS							
PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190							
On-Site / Area Command Centre (Contract Operator) 24 hour Emergency # (250) 787-7974 Reception Centre: Quality Inn Grand, Fort St. John, BC (250) 787-0521							
#1) Rick Brown	Work	(250)	261-2008	#7) Brad Wilson	Work	(403)	691-7733
Senior Operations	Home	(250)	787-0585	Drilling & Completions Manager	Home	(403)	512-9810
Foreman	Cellular	(250)	262-2802		Cellular	(403)	226-1938
#2) Mark McDermott	Work	(250)	261-2004				
Operations Foreman	Home	(250)	262-0104				
	Cellular	(250)	261-1675				
#3) Brent Denoncourt	Work	(403)	806-3414				
Manager, Northern	Home	(403)	474-1134				
	Cellular	(403)	968-9301				
#4) Rod Machula	Work	(403)	804-3261				
General Manager, Conventional Ops.	Home	(780)	778-8587				
	Cellular	(403)	808-5842				
#5) Phil Goldsney	Work	(403)	508-3630				
Safety Coordinator	Home	(403)	945-1868				
	Cellular	(403)	801-3967				
#6) Nolan Steinwand	Work	(403)	508-3571				
Environment Coordinator	Home	(403)	374-3324				
	Cellular	(250)	262-5442				

SUPPORT SERVICES			
Ambulance	911 or	Fire & Safety Services	
STARS Emergency Link	1-888-888-4567 or	Fire Power	Prov-wide 1-800-463-3187
Cellular /Globalstar Satellite Phone #4567		Inferno	Prov-wide 1-877-357-3130
BC Ambulance Service	(250) 785-2079/911	Safety	
On-Site Trojan Safety Services	(250) 785-9557	HSE	Prov-wide 1-888-346-8260
Hospital		Integrated	
Ft. St. John	(250) 262-5200	Western Canadian Spill Co-op	
RCMP – 911 or	(250) 787-8100	Co-op Area "C"	
B.C. One Call	1-800-474-6886	Clean Harbors	(888) 698-5565
		Regulatory Agencies	
		OGC	1-250-261-5700
		PEP	1-800-663-3456
		MOE	1-800-663-3456
		Worksafe BC (OHS)	1-604-273-7711
Reception Centre:	Quality Inn Northern Grand Hotel 9830 100 th Avenue, Ft. St. John, BC Ph: (250) 787-0521		

#) Name: Denotes Caller Priority Sequence for PDL

CONVENTIONAL OPERATIONS - SOUTHERN ALBERTA

SOUTHEAST ALBERTA - SHALLOW GAS / OIL

INTERNAL CONTACTS

PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190

On-Site / Area Command Centre

Enchant Field Office (403) 654-2076

Reception Centre: Heritage Inn, Taber, AB (403) 223-4424

Winnifred South/North Field Office (403) 315-2212

Reception Centre: Heritage Inn, Taber, AB (403) 223-4424

Lethbridge Airport Office (403) 329-8942

Reception Centre: Sandman Hotel, Lethbridge, AB (403) 328-1111

Parkland Field Office (403) 315-2212

Reception Centre: Thriftlodge, Claresholm, AB (403) 625-3347

Blackstone (Operated by Husky)

Contact: Stacy Rahko (403) 844-9653

Ricinus (Operated by Suncor)

Contact: Bryan Johnson (403) 638-7376

#1) Carl Kuntz				#5) Nolan Steinwand			
Senior Operations	Work	(403)	223-0161	Environment Coordinator	Work	(403)	508-3571
Foreman	Home	(403)	223-1350		Home	(403)	374-3324
	Cellular	(403)	315-2212		Cellular	(250)	262-5442
#2) Brent Denoncourt							
Manager, Field Ops.	Work	(403)	806-3414				
	Home	(403)	474-1134				
	Cellular	(403)	968-9301				
#3) Rod Machula							
General Manager,	Work	(403)	804-3261				
Conventional Ops.	Home	(780)	778-8587				
	Cellular	(403)	808-5842				
#4) Phil Goldsney							
Safety Coordinator	Work	(403)	508-3630				
	Home	(403)	945-1868				
	Cellular	(403)	801-3967				

SUPPORT SERVICES

Ambulance			Fire & Safety Services		
STARS Emergency Link		1-888-888-4567 or	Fire Power	Brooks	1-800-463-3187
Cellular /Globalstar Satellite Phone #4567			Fire Master	Prov-wide	1-403-342-7500
Hospital			HSE Integrated	Prov-wide	1-888-346-8260
Brooks	(403)	501-3232	Western Canadian Spill Co-op		
Medicine Hat	(403)	529-8000	Co-op Area "S"		
Taber	(403)	223-4461	Midwest Pumps (403) 329-0427		
Oyen	(403)	664-4300	Enerplus Resources (403) 337-2631		
RCMP	911		(Lorne Schmidt) Extention #26		
	(403)	362-5535 (Emerg.)	Co-op Area "H"		
			Challand Excavating Ltd. (24hr.) (403) 845-2469		
Taber	(403)	223-4446	Regulatory Agencies		
Oyen	(403)	664-3883	ERCB – Midnapore, Calgary (403) 297-8303		
Alberta One Call	1-800-242-3447		ERCB – Medicine Hat (403) 527-3385		
			Alberta Environment 1-800-222-6514		
			OHS 1-866-415-8690		

#) Name: Denotes Caller Priority Sequence for PDL

CONVENTIONAL OPERATIONS - SOUTHERN ALBERTA GREATER BERRY

INTERNAL CONTACTS									
PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190									
On-Site / Area Command Centre									
Hanna Inn (403) 854-2400									
Reception Centre: Super 8 Hotel, Hanna, AB (403) 854-2400									
#1) Carl Kuntz	Work	(403)	223-0161	Mike Hein	Work	(403)	854-0515		
	Senior Operations	Home	(403)		223-1350	Site Contract Operator	Home	(403)	854-3836
	Foreman	Cellular	(403)		315-2212	Hanna, Kirkpatrick, Craig Lake	Cellular	(403)	701-5029
#2) Brent Denoncourt	Work	(403)	806-3414						
	Manager, Field Ops.	Home	(403)	474-1134					
		Cellular	(403)	968-9301					
#3) Rod Machula	Work	(403)	804-3261						
	General Manager,	Home	(780)	778-8587					
	Conventional Ops.	Cellular	(403)	808-5842					
#4) Phil Goldsney	Work	(403)	508-3630						
	Safety Coordinator	Home	(403)	945-1868					
		Cellular	(403)	801-3967					
#5) Nolan Steinwand	Work	(403)	508-3571						
	Environment Coordinator	Home	(403)	374-3324					
		Cellular	(250)	262-5442					
Meryle Dupont	Work	(403)	854-6185						
	Site Contract Operator	Home	(403)	566-2379					
	Berry & Richdale	Cellular	(403)	854-6185					

SUPPORT SERVICES			
Ambulance	911 or		
STARS Emergency Link	1-888-888-4567 or		
Cellular /Globalstar Satellite Phone	#4567		
Hospital			
Brooks	(403)	501-3232	
Hanna	(403)	854-3331	
RCMP	911		
Brooks	(403)	362-5535	
Hanna	(403)	854-3391	
Alberta One Call	1-800-242-3447		
Fire & Safety Services			
Fire Power	Prov-wide	1-800-463-3187	
Fire Master	Prov-wide	1-403-342-7500	
HSE Integrated	Prov-wide	1-888-346-8260	
Western Canadian Spill Co-op			
Berry & Area - Co-op Area "S"			
P&H Oilfield Maintenance – 24h		1-403-362-6551	
	Cell	(403) 793-1420	
Hanna & Area – Co-Op Area "U"			
Greg's Contracting Services Ltd.		(780) 888-3845	
After Hours – Call Max Devey		(780) 209-7363	
Regulatory Agencies			
ERCB – Medicine Hat		(403) 527-3385	
Alberta Environment		1-800-222-6514	
OHS		1-866-415-8690	

#) Name: Denotes Caller Priority Sequence for PDL

SOUTHERN ALBERTA OPERATIONS GREATER JENNER - SHALLOW GAS / OIL

INTERNAL CONTACTS					
PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190					
On-Site / Area Command Centre Princess Field Office (403) 893-3944 Reception Centre: Diamond Jubilee Recreation Centre, Jenner, AB (403) 898-3912 Jenner Gas Plant (403) 898-3777 Reception Centre: Diamond Jubilee Cultural Centre, Jenner, AB (403) 898-3912 Bantry Field Office (403) 362-8643 Reception Centre: Holiday Inn Express Hotel & Suites, Brooks, AB (403) 362-7440					
#1) Kelly Stadnicki	Work	(403)	898-3777	#5) Justin Kraft	Work (403) 898-3777
Senior Area Foreman	Home	(403)	504-6336	Safety Coordinator	Home (403) 580-1885
	Cellular	(403)	548-0336		Cellular (403) 952-9165
#2) Dale Olson	Work	(403)	898-3777	#6) Sheldon Scyrup	Work (403) 898-3777
Lead Operator – Jenner Gas	Home	(403)	527-0712	Environment Coordinator	Home (403) 488-8513
	Cellular	(403)	952-9177		Cellular (403) 376-8927
#3) Bob Mackenzie	Work	(403)	898-3777		
Lead Operator – Jenner Oil	Home	(403)	527-0238		
	Cellular	(403)	952-9184		
#4) Ron Shannon	Work	(403)	269-5065		
Mgr, Southern AB/SK	Home	(403)	938-7173		
	Cellular	(403)	804-0775		

SUPPORT SERVICES					
Ambulance			Fire & Safety Services		
911 or STARS Emergency Link			Fire Power	Brooks	1-800-463-3187
Cellular /Globalstar Satellite Phone #4567			Fire Master	Prov-wide	1-403-342-7500
Hospital			HSE	Prov-wide	1-888-346-8260
Brooks	(403)	501-3232	Integrated		
Medicine Hat	(403)	529-8000			
Taber	(403)	223-4461			
Oyen	(403)	664-4300			
RCMP	911				
	(403)	362-5535 (Emerg.)			
Taber	(403)	223-4446			
Oyen	(403)	664-3883			
Alberta One Call	1-800-242-3447				
			Western Canadian Spill Co-op		
			Co-op Area "S"		
			Midwest Pumps	(403)	329-0427
			Enerplus Resources	(403)	337-2631
			(Lorne Schmidt)	Extention #26	
			Regulatory Agencies		
			ERCB – Medicine Hat	(403)	527-3385
			Alberta Environment	1-800-222-6514	
			OHS	1-866-415-8690	

#) Name: Denotes Caller Priority Sequence for PDL

SOUTHERN ALBERTA OPERATIONS THREE HILLS – OIL & GAS

INTERNAL CONTACTS			
PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190			
On-Site / Area Command Centre Three Hills Field Office (403) 443-7120 Reception Centre: Lamplighter Inn, Three Hills, AB (403) 443-5919			
#1) Derek Trentham Operations Team Lead	Work	(403)	443-5884
	Home	(403)	443-7324
	Cellular	(403)	443-9540
#2) Gary Rose Senior Area Foreman	Work	(403)	443-7120
	Home	(403)	442-2291
	Cellular	(403)	443-0281
#3) Ron Shannon Mgr, Southern AB/SK	Work	(403)	269-5065
	Home	(403)	938-7173
	Cellular	(403)	804-0775
#4) Justin Kraft Safety Coordinator	Work	(403)	898-3777
	Home	(403)	580-1885
	Cellular	(403)	952-9165
#5) Blake Reid Environment Coordinator	Work	(403)	556-5354
	Home	(403)	337-2609
	Cellular	(403)	559-8656

SUPPORT SERVICES			
Ambulance		911 or	
STARS Emergency Link		1-888-888-4567 or	
Cellular /Globalstar Satellite Phone #4567			
Hospital			
Innisfail	(403)	227-7800	
Three Hills	(403)	443-2444	
Stettler	(403)	742-7400	
RCMP		911	
Innisfail	(403)	227-3341 (Emerg.)	
Three Hills	(403)	443-5538 (Emerg.)	
Stettler	(403)	742-3381 (Emerg.)	
Alberta One Call		1-800-242-3447	
Fire & Safety Services			
Fire Power	Prov-wide	1-800-463-3187	
HSE	Prov-wide	1-888-346-8260	
Integrated	Prov-wide	1-403-342-7500	
Fire Master	Prov-wide	1-403-342-7500	
Western Canadian Spill Co-op			
Co-op Area “O”			
Trottier Trucking		1-800-662-7173	
Regulatory Agencies			
ERCB – Red Deer		403-340-5454	
Alberta Environment		1-800-222-6514	
OHS		1-866-415-8690	

#) Name: Denotes Caller Priority Sequence for PDL

SOUTHERN ALBERTA OPERATIONS FENN BIG VALLEY

INTERNAL CONTACTS

PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190

On-Site / Area Command Centre

Fenn Big Valley Field Office (403) 876-2352

Reception Centre: Best Western Crusader Inn, Stettler, AB (403) 742-3371

#1) Edgar Siegrist	Work	(403)	876-2352
Lead Operator	Home	(403)	876-2296
	Cellular	(403)	742-7666
#2) Gary Rose	Work	(403)	443-7120
Senior Area Foreman	Home	(403)	442-2291
	Cellular	(403)	588-2119
#3) Ron Shannon	Work	(403)	269-5065
Mgr, Southern AB/SK	Home	(403)	938-7173
	Cellular	(403)	804-0775
#4) Justin Kraft	Work	(403)	898-3777
Safety Coordinator	Home	(403)	580-1885
	Cellular	(403)	952-9165
#5) Blake Reid	Work	(403)	556-5354
Environment Coordinator	Home	(403)	337-2609
	Cellular	(403)	559-8656

SUPPORT SERVICES

Ambulance 911 or STARS Emergency Link		1-888-888-4567 or Cellular /Globalstar Satellite Phone #4567	Fire & Safety Services	
Hospital			Fire Power	Prov-wide 1-800-463-3187
Innisfail	(403)	227-7800	Fire Master	Prov-wide 1-403-342-7500
Three Hills	(403)	443-2444	HSE	Prov-wide 1-888-346-8260
Stettler	(403)	742-7400	Integrated	
RCMP 911			Western Canadian Spill Co-op	
Innisfail	(403)	227-3341 (Emerg.)	Co-op Area "O"	
Three Hills	(403)	443-5538 (Emerg.)	Trottier Trucking	1-800-662-7173
Stettler	(403)	742-3381	Regulatory Agencies	
Alberta One Call		1-800-242-3447	ERCB – Red Deer	403-340-5454
Reception Centre:		Best Western Crusader Inn 6020 50 Avenue, Stettler, AB Ph: (403) 742-3371	Alberta Environment	1-800-222-6514
			OHS	1-866-415-8690

#) Name: Denotes Caller Priority Sequence for PDL

EASTERN OPERATIONS BODO, CACTUS LAKE & PLOVER

INTERNAL CONTACTS

PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190

On-Site / Area Command Centre
Bodo Field Office (780) 753-2160
Cactus Lake, SK Field Office: (306) 753-2906
Plover Field Office: (306) 372-4896

Reception Centre: Super 8, Provost, AB (780) 753-2255

#1) Dennis Reschny	Work	(306)	753-2906
Area Foreman, Bodo	Home	(306)	753-2735
	Cellular	(306)	753-7818
#2) Dwaine Long	Work	(306)	753-2906
Area Foreman, Cactus Lake	Home	(306)	753-2497
	Cellular	(306)	753-7776
#3) Chuck Doetzel	Work	(306)	753-2906
Maintenance Foreman	Home	(306)	753-2357
	Cellular	(306)	753-7777
#4) Ron Shannon	Work	(403)	269-5065
Mgr, Eastern AB/SK	Home	(403)	938-7173
	Cellular	(403)	804-0775
#5) Justin Kraft	Work	(403)	898-3777
Safety Coordinator	Home	(403)	580-1885
	Cellular	(403)	952-9165
#6) Sheldon Scyrup	Work	(403)	898-3777
Environment Coordinator	Home	(403)	488-8513
	Cellular	(403)	376-8927

SUPPORT SERVICES

Ambulance	911 or	Alberta One Call	1-800-242-3447
STARS Emergency Link	1-888-888-4567 or	Western Canadian Spill Co-op	
Cellular /Globalstar Satellite Phone	#4567	Bodo: Co-op Area "U"	
Hospitals		Greg's Contracting Service	(780) 888-3845
Provost	(780)	Cactus & Plover: Co-op Area "2"	
Coronation	(403)	Interpipeline	(306) 965-2202
Kerrobert	(306)	B&B Contracting-custodian	(306) 834-1199
Kindersley	(306)	Regulatory Agencies	
Macklin	(306)	Bodo (Alberta)	
RCMP	911	ERCB – Wainwright	(780) 842-7570
Provost	(780)	Alberta Environment	1-800-222-6514
Kerrobert	(306)	OHS	1-866-415-8690
Kindersley	(306)	Cactus & Plover (SK)	
Unity	(306)	SK Environment	
Fire & Safety Services		-Spill Control Centre	1-800-667-7525
Fire Master	Kindersley	-Firewatch	1-800-667-9660
Fire Master	Prov-wide	-Parkwatch	1-800-667-1788
HSE Integrated	Prov-wide	SK Industry & Resources (SIR)	1-306-421-6804
		OHS	1-306-787-4496

#) Name: Denotes Caller Priority Sequence for PDL

OLDS OPERATIONS OLDS

INTERNAL CONTACTS			
PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190			
On-Site / Area Command Centre			
#1) Olds Gas Plant Control Room (403) 556-5356			
Reception Centre: Olds College, Olds, AB (403) 556-8281			
#2) Brent Taylor	Work	(403)	556-5358
Plant Operations	Home	(403)	556-6116
Foreman	Cellular	(403)	994-1690
#3) Joe Halerewich	Work	(403)	556-5359
Superintendent – Olds	Home	(403)	556-7689
	Cellular	(403)	507-3321
#4) Mike Hayes	Work	(403)	556-5360
Field Production	Home	(403)	746-2234
Foreman	Cellular	(403)	994-3377
#5) Barry Vanbeselaere	Work	(403)	556-5369
Maintenance Foreman	Home	(403)	573-1601
	Cellular	(403)	994-1830
#6) Ron Doiron	Work	(403)	556-5363
Lead Field Operator	Home	(403)	335-8694
Olds/Harmattan	Cellular	(403)	994-3388
#7) Ryan Sloan	Work	(403)	213-3780
Safety Coordinator	Home	(403)	337-2830
	Cellular	(403)	875-4583
#8) Blake Reid	Work	(403)	556-5354
Environment Coordinator	Home	(403)	337-2609
	Cellular	(403)	559-8656

SUPPORT SERVICES			
Ambulance	911 or		
STARS Emergency Link	1-888-888-4567 or		
Cellular /Globalstar Satellite Phone #4567			
Hospital			
Olds	(403)	556-3381	
Didsbury	(403)	335-9393	
RCMP	911		
Olds (24hours)	(403)	556-3323	
Didsbury	(403)	335-3381	
Alberta One Call	1-800-242-3447		
Fire & Safety Services			
Fire Master	Red Deer	(403)	342-7500
Fire Power	Prov-wide	1-800-463-3187	
HSE			
Integrated	Prov-wide	1-888-346-8260	
Western Canadian Spill Co-op			
Co-op Area "M"			
Area "M" – Pembina Pipelines		1-800-360-4706	
Regulatory Agencies			
ERCB – Red Deer		(403)	340-5454
Alberta Environment		1-800-222-6514	
OHS		1-866-415-8690	

#) Name: Denotes Caller Priority Sequence for PDL

LINDBERGH OILSANDS PROJECT
LINDBERGH

INTERNAL CONTACTS

PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190

On-Site / Area Command Centre

Gas Plant Field Office (780) 724-2704

Reception Centre: Hilltop Motor Inn, Elk Point, AB (780) 724-4001

#1) Kevin Matieshin	Work	(403)	508-8957
Manager, Lindbergh	Home	(403)	256-0939
	Cellular	(403)	999-2694
#2) Phil Goldsney	Work	(403)	508-3630
Safety Coordinator	Home	(403)	945-1868
	Cellular	(403)	801-3967
#3) Dean Soucy	Work	(403)	213-3687
Environment Team Lead	Home	(403)	532-9229
	Cellular	(403)	512-6855

SUPPORT SERVICES

Ambulance 911 or STARS Emergency Link 1-888-888-4567 or Cellular /Globalstar Satellite Phone #4567			Fire & Safety Services Fire Master Red Deer (403) 342-7500 Fire Power Prov-wide 1-800-463-3187 HSE Prov-wide 1-888-346-8260 Integrated		
Hospital Elk Point (780) 724-4040 Bonnyville (780) 826-3311 RCMP 911 Elk Point (24hours) (780) 724-3829			Western Canadian Spill Co-op Co-op Area "VR1" B&R Eckels (780) 826-3889 Bonnyville		
Alberta One Call 1-800-242-3447			Regulatory Agencies ERCB – Bonnyville (780) 826-5352 Alberta Environment 1-800-222-6514 OHS 1-866-415-8690		

Name: Denotes Caller Priority Sequence for PDL

MONTNEY GAS DEVELOPMENT GROUNDBIRCH

INTERNAL CONTACTS

PENGROWTH 24 HOUR EMERGENCY NUMBER: 1-888-488-7190

On-Site / Area Command Centre

Groundbirch Plant Office (780) 524-2331

Reception Centre: Super 8 Hotel, Dawson Creek, BC (250) 782-3700

#1) Brad Wilson Drilling & Completions Manager	Work	(403)	691-7733
	Home	(403)	512-9810
	Cellular	(403)	226-1938
#2) Phil Goldsney Safety Manager	Work	(403)	508-3630
	Home	(403)	945-1868
	Cellular	(403)	801-3967
#3) Dean Soucy Environmental Team Lead	Work	(403)	213-3687
	Home	(780)	532-9229
	Cellular	(403)	512-6855
#4) Diane Shirra VP, Gas Development	Work	(403)	213-3706
	Home	(403)	246-9097
	Cellular	(403)	471-7883

SUPPORT SERVICES

<p>Ambulance 911 or STARS Emergency Link 1-888-888-4567 or Cellular /Globalstar Satellite Phone #4567 BC Ambulance (250) 785-2079/911 On-Site Trojan Safety Services (250) 785-9557 Hospital Dawson Creek (250) 782-8501 RCMP 911 Dawson Creek (250) 784-3700 BC One Call 1-800-474-6886 Fire & Safety Services Fire Power Prov-wide 1-800-463-3187 Fire Master Prov-wide 1-403-342-7500</p>	<p>Western Canadian Spill Co-op Co-op Area "C" Clean Harbors (888) 698-5565</p> <p>Regulatory Agencies</p> <p>OGC (250) 261-5700 PEP 1-800-663-3456 MOE 1-800-663-3456 Worksafe BC (OHS) (604) 273-7711</p>
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#) Name: Denotes Caller Priority Sequence for PDL



FIRST AID TRANSPORTATION PLAN

Purpose: This code of practice is designed to provide the basics of a First Aid Transportation Plan as one component of the emergency preparedness for work being undertaken at Pengrowth worksites. This guide describes factors to consider when deciding on the type of required assistance necessary for ill or injured personnel including first aid services, equipment, supplies, records, communication and transportation.

Regulations and Codes: Provincial legislation requires that a Transportation Plan be developed prior to conducting any worksite activities or sending worker(s) to the worksite. Requirements may vary by jurisdiction; review the provincial legislation for your area prior to work commencement.

The regulations allow, in some cases, to comply with the first aid requirements by placing a first aid transportation vehicle – suitable vehicle (ECV / ETV) or ambulance at a strategic location, from which it can support more than one work-site. Considering this information, if there are a number of work-sites in close proximity, it may be more efficient to provide first aid services for the group versus individually.

First Aid and Transportation requirements at worksites are based these factors:

- Hazard level of work (Oil / Gas Const. / Pipeline, Drilling & Well Servicing are all High Hazard Work)
- Number of workers on site.
- First aid supplies required.
- Time to nearest health care facility.

Hazards and Controls: Transportation hazards can be of varying degrees and nature. The following list represents typical hazards that could compromise the ability to gain essential first aid services and should be considered each time a transportation plan is put into place.

HAZARDS	HAZARD CONTROLS
Weather or Road Conditions	Written plan and contact of emergency services
Low availability of First Aid Services	Written plan and confirmed availability of services
Remote / Isolated Locations	Shared Transport (if applicable) On Site Emergency Unit Detailed directions to be provided on transportation plan STARS Air Ambulance Contract Air Support

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENT:

- As stated in Pengrowth Corporation Safety Handbook and as Hazards dictate.

Emergency Service & Transportation Plan: A site specific transportation plan must be developed and utilized for each work-site during the hazard assessment phase of work activities.



PENGROWTH

The Plan must specify:

1. Job / Worksite Information:

- Work Description
- Number of workers
- Location / LSD

2. Distance to Health Care Facility:

- Time.
- Directions to worksite.

3. Back-up Emergency Transportation:

- Ambulance Service.
- ECV / ETV/ MTC
- STARS Air Ambulance
- Contract Air Support

4. First Aid Certification of Contractors on site:

- Check for all Safety Training Tickets required for job(s)

5. Communication Plan:

- Communication Devices
- Shared Transport Information

6. Critical Emergency Contact information:

- STARS Air Ambulance Landing Zone info.

Note: Once STARS site has been registered, there is no need to call local emergency services to obtain or confirm their telephone numbers

7. Confirmation:

- Signatures

Note: The Pengrowth Safe-Work Agreement will serve as the First Aid & Transportation Plan.

****END****

Additional References:

- Transportation and First Aid Requirements – Alberta Edition – ENFORM Alert #60-2007
- Emergency Transport Vehicle (ETV) – British Columbia – ENFORM Alert #61-2007

CONTENT CONTRIBUTORS: Safety Coordinators

DOCUMENT CUSTODIAN: Manager, Safety

REVISION # (1) DATE: January 2009

ORIGINAL ISSUE DATE: December 2008

The information presented here is intended for general use and may not apply to every circumstance. It is not a definitive guide to government regulations and does not relieve persons using this information from their responsibilities under applicable legislation. Consult your local provincial legislation for further information.



Alberta: OH&S Regulation and Code, Part 11, Section 180 Emergency Transportation and Schedule. 2
Table 7 First aid requirements for high hazard work.

Definitions:

- **ECV – Emergency Conveyance Vehicle (no attendant)**
- **MTC – Mobile Treatment Centre (with attendant)**
- **SFA / CPR – Standard First Aid / CPR**
- **AFA – Advanced First Aid**
- **Type P & No. 1,2,3 First Aid Kit – (Ref. AB. OH&S Code Sched. 2 Table 3)**
- **Health Care Facility - A hospital, medical clinic, or physician's office that has the capability of dispensing emergency medical treatment 24 hours a day.**

Table 7

REFERENCE CHART FOR FIRST AID AND TRANSPORTATION REQUIREMENTS

Number of Workers at Work Site per Shift	Close Work Site (up to 20 minutes)	Distant Work Site (20 – 40 minutes)	Isolated Work Site (more than 40 minutes)
1	Type P First Aid Kit	Type P First Aid Kit	Type P First Aid Kit
2 – 4	1 Emergency First Aider No. 1 First Aid Kit	1 Standard First Aider No. 2 First Aid Kit 3 blankets	1 Standard First Aider No. 2 First Aid Kit 3 blankets
5 – 9	1 Emergency First Aider 1 Standard First Aider No. 2 First Aid Kit	2 Standard First Aiders No. 2 First Aid Kit 3 blankets	2 Standard First Aiders No. 2 First Aid Kit 3 blankets
10 – 19	1 Emergency First Aider 1 Standard First Aider No. 2 First Aid Kit 3 blankets	2 Standard First Aiders No. 3 First Aid Kit, 3 Blankets Stretcher & Splints Based on Risk Assessment ECV or MTC May Be Required	2 Standard First Aiders No. 3 First Aid Kit 3 Blankets Stretcher & Splints MTC Required
20 – 49	2 Emergency First Aiders 1 Standard First Aider No. 2 First Aid Kit 3 blankets	3 Standard First Aiders No. 3 First Aid Kit 3 Blankets Stretcher & Splints ECV or MTC Required	3 Standard First Aiders No. 3 First Aid Kit 3 Blankets Stretcher & Splints MTC Required
50 – 99	2 Emergency First Aiders 2 Standard First Aiders No. 3 First Aid Kit 3 Blanket	2 Emergency First Aiders 3 Standard First Aiders No. 3 First Aid Kit Stretcher & Splints ECV or MTC Required	4 Standard First Aiders 1 Advanced First Aider No. 3 First Aid Kit 3 Blankets Stretcher & Splints MTC Required
Over 99 people	Refer to TABLE 7, Schedule 2 First Aid in the AB. OH&S Code.		

NOTE: This table has been modified and upgraded by Pengrowth to indicate when a Mobile Treatment Center (MTC) must be utilized.

British Columbia: WCB OH&S Regulations Part 3 Rights & Responsibilities. Occupational First Aid. Section 3.14 – 3.21 and Schedule 3-A Minimum levels of first aid (Table 5)

Definitions:

- **ETV – Emergency Transportation Vehicle.**
(No attendant. Driver requires Transportation Endorsement Course)
- **IA – Industrial Ambulance or (MTC)**
(Attendant Required)
- **Training Requirements and First Aid Kit levels.**
(Ref. WCB OH&S Regulations Part 3 Rights and Responsibilities)
- **Health Care Facility** - A hospital, medical clinic, or physician's office that has the capability of dispensing emergency medical treatment 24 hours a day.

Table 5: This table applies to a workplace that an employer determines under section 3.16 (2) (b) of the Regulation creates a high risk of injury and that is more than **20 minutes** surface travel time away from a hospital.

Item	Column 1 Number of workers per shift	Column 2 Supplies, equipment, and facility	Column 3 Level of first aid certificate for attendant	Column 4 Transportation
1	1	Personal first aid kit		
2	2 – 5	Level 1 first aid kit	Level 1 certificate	
3	6-10	Level 1 first aid kit ETV equipment	Level 1 certificate with Transportation Endorsement	ETV
4	11-30	Level 3 first aid kit Dressing station ETV equipment	Level 3 certificate	ETV
5	31-50	Level 3 first aid kit First aid room ETV equipment	Level 3 certificate	ETV
6	51-200	Level 3 first aid kit First aid room Industrial ambulance equipment	Level 3 certificate	Industrial ambulance

Saskatchewan:

(Ref: OH&S Regulations Part V- First Aid & Table 9 Summary of First Aid Requirements)

SAFE WORK AGREEMENTS & SITE HAZARD ASSESSMENTS

Purpose: A **safe work agreement** is a documented communication tool which is developed before a job begins. It helps protect workers, facilities and the general public by ensuring that:

- All parties involved have a clear understanding of their responsibilities which they may carry out or ensure others carry out
- Jobs are safely planned and executed
- Our facilities are properly prepared
- Workers clearly understand
 - the specific work to be done
 - the hazards associated with the work site and work itself
 - hazard controls that are in place

A **site hazard assessment** is a documented review of a work site prior to work commencing. It helps to ensure that the worker(s) have consciously reviewed the worksite and any potential hazards that exist or that may be created during work activities. Hazards and hazard controls identified during this review must be documented. Mitigating actions or controls must be discussed with the parties involved.

Terminology

The following information clarifies some of the terminology used in the standards and guidelines for safe work agreements and site hazard assessments (**hence forth called “the combination form”**).

Agreement Types

Safe Work Agreements for **Cold Work**

This agreement is the minimum requirement for any work activity in a non-restricted area (work **outside the 50 m** radius from a live oil or gas facility). i.e. grading a road (not entering an active lease site).

Safe Work Agreements for **Hot Work**

This agreement covers work activities within a restricted area (work **inside the 50 m** radius from a live oil or gas facility). i.e. painting or pipe fitting in satellites or excavating in a restricted area.



Safe Work Agreements for Critical Work

The critical work designation can only be used in conjunction with the cold or hot work type. In other words, critical work is either critical cold or critical hot, depending on the hazards in the workplace and the controls you choose to exercise over the work activity. Critical Work requires Pengrowth approved Safety Watch for the duration of the work. The risk assessment matrix is used to determine whether work falls into the critical category. Work in the medium or high risk areas of the matrix will be considered to be critical. See the Safety Department for training in use of this tool.

Examples of work that might be considered critical (and where a safe work agreement is required for local area personnel) include:

- Vessel entry (confined space entry permit is required).
- Tasks performed during major turnaround that would affect other workers.
- Maintenance work in an area where the probability for toxic gases exceeds the occupational exposure limit.
- Welding in a hydrocarbon production facility.

Parties to a Safe Work Agreement

Include:

- Agreement issuer – a Pengrowth representative issuing or approving the safe work agreement. The approval process includes questioning the agreement acceptor's competence to do the job and handle emergencies that may arise.
- Agreement acceptor – a maintenance or contract person responsible for doing the work. The person's initials and signature on the safe work agreement will confirm that they will ensure their workers involved in a job have reviewed and clearly understand the work and assigned responsibilities.
- Agreement co-signer (site supervisor, plant operator, etc) – signs the safe work agreement if the work will involve (overlap) their area's responsibility.
- Safety watch – The person responsible for monitoring the work site for any changes in operating and/or atmospheric conditions under a critical designation permit. Also responsible to halt work if required or execute a rescue plan if required. Minimum safety watch requirement for critical work is a Pengrowth representative capable of handling any emergency on site, at all times. (The requirement for a Pengrowth safety watch can be met by using a fully competent employee or a fully competent contract employee) Additional safety watch requirements will be determined on a per-job basis. All gas testing/monitoring must be done by a competent individual (in order to be competent, you must have completed the Gas Testing training. Discuss with Safety Department).



Standards

When is a Safe Work Agreement Required?

Safe work agreements are required for all drilling; completions, construction, repair and maintenance work, including mobilization and demobilization performed by:

1. Any person, when involved in **critical hot** and **critical cold** work.
2. Any Pengrowth employee working in an operating area, when the person responsible for the work area (e.g. Site supervisor or unit operator) dictates a safe work agreement is required (based on risk associated with the work to be done).
3. Any contractor who is performing work within the Pengrowth operating area.

Note: For many operations, only one crew may safely work at one time. Therefore, if two or more jobs will be carried out simultaneously, the second and subsequent agreements must be communicated to the holder of the first agreement and so on. Crew Foremen or Leads should sign-off on each others agreements and communicate this information to their respective work groups.

No work is allowed except what is described on the safe work agreement. A copy of the safe work agreement must be kept at the work site so that:

- All parties are able to produce the safe work agreement upon request.
- Others on the work site understand the work being done and the safe work agreement's conditions.

When is a Site Hazard Assessment Required?

Site hazard assessments are required for all work performed on Pengrowth work sites. In the majority of cases these will be carried out in conjunction with a Safe Work Agreement; however, in some cases they could be completed separately. (e.g. when a Pengrowth operations employee or representative is carrying out routine work in the field; i.e: site surveillance or controller changes, no permit required. However, a SHA is required for non-routine work such as filter changes, minor pipe fitting, working at heights etc.)

Issuer Qualifications

Only qualified individuals may issue Safe Work Agreements. Minimum qualifications are:

- Must be competent (including a good knowledge of the operating area the safe work agreement is written for).
- Must have passed the qualification test to ensure expertise in using the safe work agreement process.

Note: If employees haven't used a safe work agreement in one year, they must have refresher training before issuing an agreement.



Site Hazard Assessor Qualifications

Individuals may create a Site Hazard Assessment if they meet the following minimum qualification:

- Must be competent (having a good knowledge of the site and the work for which the SHA is to be created).
- Must have passed the qualification test to ensure understanding in using the site hazard assessment process.

Agreement Duration

The duration of the Safe Work Agreement is limited to that time when:

- Conditions of the job remain constant.
- All parties involved remain constant.
- No other work affects the safe work agreement conditions.

Safe work agreements must be revalidated or reissued:

- When working conditions change, making the safe continuation of work questionable.
CAUTION: When job conditions change, stop work immediately and do not resume work until safe to do so.
- After an emergency alarm has sounded and the cause of the alarm has been investigated and corrected.
- Following a change in work site supervision (by either contractor or Pengrowth supervisor).

Note: Several site supervisors could be involved in a single job. For example, when a job involves crossing a pipeline owned by another company, site supervisors might include the pipeline owner's site supervisor, the contractor's site supervisor and the Pengrowth site supervisor. Each of those people will have different responsibilities – all of which must be clearly understood.

Site Hazard Assessment Duration

The duration of the Site Hazard Assessment is limited to that time when:

- Conditions of the job remain constant.
- No other work affects the original site hazard assessment (ie. Scope of the work does not change).

Blanket Agreements

Blanket Agreement covers low risk, listed routine work in a specified area. This agreement would be issued to a supplier of a service. The restrictions around this type of permit are that the Contractor Company would be knowledgeable in our Safety Handbook, would be limited to competent individuals listed, only for an attached list of jobs, and in a specific area. The individuals would have to be deemed competent by their employer and have all the necessary regulatory training current to work under a blanket safe work agreement. No work can be completed under this permit outside of the job scope listed.



Exemption Process

- Contract must be for a period of one year minimum.
- The individual contract employee is exempted (not a blanket exemption for the company).
- A Pengrowth foreman will identify:
 - workers are eligible to be exempted
 - the site they are exempted for
 - jobs that will be covered by the exemption
 - required skills, and sign off on the exemption check out which is kept on file.
- The contract employer representative will also sign off on all exempted employees.

The Exempted worker:

- Must provide required certificates and keep training current
- Must follow identified checks in procedures for each facility
- Must complete only work they have been checked out for
- Must get a safe work agreement if scope of work is outside exemption process
- Must complete a Site Hazard Assessment for each task
(Note: Requirements for a SHA are outlined on page 3 of this document. A Contractors own SHA form is acceptable)
- May work with one worker under their direct supervision under the exemption
- Will complete all identified check outs and training requirements as identified in exemption process

Close Off of Safe Work Agreement

After the job is finished or the safe work agreement duration has expired, the issuer and the acceptor must close off the safe work agreement (either verbally or in writing) to indicate that:

- The workers are off the site.
- The work area is left in a safe condition.

Note: The issuer is responsible for questioning the acceptor about how the work site was left after the work was completed.

For critical hot and critical cold agreements, the acceptor must return the safe work agreement to the issuer or contact person listed on the safe work agreement. The issuer must ensure that the:

- Area has been inspected.
- Equipment has been properly prepared for return to service.

Filing Safe Work Agreements and/or Site Hazard Assessments

Safe work agreements and/or site hazard assessments must be kept for 30 days beyond the completion of the job.

If an incident occurs during the work, the combination form must be attached to the incident report.



GUIDELINES

A completed safe work agreement form is not a contract and does not protect us from the legal consequences of an incident, but it can be used as evidence in court. The same is true of the Site Hazard Assessment portion of the combination form. The intent is to help prevent an incident from occurring.

In other words, if the combination form states that we (as a company) would do certain things and we subsequently did not do those things, we would place ourselves in a position that would be difficult to defend. On the other hand, if we could otherwise demonstrate that we'd done everything reasonably practical to prevent an incident, we would be able to demonstrate a good case for a due diligence defense.

Thus the combination form, in itself, is only a tool to guide us through meaningful discussion toward making our safe work responsibilities clear.

What is "critical" is the discussion. That discussion is usually part of a pre-job meeting but could take place anywhere or at anytime.

Nevertheless, our combination form serves as a partial checklist of discussion items. But since the checklist can't cover all possible discussion items, employees/representatives are responsible for any other items that need discussing.

Note: Controls which will be implemented for the hazards identified must be listed on the form in Section F and reviewed with the acceptor.




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Completing the Combination Form

Safe Work Agreement and Site Hazard Assessment completion evolves through a consultation process. Communication and attention to detail are the “keys” to a successful Safe Work Environment.

*See Samples in package for completed copies of the entire Safe Work Agreement/SHA.

Section A – Description

		PENGROWTH		PC 24252		
		Safework Agreement		<input type="checkbox"/>		
		Site Hazard Assessment		<input type="checkbox"/>		
STARS Site # _____		Date _____				
<hr/>						
A. Between Issuer – PENGROWTH CORPORATION		No. of workers	2	No. of vehicles	1	
		Duration		7:30am	To 4:30 pm	
and Acceptor (company name)		Joe's Contracting Services		Location		K1101 Station #3, K.C. PC
Description of work (specific description):		<u>Complete groud; work on compressor base; complete work on Compressor Cylinder #3; Installing rod and valves; torque to specifications and inform operations when completed.</u>				

Clearly document the:

- Agreement Acceptor's name (the contractor's company name if a contractor is the agreement acceptor)
- Job's date, duration and location
The duration of the safe work agreement is to be determined using the best available information about the worksite and its expected activities.
- Number of workers
- Number of vehicles (trucks, rigs, cranes, loaders, etc)
 - Both the issuer and the acceptor must have a clear understanding of exactly what equipment will be required to complete the specific task in a given time frame.
- Description of Work
 - Be specific when describing the work to be done. For example, instead of writing “work in satellite”, write, “bolt-up gas piping spools inside the satellite building”.



Section B – Nature of Work

B. Nature of work ☐ Cold ☒ Hot ☐ Critical (requires owner approved safety watch)

☒ IRP Compliant Orientation

Clearly check off the correct boxes for the Nature of Work:

1. See the topic, “Agreement Types” earlier in this subject for the definitions of cold, hot, and critical safe work agreements.
2. For **critical work** in particular, discuss all site supervisor’s responsibilities in detail to ensure complete understanding (foreman, safety watch, designated worker, etc.). You may also specify – either on the “Special Instructions and Highlights from tailgate meeting” part of the agreement or an attachment – exactly what supervision is needed by which site supervisor. The Safety Watches responsibilities will be identified in Section C of the combination form.
3. The safe work agreement issuer must check to ensure that the agreement acceptor (and other contractors that will be working on site under the safe work agreement) has an IRP Compliant Orientation, if not, indoctrinate as required (ie. Use the Pengrowth Corporation orientation video and Safety Hand book exam).



Section C – Site Preparation

C. Site preparation (assign and agree to responsibilities, site hazards, and controls)		SHA	Issuer	Initials	Acceptor	Initials	Co-signer/ Safety Watch	Initials	N/A	Initials
1.	Prepare electrical systems. - de-energize, lock and tag - identify overhead lines and control measures in place - identify energized lines and control measures in place	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RS	<input checked="" type="checkbox"/>	BR	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
2.	Prepare pressurized systems. - isolate and depressurize - drain - install blinds - lock out and tag - purge (medium used)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RS	<input checked="" type="checkbox"/>	BR	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
3.	Identify and confirm location underground/overhead structures, pipes and electrical lines.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	RS	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
4.	Trenching or excavation hazards.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
5.	Ground disturbance permit. Required <input type="checkbox"/> Not Required <input type="checkbox"/> (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	

The company and the law agree that no one person or party can reasonably ensure that all job phases are done safely. Thus, the responsibility is shared.

For site preparation, discuss the job activities that make the most sense for Pengrowth employees to do, and activities that are better managed by the acceptor (contractor).

Have the issuer/co-signer and the acceptor initial beside each job activity they have accepted responsibility for completing or ensuring that others carryout as part of job execution (as shown above). If their work involves another's area of responsibility the co-signer's initials are also needed. If a task is not applicable check off the "N/A" and as the issuer, you must initial that you made that assessment (see above). There is no need for everyone to initial each section of each column. By signing at the end of the document, you are agreeing that you have read, understood, and agree to everything contained within the combination form.

Note: There may be occasions because of distance or multiple work sites, that the issuer cannot physically inspect and assess the site for hazards with the contractor. In these isolated situations, the issuer delegate's responsibility for site hazard assessment /controls and site preparation to a competent contractor.

A new item on the combination form is the addition of the Safety Watch as an applicable party for taking on responsibility. If a Safety watch is required, then that designated person will have responsibilities as outlined in Section C and perhaps in Section F where detailed instructions are contained.



The following are examples of what each point means in Section C and questions you might ask or think about when filling them in:

1. Prepare Electrical systems
 - a. What needs to be de-energized? Who will take part in the lock out and tag?
 - b. Are there overhead (high voltage energy carrier lines) lines in the area that could cause reason for concern or contact with a high load or worker? Are special measures required to protect workers? What are they and is there a documented plan in place? Check distance requirements.
 - c. Are there energized lines in the area (control wiring, 220 VAC, etc) that could cause reason for concern? Are special measures required to protect workers? What are they and is there a documented plan in place?
2. Prepare Pressurized systems
 - a. What needs to be isolated and de-pressured?
 - b. Does the system need to be drained prior to work commencing?
 - c. Are blinds required? Will the system sit open for in excess of 24 hours? What is the system pressure? Are we relying on a single block valve?
 - d. Who will take part in the lock out and tag?
 - e. Does the system need to be purged? Is this a sour system? Where will your purged gas exit the system? Do we have control over this exiting gas mixture? Think of the protection of workers and communicate a plan.
3. Identify and confirm underground and overhead structures, pipes, and electrical lines
 - a. Will there be excavating occurring or movement of a high load? (remember to use the ground disturbance procedure/forms for any disturbance that meets this criteria)
4. Trenching or excavation hazards
 - a. Does the excavation meet code? Is sloping to requirements (remember to consider soil conditions) or is shoring appropriate? Are egress points appropriate and spaced according to code?
 - b. Will workers be in the excavation or trench? What is your rescue plan if something goes wrong? Are workers near operating equipment in the excavation?
 - c. When finished work, is the excavation properly barricaded?
5. Ground disturbance permit
 - a. If required (probing into the earth deeper than 30cm) this box must be checked and the ground disturbance procedure followed.
 - b. If ground disturbance is not required, mark this box and specify why it is not required. (i.e. Hand digging will not exceed 30cm depth)
6. Slip, trip, or fall hazards
 - a. Inspect the work site for any potential hazards related to slips, trips, or falls. Will any work activities create these hazards? Document controls applicable.
7. Working on or from elevated structures
 - a. If working on an elevated structure where no fall protection is available (i.e. No guard rail) you must provide alternate means of fall arrest (ie.



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Safety harness and lanyard). When utilizing a safety harness you must check off Fall Protection Plan in Place and document this fall protection plan. This means that you have to have an appropriate anchor point, you must have thought about how you are going to rescue a worker that has fallen and is potentially dangling on the end of a lanyard.

8. Flammable or toxic hazards, ignition sources
 - a. Do flammable or toxic hazards exist or can they be created by the work activity that is occurring (i.e. Stirring up tank bottoms)
 - b. Will there be any ignition sources present? How will these be mitigated? Can the sources be shut off for the duration of the work? Are extinguishers standing by?
 - c. Is explosion proof equipment and lighting being used?
9. Determine gas/air quality testing required
 - a. Where gas testing is required, the gas test must be performed and documented by a "competent individual" prior to any work starting. If using "fixed" plant gas detection, mark that into the agreement under the Continuous blank, as follows. ... "Continuous ___fixed___". If you are using a portable detector, then indicate the correct frequency of monitoring ... "Frequency ___2___hrs or continuous ___Portable___" and check off the "Personal Gas Detection" in Section E. For our purposes we will consider "Personal Gas Detection" to mean hand held gas detector, personal multi-head monitor, etc. Any "non-fixed" device that will be used to detect combustible, toxic, oxygen, or CO in a local area where work may be proceeding.
10. Response discussed for: atmospheric changes, weather/temperature hazards
 - a. Atmospheric changes could be a gas release in the work area or gas detection from fixed plant gas detection equipment. How will workers respond? Where is the muster area? How do you get there? Get your permit re-signed once the issue is resolved and it is safe to return to work.
 - b. Are there weather or temperature extremes to consider? Is it snowing and very cold? Could wind chill be a factor to consider? If working in a very warm compressor building, how can we avert heat exhaustion? Is it raining and sloughing may be an issue for any excavations, etc?
11. Appropriate site specific procedure developed and reviewed
 - a. Develop and review work procedures and aspects of the job that will ensure that the work activity remains in the low risk category of the risk assessment matrix. These risks could include uncontrolled emission, cave in, fire, entry into a confined space, or hydrate removal that could become a serious danger to people, property or the environment. What actions need to be taken on critical work to ensure that it remains in the low risk category? Document the control plan.
12. Inspect the work site and equipment
 - a. Ensuring that the workplace is inspected prior to issuing the agreement is the shared responsibility of the issuer and the other parties to the agreement. This is when the site hazard assessment and the safework agreement should be created. Not the day before, not without viewing and assessing the site for hazards and controls to mitigate those hazards. (See Pg 10 under Section C - Site Preparation for limited exceptions to the above.)



13. Pinch points or position of hazard
 - a. Review the work to be completed, be aware of positioning and how pinch points can be eliminated. Use tag lines; never position yourself between a moving load and a static object; use building hoists as appropriate carefully controlling the lift, never apply tension to "spring" something loose.
14. Noise Hazards, Illumination/Lighting hazards
 - a. Can the noise be eliminated? What level of hearing protection is required? Both ear plugs and muffs?
 - b. Is there enough light to perform the work without incident? If portable lighting is required, it must meet electrical code classifications (i.e. Low voltage for tank/vessel entry)
15. Moving/Rotating equipment
 - a. When working around moving equipment is personal visibility appropriate? Are flag people being utilized? What is the maximum speed when approaching workers? Is this speed posted for passers by that may not be a part of this job?
 - b. Can the machine be shut off? If not, are all guards in place? Is all loose clothing bound up to eliminate the chance of being caught up in the equipment?
16. Confined space hazards, Confined space plan in place
 - a. For confined space entry a documented plan must be in place that considers the risk to workers, rescue plan, and communication plan. Vessel or tank entry must be documented as per the Confined Space Entry permit and procedure. Pengrowth's procedure is to take precedence over a safety Watch companies plan unless their procedure is clearly more rigorous (to be approved by Safety Department prior to determination and use).
17. First Aid Supplies and Transportation Plan
 - a. Using tables on the permit book cover, determine the 1st Aid supplies and emergency transportation requirements if applicable.
18. Establish and document emergency plans and communicate to all workers
 - a. A discussion must take place between the issuer and the acceptor(s)/safety watch/co-signer as to what is to be done during an emergency. Approved procedures are to be followed for evacuation of the facility and documentation of the person to contact and the method of contacting them (radio/phone, etc.) is required. The discussion should also include what the acceptor(s) must do if any aspect of the work changes from the original communication at safe work agreement issue. The clearer the job scope, the easier it is to complete an accurate safe work agreement.
19. Working alone/reporting plan established and reviewed
 - a. The working alone contact must be noted as well as the means of communication and timing of communication.
20. Job Completion Check out contact
 - a. Verbal over the phone or personal contact required is dependant upon the nature of the work being performed. This may be the same contact as that under #8. Emergency plans contact.



Section D – Controlled Products involved with work activities

D. Controlled Products involved with work activities		<input type="checkbox"/>	<input type="checkbox"/>	<u>RS</u>	<input type="checkbox"/>	<u>BR</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1. Controlled products (supplied by either party) that workers will be exposed to are identified by WHMIS labeling, hazards are understood and control measures are in place.		MSDS available for each <input type="checkbox"/>		MSDS reviewed <input type="checkbox"/>					
2. Controlled products are		<u>Varsol</u>		<u>AGX 40 Lube Oil</u>					
3. Dangerous goods are									

When controlled products are involved, see MSDS (Material Safety Data Sheets). Document controlled products workers may be exposed to. Discuss all the hazardous material that might be involved and how to manage them.

Government regulations stipulate what is controlled under TDG and WHMIS. If you are uncertain as to what products are controlled, involve a competent WHMIS or TDG individual in this discussion. If a competent individual is not available, use the WHMIS/TDG guides available at the worksite to check for proper handling of the materials in the work area.

Section E – Protective Equipment to be Used

E. Protective equipment to be used	
<input type="checkbox"/> Personal Protective Equipment as per <i>Safety Handbook</i>	<input type="checkbox"/> Special Protective Clothing
<input type="checkbox"/> Personal Gas Detection	<input type="checkbox"/> Eye/Face Protection
<input type="checkbox"/> Fire Extinguishers	<input type="checkbox"/> Positive-air Shutoff
<input type="checkbox"/> Respiratory Protective Equipment	<input type="checkbox"/> Other (Specify):

1. Agree on and document protective equipment to be used.
2. The Pengrowth Safety Handbook provides detailed instruction on the types of personal protective equipment that should be used when performing specific types of work. This document is a reference to help guide you through determining what may be required to reduce or eliminate exposure to hazards.



Section F – Special instr., hazard controls, and tailgate meeting notes

F. Special instructions, hazard controls, tailgate meeting notes and directions to location (attach additional documents, as required.)

#1) Lock out unit in MCC and Panel # 2) Block-in, vent and swing blinds, all parties to review lock-out sheet. # 9) No smoking on lease, smoking only allowed in parking lot; # 8) in the event of a gas detection you must evacuate the area by the Nearest exit and proceed to the muster area (do not drive, shut down all equipment prior to leaving); once the "all clear is Given, your permit must be reissued or signed. D-2) Take extra caution when washing down equipment with Varsol; follow the MSDS as discussed. #19) Report to the Control Room prior to departure for the day so that a site wrap up discussion can occur.

Use "Special instructions, hazard controls, and tailgate meeting notes" to communicate specific activities or responsibilities that are:

- Considered an essential part of that day's work.
- Highlighted in a tailgate meeting.
- Highlighted as controls for any noted hazards from the Site Hazard assessment.

For example,

Special instructions - "Call operations before cutting into the line."

Tailgate meeting highlights – "line contained acid – safety showers spotted at site."

Smoking Areas – "Designated in parking lot area only"



Section G – All Parties Agree to:

<i>Ron Serious</i>	Ron Serious	403-123-4567
<i>Bill Ranford</i>	Bill Ranford	403-987-6529
<i>Sil Krammer</i>	Sil Krammer	403-585-7189

1. Have the issuer and any co-signer (where applicable) sign the form to indicate all items have been adequately discussed and documented also have the acceptor sign the form to indicate all discussed items are understood.

In signing the combination form, both the issuer and the acceptor agree to:

- Provide a copy of the safe work agreement upon request (post if desired).
- Provide and maintain a safe workplace.
- Perform only the work specified in the safe work agreement and the mitigating controls as outlined in the Site Hazard Assessment.

The issuer retains a copy of the Combination Form in a recognized place at the work location.

Note: Throughout the job, others on the worksite must understand the work being done and the Combination Form's conditions. If the job is complex, you might consider attaching the acceptor's work plan to the signed Combination Form.

Once the document has been signed ensure that all affected individuals get their copy (and attachments if applicable).



Alberta: OH&S Regulation and Code, Part 11, Section 180 Emergency Transportation and Schedule. 2
Table 7 First aid requirements for high hazard work

REFERENCE CHART FOR FIRST AID AND TRANSPORTATION REQUIREMENTS

Number of Workers at Work Site per Shift	Close Work Site (up to 20 minutes)	Distant Work Site (20 – 40 minutes)	Isolated Work Site (more than 40 minutes)
1	Type P First Aid Kit	Type P First Aid Kit	Type P First Aid Kit
2 – 4	1 Emergency First Aider No. 1 First Aid Kit	1 Standard First Aider No. 2 First Aid Kit 3 blankets	1 Standard First Aider No. 2 First Aid Kit 3 blankets
5 – 9	1 Emergency First Aider 1 Standard First Aider No. 2 First Aid Kit	2 Standard First Aiders No. 2 First Aid Kit 3 blankets	2 Standard First Aiders No. 2 First Aid Kit 3 blankets
10 – 19	1 Emergency First Aider 1 Standard First Aider No. 2 First Aid Kit 3 blankets	2 Standard First Aiders No. 3 First Aid Kit, 3 Blankets Stretcher & Splints Based on Risk Assessment ECV or MTC May Be Required	2 Standard First Aiders No. 3 First Aid Kit 3 Blankets Stretcher & Splints MTC Required
20 – 49	2 Emergency First Aiders 1 Standard First Aider No. 2 First Aid Kit 3 blankets	3 Standard First Aiders No. 3 First Aid Kit 3 Blankets Stretcher & Splints ECV or MTC Required	3 Standard First Aiders No. 3 First Aid Kit 3 Blankets Stretcher & Splints MTC Required
50 – 99	2 Emergency First Aiders 2 Standard First Aiders No. 3 First Aid Kit 3 Blanket	2 Emergency First Aiders 3 Standard First Aiders No. 3 First Aid Kit Stretcher & Splints ECV or MTC Required	4 Standard First Aiders 1 Advanced First Aider No. 3 First Aid Kit 3 Blankets Stretcher & Splints MTC Required
Over 99 people	Refer to TABLE 7, Schedule 2 First Aid in the AB. OH&S Code.		

NOTE: This table has been modified and upgraded by Pengrowth to indicate when a Mobile Treatment Center (MTC) must be utilized.

British Columbia: WCB OH&S Regulations Part 3 Rights & Responsibilities. Occupational First Aid. Section 3.14 – 3.21 and Schedule 3-A Minimum levels of first aid (Table 5)

Table 5: This table applies to a workplace that an employer determines under section 3.16 (2) (b) of the Regulation creates a high risk of injury and that is more than **20 minutes** surface travel time away from a hospital.

REFERENCE CHART FOR FIRST AID AND TRANSPORTATION REQUIREMENTS

Item	Column 1 Number of workers per shift	Column 2 Supplies, equipment, and facility	Column 3 Level of first aid certificate for attendant	Column 4 Transportation
1	1	Personal first aid kit		
2	2-5	Level 1 first aid kit	Level 1 certificate	
3	6-10	Level 1 first aid kit ETV equipment	Level 1 certificate with Transportation Endorsement	ETV Required
4	11-30	Level 3 first aid kit Dressing station ETV equipment	Level 3 certificate	ETV Required
5	31-50	Level 3 first aid kit First aid room ETV equipment	Level 3 certificate	ETV Required
6	51-200	Level 3 first aid kit First aid room Industrial ambulance equipment	Level 3 certificate	Industrial ambulance

Saskatchewan:

- Ref: OH&S Regulations Part V- First Aid & Table 9 Summary of First Aid Requirements



Self Study 1

The self study is an important part of this training package. Please try to answer the questions on your own prior to looking at the answer's section. You will note that not all of the items queried in the self study were explained in the training section. This has been done on purpose and is meant to remind you of concepts contained in the Safety Handbook and elsewhere within the Pengrowth training program that affect Safe Work Agreements.

- a) What information/discussion points need to be documented in the first section of the safe work agreement?
 - 1. _____ of people and _____ equipment
 - 2. Contractor's _____ name
 - 3. _____ and _____ of work
 - 4. Approved _____ for work activities
 - 5. Detailed and specific _____ of the work that is to be done
- b) What conditions must be considered when setting the duration for the safe work agreement?
 - 1. _____ of the job remain _____.
 - 2. All _____ remain constant
 - 3. No other _____ will impact the conditions of the safe work
- c) What type of work takes place within 50m of a hydrocarbon production facility?

- d) When can you use the critical descriptor by itself?

- e) When would you use the critical descriptor? When the _____ associated with a specific work activity is medium or high on the _____ matrix.

- f) Who is responsible to ensure the contractor understands the areas that they can smoke while on a Pengrowth lease?

- g) What is expected of the agreement co-signer on the safe work agreement? To understand that a _____ activity in one area may overlap into their area and determine if the activity could _____ or _____ to an incident in their area.
- h) Who can complete the atmospheric testing portion of the safe work agreement? Anyone who has demonstrated _____ in gas testing.
- i) How many blankets are required to be on-site for 2-4 workers more than 40 minutes from a medical facility? _____. And which Table did you use?

Self Study 2

- j) In an open excavation type permit, which aspect of the job could require discussion as a critical work procedure? Potential _____, OH&S _____ for excavation, and Confined Space Entry procedure.
- k) What discussion needs to occur while establishing the height of overhead power lines? The actual _____ and voltage for the energized power lines and the _____ of the safe work agreement acceptor's equipment to that voltage. A need to check the _____ for clearing overhead power lines to ensure a safe working distance is maintained could then be determined.
- l) Who is required to establish and explain the emergency plan? This is a _____ process between the issuer and the acceptor with an understanding of what each _____ the other to do in the event of an emergency being clearly understood by all those involved in the work.
- l) Who is required to provide information about controlled products?
Both _____ and the _____.
- m) Who is responsible for determining the types of protective equipment required at the worksite?

- n) What equipment requires a positive air shut off? All diesel engines that are working under a _____ or _____ hot permit.
- o) Where would you identify the procedure for leaving a vehicle unattended in a live surface facility? The _____ instructions section of the permit.
- q) Does each safe work agreement always require four signatures prior to issue?
_____.
- r) When would you not sign off a safe work agreement? When the _____ area is not acceptable to the issuer
- s) What regulations do you agree to comply with when you sign a safe work agreement? Applicable _____ and _____ regulations and standards
- t) Who is responsible to ensure that all workers affected by this safe work agreement are informed of its contents? The safe work agreement _____ (contractor) must ensure that all their _____ and sub-contractors understand and comply with the conditions of the safe work agreement.



Self Study - Answers

- a) What information/discussion points need to be documented in the first section of the safe work agreement?
 - 1. Number of people and motorized equipment
 - 2. Contractor's company name
 - 3. Date and location of work
 - 4. Approved duration for work activities
 - 5. Detailed and specific description of the work that is to be done
- b) What conditions must be considered when setting the duration for the safe work agreement?
 - 1. Conditions of the job remain constant
 - 2. All parties remain constant
 - 3. No other work will impact the conditions of the safe work
- c) Hot work.
- d) This descriptor is never used alone. It must always have either the hot or cold designation following it.
- e) When the risk associated with a specific work activity is medium or high on the risk assessment matrix.
- f) The issuer has the responsibility to ensure the contractor is aware of the approved smoking locations for his work location.
- g) To understand that a work activity in one area may overlap into their area and determine if the activity could cause or contribute to an incident in their area.
- h) Anyone who has demonstrated competence in gas testing.
- i) Three Blankets, Alberta OH&S, Table 7 on permit book front cover.
- j) Potential cave in and OH&S standards for excavation, Confined Space Entry procedure.
- k) The actual height and voltage for the energized power lines and the proximity of the safe work agreement acceptor's equipment to that voltage. A need to check the procedure for clearing overhead power lines to ensure a safe working distance is maintained could then be determined.



Self Study – Answers Continued

- l) This is a joint process between the issuer and the acceptor with an understanding of what each expects the other to do in the event of an emergency being clearly understood by all those involved in the work.
- m) Both issuer and the acceptor.
- n) Both issuer and acceptor are responsible to ensure that all the various types of protective equipment are considered and assigned, as required, to the work.
- o) All diesel engines that are working under a hot or critical hot permit.
- p) The special instructions section of the permit.
- q) No. The safe work agreement co-signer and the safety watch signatures are required only when the work overlaps into their area or has a critical designation.
- r) When the work site area is not acceptable to the issuer.
- s) Applicable Government and Pengrowth regulations and standards.
- t) The safe work agreement acceptor (contractor) must ensure that all their employees and sub-contractors understand and comply with the conditions of the safe work agreement.

Conclusion

This concludes the safe work agreement-site hazard assessment training information. If you feel that you fully understand the information presented and are prepared to prove competency on this aspect of your work please acquire a testing package.

If you have any questions or concerns please talk with the individual that ensures your training needs are met.



Potential Pengrowth Critical Safe Work Agreement Requirements
(this is not meant to be an inclusive listing...EXAMPLES ONLY)

1. Open flame (e.g. steamers, portable heaters) – within 50m of a live surface hydrocarbon facility.
2. Welding/grinding – within 50m of a live surface hydrocarbon facility.
3. The use of portable non-explosion proof electric equipment in a hazardous area, without an approved procedure (e.g. drills, testing equipment, portable lights, etc.)
4. Use of hoists/cranes where the risk is deemed critical (black/gray on risk matrix).
5. Working within the restricted area of power lines (refer to area standard).
6. A confined space entry that contains a hazardous atmosphere.
7. Opening live electrical boxes in a hazardous area, without an approved procedure.
8. Operating vehicles within 50m of a live surface hydrocarbon facility during process upset conditions when there is not a loss of hydrocarbon containment. During normal operations a permit is not required.
9. Use of hazardous material where the risk is deemed critical (black or gray on risk matrix).
10. Moving heavy equipment with restricted access areas, after a risk assessment has been complete.
11. Ground disturbance, with the use of mechanical equipment, within 5m of a live buried structure based on risk assessment.
12. Construction around live pipelines and based on risk assessment.
13. NGL pipeline decommissioning. A site specific procedure must be approved by the Area Foremen and Safety Department.
14. High level of activity in one area (e.g. major turnarounds).

Note: Most work on this list could be considered to be critical and must therefore be identified as such on the work permit. Critical work requires 100% supervision by a Pengrowth representative. All jobs should be looked at from a risk assessment basis to ensure work is performed in a safe and efficient manner.

****END****

CONTENT CONTRIBUTORS: Safety Coordinators

DOCUMENT CUSTODIAN: Manager, Safety

REVISION # 2 DATE: November 2009

ORIGINAL ISSUE DATE: December 15, 2007

The information presented here is intended for general use and may not apply to every circumstance. It is not a definitive guide to government regulations and does not relieve persons using this information from their responsibilities under applicable legislation. Consult your local provincial legislation for further information.

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***Refer to the Insider/HSE for the most current copy**

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PENGROWTH

Safe Work Agreement Code of Practise Examination

Name: _____

Date: _____

- #1. The purpose of Pengrowth's safe work agreement is to protect our facilities and to ensure that workers clearly understand their duties in the work to be done and all the hazards associated within that work.
True or False
- #2. A Site Hazard Assessment is a documented review of the work site prior to work commencing, it includes identifying the hazards that are present and documenting the controls needed to prevent an incident from occurring.
True or False
- #3. A change in job scope or a change in job personnel are examples of when a safe work agreement/site hazard assessment must be reissued.
True or False
- #4. Any Pengrowth employee or representative is allowed to conduct a gas test.
True or False
- #5. The safe work agreement/site hazard assessment protects Pengrowth Corporation and its employees from the legal consequences of an incident.
True or False
- #6. What are the qualifications needed by employees and contractors to be authorized to issue safe work agreements or site hazard assessments on behalf of Pengrowth?
a) *must be employed in a safety position*
b) *must be competent in the area of work that the SWA/SHA is covering*
c) *must have completed and passed the SWA code of practise exam*
d) *both b and c*
- #7. The _____ is the tool utilized to deem whether hot or cold work are considered critical.
a) *site hazard assessment*
b) *risk assessment matrix*
c) *safety incident report*
d) *environment incident report*
- #8. The duration of the safe work agreement is limited to the time that what condition(s) can be met?
a) *the condition of the job remains constant*
b) *the parties involved in the job remain constant*
c) *no other worker effects the condition of the job*
d) *all of the above*
- #9. What does the acceptors signature or initials on the safe work agreement/site hazard assessment signify?
a) *that they have received the SWA/SHA*
b) *that they agree with everything written on the SWA/SHA*
c) *that all workers on the job clearly understand their roles and responsibilities*
d) *that all workers on the job have read the SWA/SHA*
- #10. The agreement _____ is the person responsible to issue or approve the safe work agreement/site hazard assessment.
a) *issuer*
b) *acceptor*
c) *co-signer*
d) *all of the above*
- #11. The agreement _____ signs the safe work agreement/ site hazard assessment when work overlaps into their area.
a) *issuer*
b) *acceptor*
c) *co-signer*
d) *all of the above*

- #12. Use the _____ portion of the Safe Work Agreement form to communicate specific activities, hazard controls or responsibilities that are considered an essential part of the day's work
- a) *site preparation*
 - b) *special instructions*
 - c) *controlled products*
 - d) *land location*
- #13. Pengrowth defines cold work as:
- a) *any work that does not create an ignition source.*
 - b) *any work that creates an ignition source.*
 - c) *any work within a 50 meter radius of a live oil or gas facility.*
 - d) *any work outside a 50 meter radius of a live oil or gas facility.*
- #14. Pengrowth defines hot work as:
- a) *any work that does not create an ignition source.*
 - b) *any work that creates an ignition source.*
 - c) *any work within a 50 meter radius of a live oil or gas facility.*
 - d) *any work outside a 50 meter radius of a live oil or gas facility.*
- #15. Welding on piping in a hydrocarbon process environment requires what type of safe work agreement:
- a) *hot work.*
 - b) *critical hot work.*
 - c) *cold work.*
 - d) *critical cold work.*
- #16. An instrument mechanic calibrating a chart recorder in a process building requires what type of safe work agreement:
- a) *hot work.*
 - b) *critical hot work.*
 - c) *cold work.*
 - d) *critical cold work.*
- #17. A worker performing a vessel entry requires what type of safe work agreement:
- a) *hot work.*
 - b) *critical hot work.*
 - c) *cold work.*
 - d) *critical cold work.*
- #18. A grader operator grading roads within a facility requires what type of safe work agreement:
- a) *hot work.*
 - b) *critical hot work.*
 - c) *cold work.*
 - d) *critical cold work.*
- #19. An electrician disconnecting a motor requires what type of safe work agreement:
- a) *hot work.*
 - b) *critical hot work.*
 - c) *cold work.*
 - d) *critical cold work.*
- #20. A worker pre-fabbing pipe in an isolated area requires what type of safe work agreement:
- a) *hot work.*
 - b) *critical hot work.*
 - c) *cold work.*
 - d) *critical cold work.*
- #21. Review the sample "EXAM" Safe Work Agreement / Site Hazard Assessment form. Identify (circle) at least five (5) areas that have missing or incorrect information.



Safework Agreement

Site Hazard Assessment

Date Mar 11, 200x

A. Between Issuer – PENGROWTH CORPORATION		No. of workers	No. of vehicles	1	Duration	07:30	To	16:30
and Acceptor (company name)		Sam's Steaming		Location		Production Complex		
Description of work (specific description)		Steam clean jacket water coolers on compressors K1103, K1104 and K1105. Operations to shut down and lockout units as needed.						

B. Nature of work ☒ Cold ☐ Hot ☐ Critical (requires owner approved safety watch) ☐ IRP Compliant Orientation

C. Site preparation (assign and agree to responsibilities, site hazards, and controls)		SHA	Issuer	Initials	Acceptor	Initials	Co-signer/ Safety Watch	Initials	N/A	Initials
1.	Prepare electrical systems. - de-energize, lock and tag - identify overhead lines and control measures in place - identify energized lines and control measures in place	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	JO	<input checked="" type="checkbox"/>	SS	<input type="checkbox"/>		<input checked="" type="checkbox"/>	JO
2.	Prepare pressurized systems. - isolate and depressurize - drain - install blinds - lock out and tag - purge (medium used)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>	JO
3.	Identify and confirm location underground/overhead structures, pipes and electrical lines.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>	JO
4.	Trenching or excavation hazards.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>	JO
5.	Ground disturbance permit. Required <input type="checkbox"/> Not Required <input type="checkbox"/> (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
6.	Slip, trip, or fall hazards.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	JO	<input checked="" type="checkbox"/>	SS	<input type="checkbox"/>		<input type="checkbox"/>	
7.	Working on or from elevated structures. Fall Protection Plan in place <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>	JO
8.	Flammable or toxic hazards <input checked="" type="checkbox"/> Ignition sources <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	JO	<input checked="" type="checkbox"/>	SS	<input checked="" type="checkbox"/>	BS	<input type="checkbox"/>	
9.	Determine gas/air quality testing required: Frequency _____ hrs or continuous _____	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	JO	<input checked="" type="checkbox"/>	SS	<input type="checkbox"/>		<input type="checkbox"/>	
10.	Response discussed for: Atmospheric changes <input checked="" type="checkbox"/> Weather/temperature hazards <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	JO	<input checked="" type="checkbox"/>	SS	<input checked="" type="checkbox"/>	BS	<input type="checkbox"/>	
11.	Appropriate site specific procedures developed and reviewed (i.e.) confined space entry/rescue plan.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>	JO
12.	Inspect worksite and equipment.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	SS	<input type="checkbox"/>		<input type="checkbox"/>	
13.	Pinch points or position of hazard.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	SS	<input type="checkbox"/>		<input type="checkbox"/>	
14.	Noise hazards <input checked="" type="checkbox"/> Illumination/Lighting hazards <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	JO	<input checked="" type="checkbox"/>	SS	<input type="checkbox"/>		<input type="checkbox"/>	
15.	Moving/rotating equipment.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>	JO
16.	Confined space hazards. Confined Space Plan in place <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>	JO
17.	First Aid Supplies and Transportation Requirements. See Table on cover (ref. COP # 016)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	JO	<input checked="" type="checkbox"/>	SS	<input checked="" type="checkbox"/>	BS	<input type="checkbox"/>	
18.	Documented Emergency Plan and directions to location (Use section F. Blow)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	JO	<input checked="" type="checkbox"/>	SS	<input checked="" type="checkbox"/>	BS	<input type="checkbox"/>	
19.	Working alone/reporting plan established and reviewed	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>	JI
20.	JobCompletion checkout – Contact: Joe Operator Ph. # 333-7123	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	JO	<input checked="" type="checkbox"/>	SS	<input type="checkbox"/>		<input type="checkbox"/>	

D. Controlled Products involved with work activities

1. Controlled products (supplied by either party) that workers will be exposed to are identified by WHMIS labeling, hazards are understood and control measures are in place.	MSDS available for each <input checked="" type="checkbox"/>	MSDS reviewed <input checked="" type="checkbox"/>
2. Controlled products are	XYZ Degreaser	Natural Gas
3. Dangerous goods are		

E. Protective equipment to be used

<input checked="" type="checkbox"/> Personal Protective Equipment as per Safety Handbook	<input type="checkbox"/> Special Protective Clothing	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Respiratory Protective Equipment	
<input type="checkbox"/> Personal Gas Detection	<input checked="" type="checkbox"/> Eye/Face Protection	<input checked="" type="checkbox"/> Fire Extinguishers	<input type="checkbox"/> Positive-air Shutoff	<input type="checkbox"/> Other (Specify):

F. Special Instructions, hazard controls, and tailgate meeting notes (attach additional documents, as required)

#1 & 2) Operations to lockout panel switch, fuel gas and starting air on each unit.

#6) Area may become muddy and slippery when wet, consider using matting or boards around base of coolers.

#8 & 11) Should gas alarm sound, shut down your truck and boiler, move to muster point in maintenance shop.

#9 & 10) Safety watch to continuously monitor area for LEL's and shut down work if gas detected.

#13) Contractor to inspect all tools and equipment before starting work.

#14) Eat your lunch on the compressor building roof.

#15) Wear hearing protection at all times.

- G. All parties agree to:
1. Comply with all applicable government regulations, company and Pengrowth standards.
 2. Maintain a copy of this agreement at the work site.
 3. Provide and maintain a safe workplace.
 4. Perform only the work specified in this agreement.
 5. Ensure that any other member(s) of their organization or subcontractor who will or may work on this work site have a complete understanding of the conditions of this agreement and the nature of the work being done.

	Signature	Print	Phone Number
Issuer	Joe Operator	Joe Operator	333-7123
Acceptor	Sam Smith	Sam Smith	450-6789
Co-signer			
Safety Watch	Bea Safe	Bea Safe	778-4567
Subcontractors			

White – Original to Contractor

Canary – Office

Pink – Job Site

COP – 002	CODE OF PRACTICE	Rev#(1) – September 2008
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ATMOSPHERIC TESTING

Purpose: Atmospheric testing is legally required to ensure air quality is within acceptable limits for oxygen content and explosive/toxic gases or materials. Atmospheric tests must be conducted by a qualified person when:

- Oxygen content might be less than 19.5 percent or greater than 23 percent (the normal oxygen content in the air).
- Work involves an ignition source in a potential hydrocarbon area.
- Toxic gases or materials may be present.
- Work will include a confined-space entry.

Additionally, atmospheric testers must effectively monitor air quality for all explosive and toxic materials in the work area and protect workers while they are performing a hazardous task. Effective monitoring includes immediately stopping all work if conditions change to a state that would potentially put workers at risk of injury.

Hazards	Hazard Controls
Misuse or abuse of testing equipment	Multi-head detector maintenance requirements in place.
Human/reading error	Atmospheric test training & examination.
Exposure to hazardous atmosphere identified as per testing criteria.	Area Critical Procedure for Respiratory Equipment – selecting, maintaining and use of Personal Multi-head gas detector.
Working Alone	Working Alone Procedure
Personal Injury	Communication system; emergency response plans in place.

Atmospheric Tester Qualifications: Competent personnel executing atmospheric testing will:

- Have taken a gas-testing course, complete with theory and practical instruction.
- Be competent in the use of the specified monitoring equipment and be able to demonstrate the proper use of and limitations of atmospheric detectors and be authorized by Pengrowth for such activity.
- Be able to demonstrate the donning and proper use of respiratory-protective equipment.
- Have training on Pengrowth's Critical Work Procedure for H₂S and hydrocarbon handling, storage and disposal.
- Receive regular refresher training to maintain an acceptable proficiency level (re-training is mandatory at least every three years).

Documentation: Atmospheric-tester qualifications and test results will be kept with the employee's training records. A current record of all personnel qualified to conduct atmospheric tests will also be filed. Where air-quality tests are required, the type of test, frequency, time and result of each test will be documented on the safe work agreement and (when procedure warrants) an additional tracking record.

Gas Testing Criteria:

Potential Hazard	Operating Conditions	Maximum Levels
LEL of flammable gases	Potential ignition source or sparking No ignition source or sparking	0 percent LEL 1-10 percent LEL
Oxygen content	In all work areas	19.5 to 23 percent
Toxic gases	Hydrogen Sulphide ⁽¹⁾	10 ppm per 8-hour day
Carbon Monoxide	In all work areas	25 ppm per 8-hour day
Other gases/chemical substances	Wherever workers are exposed to the substance. ⁽¹⁾	See guidelines in provincial OH&S legislation.

⁽¹⁾Acceptable levels in work areas will be determined for each toxic gas from the OEL (occupational exposure limit) on Material Safety Data Sheets and OH&S Chemical Hazards Regulation.

Atmospheric Monitor Maintenance: In order to provide a safe work environment, it is important that personnel have a solid understanding of the hazards of work areas and the gas detection equipment used. The following will apply when using personal gas detection equipment:

1. All atmospheric monitors will be bump tested prior to use and calibrated according to manufacturer's specifications.
2. In-house inspected detectors will have a dated inspection sticker and service information will be logged in the record book.
3. All atmospheric monitors will be subject to scheduled, planned maintenance according to manufacturer's specifications. Only authorized instrumentation personnel and/or authorized manufacturer will inspect or repair gas detectors.
4. A malfunctioning atmospheric monitor must never be used for gas detection testing or left where another individual may have access to it. Any faulty atmospheric monitor will be immediately removed from service, inspected and repaired.

Atmospheric Testing Procedure – Tester Responsibilities:

1. Identify areas where oxygen content may not be within the acceptable range (19.5 to 23 percent) and/or explosive or toxic environment or material may be present.
2. Identify atmospheric monitoring requirements.
3. Identify the type of tests to be conducted and the frequency of testing.
4. Conduct tests and document results on the safe work agreement and/or alternate tracking system.
5. Where air quality deviates from acceptable normal ranges for oxygen, flammability or toxicity levels, immediately shut down the work activity until the levels can be reduced to acceptable ranges or until special procedures are developed and implemented to allow work to continue so as not to place any worker at risk.



Note: Control measures must include precautions to reduce atmospheric risks to as low as reasonably practicable. (e.g., removing the hazard; increasing ventilation; eliminating static electricity or ignition sources).

*****END*****

Additional References:

Pengrowth – COP # 011 H2S and Hydrocarbon
Pengrowth – COP # 022 Venting or Draining Hydrocarbon Liquids
Pengrowth – COP # 004 Building Entry Procedure
Pengrowth – COP # 013 Isolation of Piping and Vessels
Pengrowth – COP # 024 Working Alone

Content Contributors: Safety Coordinators

Document Custodian: Manager, Safety

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The information presented here is intended for general use and may not apply to every circumstance. It is not a definitive guide to government regulations and does not relieve persons using this information from their responsibilities under applicable legislation. Consult your local provincial legislation for further information.



Atmospheric Testing Code of Practise Examination

Name: _____

Date: _____

#1. When no ignition sources exist, work is able to begin or continue if LEL levels exceed 10%.

True or False

#2. The acceptable oxygen content range for working in all areas is 19% to 25%.

True or False

#3. Atmospheric testing personnel must ensure that the atmospheric test results remain within the acceptable limits for the duration of the job.

True or False

#4. What is the acceptable OEL limit for H₂S if a worker is working in an area over a maximum period of 8 hours?

- a) no more than 5 ppm
- b) no more than 10 ppm
- c) no more than 20 ppm
- d) no more than 25 ppm

#5. Where exceedance of acceptable oxygen level (above 23%) or LEL% (above 10%) is detected:

- a) work may continue only for short periods of time.
- b) work cannot continue until the levels can be reduced into the acceptable ranges.
- c) work may continue if levels are stable for 15 minutes and continuous testing is available.
- d) work cannot continue for 24 - 48 hours to let the atmosphere stabilize.

#6. Who is permitted to repair gas detection?

- a) Anyone trained in the use of the equipment.
- b) An authorized instrument technician
- c) The manufacturer.
- d) Both b and c.

#7. What qualifies an individual to perform atmospheric testing on behalf of Pengrowth.

- a) employed by a safety services company.
- b) employed by a safety services company, and competent with the equipment being used.
- c) a Pengrowth employee that is aware of the hazards
- d) a person competent with the equipment being used, who is aware of the hazards and authorized to perform the work

#8. When air quality tests are required, the type, frequency, time and results of the tests are to be recorded on the:

- a) Safe work agreement/ Site hazard assessment
- b) The operator log book
- c) The atmospheric testing log
- d) Both A and C

COP - 006	CODE OF PRACTICE	Rev # (3) – April 2009
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CONFINED SPACE

Purpose: This Code of Practice describes the practices and procedures to be followed when workers enter and work in a confined space. It is intended to assist Pengrowth personnel in identifying existing and potential confined space work locations.

Confined space definition: A confined space is an enclosed or partially enclosed space that is not designed or intended for continuous human occupancy. They typically have a restricted means of entry or exit and may become hazardous to a worker entering it because of the:

- (a) Design, construction, location or atmosphere;
- (b) Work activities, materials or substances in it;
- (c) Provisions of first aid, evacuation rescue or emergency response service is compromised;
- (d) Hazards related to it.

Confined spaces are usually entered for the purposes of cleaning, inspection, maintenance, repair or construction and are not sites of ongoing or regular work activity.

Regulations & Codes: Occupational Health and Safety Regulations and Codes governing confined spaces are set by each provincial or territorial jurisdiction. This code of practice sets minimum standards required by Pengrowth. Provincial regulations need to be reviewed to ensure compliance with any additional jurisdictional requirements.

Types of Confined Spaces: Confined spaces might include but are not limited to:

- Limited or restricted access or egress
- Tanks, vessels, free-water knockouts, separators, towers, furnaces and sumps
- Excavations, pits and trenches, bell holes deeper than 1.2 metres. Including some diked areas, such as tank farms;
- Furnaces, culverts, sumps, tanks farms, buildings/housing over piping, production water tanks, etc.
- Any other space where access or exit is limited, examples are; the top of storage tanks; elevated pipe racks; tank stairways; some compressor basements; and spaces where ventilation is or could become inadequate;

Hazard assessment: If a worker is required to enter or work in a confined space, a hazard assessment is required. A hazard assessment must be completed by a competent person having knowledge of confined spaces and meeting the requirements of hazard assessments, elimination and control as per OH&S legislation.

Hazard assessments must include as a minimum:

- Classification of Confined Space as Class A, B or C (see [Confined-Space Classifications](#))
- Items included on the confined space hazard assessment checklist;
- A review of detailed vessel diagrams applicable to the work including internal structures;
- Access and egress points;
- Isolation and ventilation points and nitrogen vent points (if applicable);
- Preparation, handling, storing and disposal of all Dangerous Oilfield Waste (DOW) and other wastes.

Hazards that may be found in a confined space could include:

Hazards		Hazard Controls	
Potential	Possible Cause	Prevention	Additional Control Measures
Flammable/explosive vapors and liquids	Residue or leakage	Properly clean/purge, isolating systems, and ventilate	Use multi-head gas monitor, SCBA and safety watch
Oxygen deficiency	Inadequate ventilation, contaminants and/or oxidation	Proper ventilation equipment and cleaning	Atmospheric monitoring; continuous ventilation air systems and SCBA/SABA
Oxygen enrichment	New molecular sieve, or a molecular sieve that has been exposed to air	Use ambient temperature nitrogen to purge the sieve. DO NOT use fuel gas for purging.	Monitor oxygen and continue to purge until the oxygen content is below 2%.
Shock/static hazards	Shorting to ground and moisture	Clean, dry work area and low-voltage (12 volts or less) lighting; Equipment inspections	Incorporate ground fault circuit interrupter on powered equipment
Energized/rotating equipment	Equipment in or connected to confined space not locked or wrong equipment locked out	Identify or double check, lock out and tagged equipment in a zero energy state; follow lock-out procedures	Physically disconnect equipment and follow-up lock out procedure and log.
Sludge or scale deposits	Normal operations deposits, production vessels, separators	Flushing, cleaning	Atmospheric monitoring; continuous ventilation air systems and respiratory protection
Skin irritants and corrosives	Chemicals contained in or used for cleaning spaces	MSDS review, procedure, proper cleaning and flushing	Chemical suits, atmospheric monitoring, and respiratory protection.
Slippery or uneven surfaces or obstacles	Vessel configuration, previous contents	Additional cleaning or flushing and lighting	Harness lifeline (if applicable)
Extreme heat or cold	Lack of ventilation or air flow, high ambient temperature	Procedure for cool down of unit, increase air flow, safety watch	Cool liquids, appropriate rest breaks
Low lighting levels	Restricted movement, internal configuration	Explosion proof lighting	Open additional ports to allow light in.
Elevated Work	Confined space configuration, duties being performed	Fall protection plan	Harness, lifelines, rescue equipment , scaffolding
Iron sulphide	Proper purging and flushing;	Keep wet with water or other wetting agents (F500)	Safe disposal of contaminated materials
Ignition source	Sparks Lighting Welding	Explosion-proof lighting/GFI's, Spark watch/control, welding blankets, continuous atmospheric monitoring, hot permit	Monitor area with appropriate fire fighting equipment, stop work and resolve

Planning the Work Execution

Confined space entry plans should be developed well ahead of time. This will allow everyone time to coordinate support activities. Planning is usually led by the site supervisor and the workers entering the confined space. Before entering or allowing entry into the confined space, the following will be completed where applicable:

1. Identify and classify the confined space
2. Conduct pre-entry Hazard Assessment and document findings on checklist.
3. Develop site specific procedure and a rescue plan
4. Select workers, as safety watch, supervisor/Foreman and Pengrowth Representative as per Code of Practice criteria
5. Verify training and competency qualifications
6. Verify isolation and lock-out with visual checks as per Pengrowth procedure
7. Ventilate the confined space as per Pengrowth Procedure
8. Ensure Safe Work Agreement has been completed
9. Establish a communication system and confined space testing requirements.
10. Identify and inspect safety equipment required (must be in place)
11. Conduct the initial tests of the confined space environment and record the results.
12. Ensure continuous gas monitor is in place and has been bump checked prior to use.
13. Host tailgate meeting and review all information including preplanning documentation, site-specific procedure and rescue plans with confined space participants (crew).
14. Discuss right to refuse

Note: *No entry is allowed if:*

- **Oxygen content greater than 23%; or**
- **LEL is greater than 10%;**

Preparing the Space

Workers must, without entering the confined space – clean, isolate and ventilate the confined space to as safe a condition as reasonably possible prior to allowing anyone to enter the confined space.

Safe Work Agreements / Confined Space Entry Attachments must:

- List the names of each worker who enters the confined space
- Identify the location of the confined space;
- Specify the time period for which the entry is valid;
- Consider hazards and safety precautions required for work being done;
- Safe Work Agreement must be readily available; preferably posted at the site near the entrance to the confined space; and
- Permit valid period must be identified.

Notes:

The Safe Work Agreement is considered expired at the end of the shift, when the confined space is returned to service, if the permit issuer changes (shift change), or when the entry is delayed for an extended period due to emergency or other work interruptions.

STANDARDS - Responsibilities for Safety and Protection

Following are responsibilities beyond those of people doing the work:

Area managers will ensure that:

- before workers enter a confined space, the confined space is classified as Class A, B or C (see [Confined-Space Classifications](#))
- all workers requiring entry, supervising a confined-space entry or serving as a safety watch are properly trained (see [Qualifications](#))
- a qualified company site supervisor is assigned to each entry as specified (see [Table 1 under Confined-Space Classifications](#))

The company site supervisor must ensure that:

- all Confined-Space-Classification Requirements (see [Table 1 under Confined-Space Classification](#)) are met
- entry is necessary by ruling out all other options
- the space is properly isolated for the work to take place, e.g., the vessel is isolated from external piping and equipment

NOTE: *The isolating should be as close to the vessel as practical. Any piping between the isolation point and the vessel must be considered part of the confined space.*

- The space is properly purged and ventilated
- The necessary equipment is available at the work location, e.g., supplied air; gas-detection; personal-protective and ventilation equipment; harnesses and lifelines
- The presence of Benzene is tested for --- if workers will be exposed to any of the following products:
 - crude oil
 - condensate
 - asphaltines
- the potential for radioactivity or Naturally Occurring Radioactive Material (NORM) contamination is assessed by:
 - checking for NORM stickers on vessels
 - reviewing NORM inventory with maintenance planners
- a qualified work crew, safety watch and rescue team are in place (see [Table 1](#) and [Table 2](#))

The agreement acceptor, e.g., contract crew supervisor, must:

- notify the company site supervisor or designate of job-scope changes or changing conditions. The work site must be re-inspected and tested by the agreement issuer before the job can resume
- ensure preparation and precautions are acceptable, understood and agreed to before signing and accepting the [Safework Agreement/Hazard Assessment form](#) and [Confined-Space-Entry Checklist](#)
- define appropriate tools to use for the job, e.g., air compressors or tool pouches

The safety watch, contract crew supervisor or designate must:

- inspect the working condition of all personal-protective, emergency and work-related equipment required for use in Class A and B spaces before initial entry
- retain written inspection records

The safety watch at the entrance must:

- be assigned to confined-space classifications as required (see [Table 1](#))
- if workers inside the space are wearing respirators, either:
 - wear a respirator (without the mask on)
 - have a respirator nearby and ready for immediate use
- if workers inside the space are not wearing respirators, have a respirator nearby and ready for immediate use

- be able to communicate at all times with the workers inside
- never leave their post, unless relieved by another qualified safety watch
- monitor and record on the [Confined-Space Entry – Worker and Equipment Tracking Sheet](#)
 - all workers entering and exiting the space and why
 - equipment being taken into and out of the space
- continuously monitor air in the space
- be able to summon help and effect a rescue
- have access to a sounding alarm (i.e., an air horn) for emergencies

Table 1: Safety Watch Levels (as defined in Appendix 1)

Class	Work Description	Safety Watch Level	Company Site Supervisor Present at the Work Site
Class A	• all work activities	Level A	Yes (for initial entry to confirm isolation, purging and special requirements)
Class B	• entry for initial gas testing • *all subsequent work activities	Level A Level B	Not Required Not Required
Class C	• *initial gas testing • *all subsequent work activities	Level B Level C	Not Required Not Required

NOTE: *The need for a safety watch must be determined by the company site supervisor and documented on the Safework Agreement.

Qualifications

To ensure everyone's safety, personnel associated with the entry must be trained and competent in their duties related to the confined-space activity.

Planning Stage

Workers involved in planning an entry must be competent in this procedure.

Entry and Supervision

Workers who enter a Class A space must be trained and certified in confined-space entry.

NOTE: *Workers (engineering and technical staff) who aren't certified in confined-space entry may enter a Class A confined space once it's clean and deemed safe. This would only be allowed in a Class A confined space where:*

- respirators and lifelines aren't required
- the safety watch and company site supervisor have deemed:
 - risks associated with the space's condition at the time of entry are low
 - the space is safe for entry by a non-certified worker
- the workers are:
 - trained in the company Confined Spaces – Entering procedure
 - not doing work in the space or on equipment within the space, but simply observing the work, conditions and equipment inside
 - accompanied by an individual who is certified for confined-space entry and is familiar with the conditions of the specific space being entered

Workers who enter a Class B space must review this procedure, the Confined-Space-Entry Checklist and the Hazard Assessment (if required) and be supervised by an individual who is familiar with the entry and who is trained and certified in confined-space entry.

Safety Watch

Safety watch requirements are outlined in appendix 1 of this code of practice.

Rescue-Team Personnel

The company site supervisor must ensure that:

- for Class A:
 - a rescue team is identified by name (see [Table 2 under Confined-Space Classifications](#)) and notified to respond
 - at least one member (usually the rescue-team leader) has confined-space rescue certification; first-aid certification, including CPR & AED; and training in the use of appropriate rescue procedures and emergency-rescue equipment for the confined space
- for Class B and C:
 - a rescue team is identified by position and available to respond
 - at least one member (usually the rescue-team leader) has first-aid certification, including CPR & AED; and training in the use of appropriate rescue procedures and emergency-rescue equipment for the confined space

NOTE: The rescue-team leader training might also require specialized training, such as:

- aerial high-angle rescue (tower work)
- trench rescue
- drilling or service rig rescue
- diver qualifications (for river or lake diving work)

All Workers

All workers, including all rescue-team personnel, must have a working knowledge of:

- government regulations that apply
- the confined-space hazard assessment
- this procedure
- the emergency rescue plan
- all standards and procedures that apply.

Special Equipment

Required equipment might include:

- self-Contained Breathing Apparatus (SCBA)
- supplied-Air Breathing Apparatus (SABA)
- air-purifying respirator
- air movers
- fire extinguishers
- multiple lockout devices, locks and tags
- isolation blinds and plugs
- safety harnesses, lanyards and lifelines
- rescue equipment specific to the type of space and rescues that might be required, e.g., respirators, stretchers or tripods
- a radiation meter to measure NORM contamination.
(See [Naturally Occurring Radioactive Material \[NORM\] – COP-015](#))



- air-testing and monitoring equipment to identify potential air contaminants, e.g., carbon monoxide when welding
- UltraRae photoionization detector or colourimetrics tubes, e.g., Draeger to measure Benzene levels

Gas-Sampling and Gas-Detection Equipment

Gas-sampling and –detection equipment must have:

- lower explosive limit (LEL) monitor set to alarm at 10 percent and 20 percent LEL
- oxygen monitor set to alarm at 19.5 and 23 percent
- H₂S monitor set to alarm at 10 ppm (parts per million)

NOTE: H₂S is heavier than air and may pool in low areas of confined spaces. Gas Detectors used for initial atmospheric testing must be equipped with an integrated or “in-line” sampling pump.

Electrical Equipment

Flashlights must be approved for use in classified areas. Power lights and electrical tools rated for voltages between 12 and 120 must be protected by a Class A (5 mA) ground-fault circuit interrupter (GFCI), where:

- The GFCI is used to protect only one light or electrical tool. In other words, the GFCI must be a single-outlet or, if it's a double outlet, only one light or tool can be plugged in.
- The cord to the light or tool must be kept as short as possible to do the job, and made from extra-hard-usage, outdoor, flexible cord, e.g., Type SOW

NOTE: If flammable vapours (LEL) are present in any amount, the light or tools must be approved for use in Class 1 Division 1 areas. Where LEL is zero, general purpose lights or electrical tools may be used, provided they're industrial grade.

Safety Harness and Lifelines

A five-point safety harness must be worn for all Class A and B work. A safety harness with a lifeline attached is required when:

- entering spaces for the first time, e.g., when gas testing
- specific, local circumstances dictate, e.g., due to a space's internal layout
- the potential exists to fall e.g., from a high structure
- entering a high-hazard space (specific to British Columbia regulations)
- rescue might be difficult

Caution: Life lines should not be used when the use of the lanyard poses and increases the risk to the worker entering. (i.e.) entanglement in equipment or situations where it may delay escape or rescue.

Confined-Space Classifications

Classification must be completed by individuals thoroughly experienced in Confined Space Entry and associated hazards. (E.g. Site Supervisors, Maintenance/Operation Foreman with input from area Safety Coordinator if necessary.) The classification shall be based on the conditions present at the time of entry with consideration for potential changes of conditions as identified in the hazard assessment.

Confined spaces must be classified as one of the following:

- Class A (High Hazard) - Class B (Medium Hazard) - Class C (Low Hazard)

Class A

Class A includes high-hazard spaces, defined as:

- potentially exposing workers to risk of incapacitation, injury, acute injury or death. E.g. an enclosure which may be immediately dangerous to life or health (IDLH). These include but are not limited to oxygen deficiency, explosive or flammable atmospheres, and/or concentrations of toxic substances
- potentially impairing workers' ability to escape in the event of a respirator failure
- including vessels; manholes; sewers; sumps and bunkers; furnaces, heaters and boilers; and rig tanks

NOTE: *All requirements in this procedure apply for entry into Class A spaces. For classification requirements, see Table 2.*

Class B

Class B includes medium-hazard spaces, defined as:

- having respirable air that falls within the limits outlined in this procedure, but having the potential to change if equipment failure occurs, e.g., valve leakage
- having a low risk of death, injury or acute illness
- having an acceptable ability to escape if equipment fails
- including aerial coolers (hazardous products) and utilidors (hazardous products)
- steam generators; heating, ventilation and air conditioning (HVAC) units (with gas supply)

NOTE: *To determine what in the procedure applies for entry into Class B spaces, see Table 2.*

Class C

Class C includes low-hazard spaces with limited access and egress, defined as:

- potentially requiring rescue and first-aid equipment
- having clean respirable air (tested or otherwise known) that's unlikely to change during the work activity
- including buildings with limited access and egress; communication towers; tank, tower and vessel stairways; tanks, dikes or berms higher than 1.2 meters (4 feet); HVAC units (with electric or glycol supply); pipe racks; tower or vessel skirts; utilidors (non-hazardous products); aerial coolers (non-hazardous products); compressor fan housings and hoods; and scaffolds
- properly sloped and cut-back trenches or excavations deeper than 1.2 meters (4 feet)

NOTE: To determine what in this procedure applies for entry into Class C spaces, see [Table 2](#). An approved job-specific procedure may also be used as an alternative to this procedure to manage hazards associated with Class C spaces.

Classification Changes

Ongoing hazard assessments during the course of a project may enable re-classification of a confined space. (I.e. an initial Class "A" may be deemed Class "B" once it contains respirable air)

Changes to the initial classifications must include a documented review and approval of the Pengrowth Site Supervisor and Foreman (Noted on the Pre-Entry Check)

Table 2: Confined-Space Requirements

Category	Requirements	Classes			
		A	B	C	Notes
Training	This procedure	X	X	X	1
	Confined-Space Entry certification	X	X		2
	Confined-Space rescue (specific to work)	X			
	First Aid, CPR, AED	X	X	X	
Personnel	Rescue team	X	X	X	3
	Qualified gas tester	X	X	R	
Equipment	Respirator	X	X		
	Three-way gas detector	X	X	R	
	Safety harness	X	X		4
	Rescue equipment	X	X	X	3
	Safework Agreement (entry permit)	X	X	X	5
Documentation	Confined-Space Entry Checklist	X	X		
	Hazard assessment (as per procedure)	X	X		
	Confined-Space Entry – Worker and Equipment Tracking Sheet	X			
	Confined-Space Rescue Plan	X	X	X	6
	Material Safety Data Sheets (MSDS)	X	X	R	
	Process and instrument diagrams (P&IDs)	X			
	Equipment inspection records	X	X		
Work Activities	Purging	X			4, 7
	Isolating	X			4, 7
	Performing lockouts	X			4, 7
	Ventilating	X			4, 7
	Performing pre-entry cleaning	X			
	Testing and monitoring for gas, e.g., LEL, H ₂ S or Benzene	X	X		
	Filing records	X			

NOTES:

X – Required

R – Recommended

1 – Competence-based training for employees and review of procedure for contractors

2 – For Class B, entry certification required by Supervisor only

3 – Determined by the Confined-Space Rescue Plan

4 – For Class B, depending on the work being done

5 – Might not be needed for an employee entering a Class C space

6 – Generic plans acceptable for Class B and C

7 – For Class C, depending on the work being done



Confined-Space Atmosphere Testing and Monitoring

The company site supervisor must ensure that the confined-space atmosphere is tested and monitored, as specified on the Safework Agreement, for:

- the presence of:
 - flammable or explosive substances
 - any toxic substance, e.g., H₂S or Benzene
 - NORM, where these might exist
 - Oxygen content

Class A

For Class A spaces, the following tests must be performed and recorded on the Confined-Space Entry Checklist:

- initial (pre-entry) test completed 20 minutes, or less, before entry
- continuous monitoring or intermittent testing as specified on the Safework Agreement
- retesting if workers have vacated the space for more than 20 minutes, e.g., coffee and lunch breaks

Class B

For Class B spaces, the following tests must be performed and recorded on the Confined-Space Entry Checklist:

- initial (pre-entry) test completed before entry
- continuous monitoring or intermittent testing as specified on the Safework Agreement

Class C

For Class C spaces, tests as specified on the Safework Agreement

Planning the Rescue

Confined space rescue plans should be developed along with the activity plans and reviewed by all personnel associated to the confined space prior to any entry taking place. This will allow everyone time to coordinate support activities. Planning is usually led by the site supervisor, safety supervisor and the workers entering the confined space. Before entering or allowing entry into the confined space, the following will be completed where applicable:

1. Identify the type of confined space (use drawing where necessary)
2. Identify and discuss the hazards that could be encountered.
3. Identify selected workers and review assigned responsibilities
4. Verify training certification and competency/qualifications
5. Inventory the type, location and use of any emergency measures available
6. Inspect rescue equipment
7. Complete site specific rescue plan documentation

Entry With Out Respiratory Protection

Entry without respiratory protection may only proceed if:

- Contaminant amounts are below regulated occupational exposure limits;
- The oxygen content is between 19.5 and 23 percent by volume in air;

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***Refer to the Insider/HSE for the most current copy**



- Flammable vapors are constantly at 0 percent LEL;
- Hydrogen sulphide (H²S) levels are constantly at 0 ppm;
- NORM concentrations are below 200 Counts-Per-Minute. (cpm); and
- Benzene concentrations are below 0.5 ppm.

Ventilating

Enough ventilation should exist to:

- Provide secondary protection in case harmful substances are accidentally introduced;
- Remove contaminants that might be produced by work inside a confined space, e.g., by welding, cutting or coating; and
- Cool a confined space to improve working conditions.

Extreme heat can develop during welding and cutting operations in confined spaces. General exhaust ventilation at the minimum rate of 56.6 m³ (2,000 cubic feet) per minute per welding unit will control both the fumes and the heat developed during the process; however, weld quality can suffer with increased air movement. Depending on the circumstances, a small fan might be all that is needed to keep air moving. Also, welders should be equipped with special face shields that include supplied air when welding inside a confined space. Additional air or supplied air cooling might be needed to maintain desirable workplace temperatures for welding over extended periods.

Inerting a Confined Space

When the atmosphere inside a confined space is flooded with an inert gas an oxygen deficient atmosphere is created (e.g., nitrogen, to eliminate the hazard of a flammable vapour ignition inside the space). When work is to be carried out in a confined space flooded with an inert gas a specific Hazard Assessment and Entry Procedure should be completed, identifying the hazards and control methods. An infrared LEL monitor must be used for measuring explosive levels inside the confined space when entry is required within an oxygen deficient atmosphere as a minimum for work in inert confined spaces:

- Workers must be trained in the use of SCBA/SABA;
- Atmosphere tests must be taken to ensure the atmosphere remains inert; and
- All ignition sources must be controlled so they can not trigger a fire or explosion.

Retaining Records

Entry permits, air monitoring data, worker entry log and other related records for confined space entry into hazardous locations should be retained

- One year if no incident or unplanned event occurs or
- Three years if an incident or unplanned event has occurred.

Review

No one may enter a confined space until the site specific procedure and rescue plan in conjunction with this code of practice is completed and reviewed with the entire crew.

APPENDIX I

Introduction

A safety watch is a person (employee or contractor) assigned to a specific job to maintain a safe work environment. The safety watch:

- monitors the work site for changes in atmospheric or operating conditions
- monitors the overall safety aspects of a job, specifically the:
 - interactions between workers and equipment
 - interfaces between workers and groups of workers
- is competent to recognize an emergency and can initiate an emergency response for the work assigned. (The safety watch function might include a role in emergency response plans for the work).

Supporting the safety watch function, and often playing an initial role before critical work is done, is the company site supervisor. A company site supervisor is an employee or contractor assigned the responsibility by the company to supervise a particular job.

Critical work is work that falls in the medium – or higher-risk area of the Pengrowth Risk Assessment Matrix. Often, in critical work the number of tasks or conflicting activities on a work site, e.g., a turnaround or multiple tasks that overlap, increases the risk.

This subject addresses the roles, responsibilities, training and qualifications for the safety watch function in our company.

Regulations

Regulations related to the safety watch function include occupational health and safety regulations.

Levels of Safety Watch

Level A Safety Watch

A Level A safety watch is responsible for control of confined-space entry work and for monitoring critical work. Responsibilities include:

- monitoring the work environment as agreed to on the safework agreement
- maintaining a communication link with operations and other affected individuals
- recognizing and being alert to critical changes in the work environment and communicating with affected parties
- stopping work in imminent-danger situations
- initiating first-hour response in the event of an incident

For safety-watch requirements for confined space entries, see also Confined Spaces #COP-006

A Level A safety watch must have skills and experience in:

- gas detection of explosive, oxygen-deficient and toxic environments
- use and care of self-contained breathing apparatus (SCBA)
- standard first-aid (including CPR)
- basic firefighting
- confined-space entry
- confined-space rescue training as required for specific tasks, e.g., rescue team leader
- high-angle rescue as required for particular tasks or work sites

A Level A safety watch must have knowledge of:

- government regulations that apply
- Workplace Hazardous Materials Information System (WHMIS)
- communication equipment
- Safework Agreement
- isolation and lockout of equipment
- general emergency procedures
- site-specific alarms
- evacuation procedures
- confined-space entry procedure

Specific responsibilities and instructions for the Level A safety watch will be on the safework agreement.

Level B Safety Watch

A Level B safety watch (qualified gas-testing personnel) is responsible for ensuring that air quality is within acceptable limits. Responsibilities include:

- testing for explosive mixtures, oxygen-deficient atmospheres or toxic gases
- document gas-testing readings on safework agreement or Confined-Space Entry Checklist.
- where ongoing monitoring is required, doing the initial gas test before assigning (optional) the ongoing monitoring to a Level C safety watch
- ensuring gas detection and monitoring equipment is appropriate for the task, properly calibrated, function tested and in good working condition
- stopping work in imminent-danger situations
- initiating first-hour response in the event of an incident
- briefing the Level C safety watch on the initial gas-detection readings, ongoing monitoring instructions and response procedures

A Level B safety watch must have the skills and experience in:



- gas detection of explosive, oxygen-deficient and toxic environments
- use and care of SCBA
- standard first-aid (including CPR)
- confined-space entry
- basic firefighting

A Level B safety watch must have knowledge of WHMIS.

Specific responsibilities and instructions for the Level B safety watch will be on the safework agreement. Level B safety-watch activities may be combined with work execution, provided both safety-watch and job requirements can be met.

Level C Safety Watch

A Level C safety watch (gas monitoring and spark or equipment watch) is responsible for effectively:

- testing air quality for explosive mixtures, oxygen-deficient atmospheres or toxic gases
- monitoring:
 - air quality to ensure quality stays within predetermined limits
 - area for stray sparks
 - equipment movement in relation to company facilities, underground structures, overhead power lines, other equipment and workers

For confined-space entry, gas monitoring may only occur after qualified gas-testing personnel have completed initial gas testing.

- confirming that monitoring equipment is properly calibrated and in good working condition
- watching for stray sparks that might ignite flammable materials, e.g., grass, wood and hydrocarbons
- watching that equipment doesn't come near facilities, structures or utilities
- developing a response plan with the agreement issuer in the event that a detector or monitor alarms, e.g., shutting down work, evacuating area or reporting to operations

Specific responsibilities and instructions for the Level C safety watch will be on the safework agreement. Level C safety-watch activities may be combined with work execution, provided both safety-watch and job requirements can be met.

A Level C safety watch must have the skills and experience in:

- basic operation, care and use of required detection and monitoring equipment
- use of radio or other assigned communication equipment
- emergency first-aid (including CPR)
- basic firefighting

A Level C safety watch must have knowledge of WHMIS.

Specific responsibilities and instructions for the Level C safety watch will be on the safework agreement. Level C safety-watch activities may be combined with work execution, provided both safety-watch and job requirements can be met.



Other Safety Watches

Other safety watches (besides Levels A, B and C) are required for specific jobs that have unique hazards. Other safety watches must understand the work being done.

Work that might require other safety watches includes:

- Moving cranes, pickers or other equipment in tight spaces or in a restricted zone i.e., 7 m (23 feet) around power lines. (Safety watch might be the boom walker).
- Critical lifts. (Safety watch might be the rigger).
- Underwater work involving divers
- Ground disturbance including deep excavations. (Safety watch might be a Level 2 ground disturbance supervisor).
- High-angle work, e.g., working on communication towers and antennae
- Work where specialized rescue techniques could be required, e.g., elevators, collapsed structures, settling ponds, runoff ponds and oil-spill recovery
- Inspect and monitor breathing air equipment (Bottle Watch) during multi-confined space entries.

*****END*****

Additional References:

Pengrowth – COP # 011 H₂S and Hydrocarbon
Pengrowth – COP # 013 Isolation of Piping and Vessels
Pengrowth – COP # 015 Naturally Occurring Radioactive Material (NORM)
Pengrowth – COP # 022 Venting or Draining Hydrocarbon Liquids

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The information presented here is intended for general use and may not apply to every circumstance. It is not a definitive guide to government regulations and does not relieve persons using this information from their responsibilities under applicable legislation. Consult your local provincial legislation for further information.

**CONFINED SPACE PRE- JOB HAZARD ASSESSMENT CHECKLIST**

Consider and identify controls for these and other hazards that may be associated with the entry!

- ☐ Toxic atmosphere ☐ H₂S ☐ Carbon Monoxide ☐ Other _____
- ☐ Flammable gas/liquids, oil, condensate, produced water, gas; Sludge and scale deposits;
- ☐ Potential for spills, leaks or vapors escaping;
- ☐ Skin irritants and corrosive materials;
- ☐ Asphyxiate gasses, nitrogen, carbon dioxide, helium, methane, and ethane;
- ☐ Materials causing engulfment or entrapment, soils, beads, rings/saddles, other;
- ☐ NORM (normally occurring radioactive materials);
- ☐ Oxygen deficient atmospheres < 19.5 % O₂; or Oxygen enriched atmospheres > than 23% O₂;
- ☐ Contaminants above 50% Occupational Exposure Limits for chemical substances
Refer to Schedule 1, Table 2 of AOH&S Codes or similar provincial regulations
(Including, benzene, carbon monoxide, carbon dioxide, silica, etc.);
- ☐ Water pollution or uncontrolled introduction of steam, water, fluids or gas;
- ☐ Air pollution caused by work activities such as venting or flaring of hydrocarbons;
- ☐ Ignition sources from welding or other hot work activities;
- ☐ Ignition sources from static electricity or the use of non explosive equipment in a hazardous area
or frayed electrical cords;
- ☐ Ignition source from iron sulphide;
- ☐ Noise caused by venting, steaming or other work activities;
- ☐ Injury from energized or rotating equipment;
- ☐ Low lighting levels;
- ☐ Working at heights that could result in falls;
- ☐ Lifting and other work activities in restricted areas;
- ☐ Slippery or uneven surfaces, cords and hoses causing slipping and tripping hazards;
- ☐ Work and rescue hazards associated with internal structures, weirs, etc;
- ☐ Entrance and exits unrestricted, no tripping hazards, and vehicle parking;
- ☐ Traffic controls in place to prevent contamination of confined space from vehicle exhaust, vacuum
or tank truck vent hoses, and other sources;
- ☐ Hazards and MSDS for cleaning agents or other substances on site available and reviewed;
- ☐ Hot surfaces or work conditions; Confirm internal coating temperature restrictions;
- ☐ Hazards introduced by the work being conducted or adjacent work or operating; and equipment

Comments : _____ (Additional comments on reverse)



Confined-Space Daily Pre-Entry Check

Vessel Identification or Location _____ Date _____

Job Description (reason for entry) _____

Confined Space Classification ☐ A (High) ☐ B (Medium) ☐ C (Low)....Note: Pre-Entry Check not required

Items to Check	Yes	No	N/A	Checker's Name	Time	Acceptor
1. Has a safe work agreement/hazard assessment been conducted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
2. Has the equipment been isolated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
3. Has the equipment been locked-out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
4. Is ventilating equipment in place and operating?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
5. Is electrical equipment that's over 12 volts ground-fault protected?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
6. Has gas detection equipment been bump tested this shift and is operating?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
7. Is a self-contained breathing apparatus on site for: • each worker entering the c. space; • safety watch; and • back-up SCBA for emergency	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____ _____ _____	_____ _____ _____	_____ _____ _____
8. Are safety harnesses and lifelines prepared, and available for: • workers in confined spaces; • safety watch.	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	_____ _____	_____ _____	_____ _____
9. Has a system of communication been established and tested including: • two-way radios; • aerosol horn; • other _____	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____ _____ _____	_____ _____ _____	_____ _____ _____
10. Has a Safety Watch been designated? Name _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
11. Rescue Plan developed & reviewed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
12. Is the necessary emergency response equipment on location and ready?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____
13. Has initial gas test been done?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____

Initial Test Date/Time _____ Conducted by _____

LEL _____ H₂S _____ O₂ _____ Other _____

Contractor Representative (Print) _____ Signature _____ Date _____

Pengrowth Site Representative (Print) _____ Signature _____ Date _____

Site Safety Representative (Print) _____ Signature _____ Date _____

Authorized Entrants (Print)	Reason for entry
_____	_____
_____	_____
_____	_____
_____	_____



CONFINED SPACE ENTRY – DAILY WORKER TRACKING SHEET

Confined Space Location: _____

Date: _____

Vessel #: _____

Safety Watch: _____

Worker (Name)	Time in	Oxygen	LEL	H2S	Other (list) _____	Time Out	Running Total

All workers out of confined space and accounted for ☐

Close Out: Date: _____ Time: _____ Safety Watch _____



CONFINED SPACE ENTRY – DAILY EQUIPMENT TRACKING SHEET

Confined Space (Vessel): _____

Date: _____

Location: _____

Safety Watch: _____

Equipment (Description)	Date	Time In	Equipment Use	Time Out	Workers Initials

All equipment out of confined space and accounted for ☐

Close Out: Date: _____ Time: _____ Safety Watch _____



Confined Space Rescue Plan

Vessel Identification or Location: _____

Date: _____

Type of Work (circle) _____

Vessel

Tower

Tank

Other _____

Description of work

Drawings of Work Area Attached:

☐ Yes

☐ No

☐ Not required

If required, but not available, hand sketch the internals of the confined space on the last page of this tool.

Potential Emergencies: ☐ Fire or Explosion ☐ Falls ☐ Medical ☐ Leak ☐ Spills ☐ Other _____

Rescue Equipment: ☐ Body Harness ☐ Tripod ☐ Lifeline ☐ Stretcher ☐ SABA ☐ SCBA

☐ First-aid kits ☐ Fire extinguisher ☐ Gas-detection equipment ☐ Flashlights ☐ Retractable lanyard

☐ High angle rescue equipment ☐ Other (specify) _____

Communications Plans and Equipment

Between-Safety-Watch and Workers: ☐ Radio ☐ Horn ☐ Phone ☐ Other _____

Between-Safety-Watch and Rescue Team: ☐ Radio ☐ Horn ☐ Phone ☐ Other _____

Rescue Procedure Who will be involved in the rescue?

Position	Name	Method of Contact
Leader		
Member 1		
Member 2		
Member 3		
Member 4		

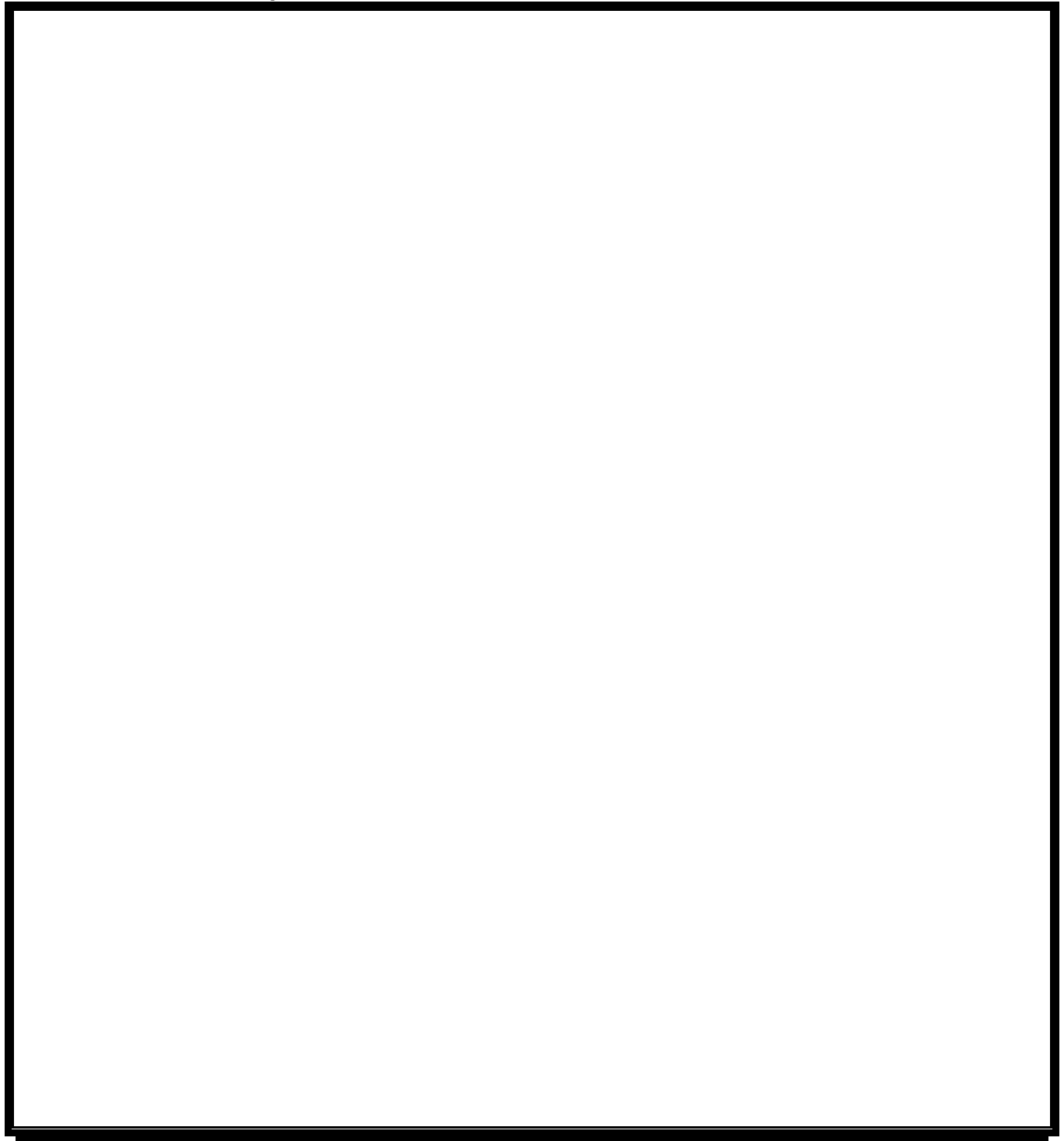
Evaluate:	Yes	No
Are workers listed as ERT personnel qualified and physically capable to perform this type of rescue? (See Qualifications for Safety Watch in COP-006)		
Have all workers been informed and understand that no one enters or exits the confined space without notifying the safety watch?		
Have all workers have been informed and understand that the safety watch must never enter the confined space to initiate a rescue, until another qualified rescue team member is present and rescue operations are activated?		
Have all workers been advised and agreed that if the gas detection equipment or other alarm sounds, they must immediately shut down all work and evacuate the confined space?		
Have all workers have been advised and agreed there will be no re-entry until the confined space is deemed safe for entry and all required permits have been reissued or resigned?		

If any question is answered "NO" – work can not proceed until the issue has been rectified.

Designated Muster Area: _____ Wind direction _____

What is the method of transporting an injured worker to a Medical facility?

Sketch of Confined Space



Plan Completed By: _____ Approved By: _____ Date: _____

Reviewed with all workers involved in the Confined Space Entry ☐ Yes



Confined Space Code of Practise Examination

Name: _____

Date: _____

- #1. The purpose of Pengrowth's confined space code of practise is to provide guidelines to be used when dealing with a confined space, that are approved by Pengrowth and known to meet all applicable rules and regulations.
True or False
- #2. A confined space may be entered if the following readings are displayed on the 4 gas testing equipment that is being used to check the atmosphere in the confined space: H₂S = 2 ppm, LEL = 18%, O₂ = 21.1% and CO = 3 ppm.
True or False
- #3. A Level "B" Safety Watch requires Confined Space Rescue Training.
True or False
- #4. A competent Rescue Team and Plan are required for all classes of Confined Spaces.
True or False
- #5. Benzene testing in the confined space is required by OH&S if workers are coming in contact with crude oil, condensate or asphaltines while in that confined space.
True or False
- #6. When should the Pre- job hazard assessment for a confined space job be completed?
a) *In the planning stage, before the job is executed.*
b) *During the tailgate meeting.*
c) *After the job is complete to finish the paperwork.*
d) *Never, it is only a guide.*
- #7. The expiration of a safe work agreement is considered to take place when:
a) *the scope of the work has changed.*
b) *a change in personnel has occurred.*
c) *a delay in the work has occurred.*
d) *all of the above.*
- #8. A Confined-Space Entry – Worker and Equipment Tracking Sheet is required for which class of confined space?
a) *Class B*
b) *Class C*
c) *Class A*
d) *All of the above*
- #9. How long must confined space records be kept on file?
a) *7 years*
b) *1 year*
c) *3 years if no unplanned incident occurs and 7 years if an incident occurs*
d) *1 years if no unplanned incident occurs and 3 years if an incident occurs*
- #10. Confined Spaces must be classified as one of the following: (Fill in the Blank)
a) Class _____ - A low hazard confined space
b) Class _____ - A medium hazard confined space
c) Class _____ - A high hazard confined space

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GROUND DISTURBANCE

Purpose: Pengrowth Corporation requires that all ground disturbance activities be carried out in a manner that ensures worker safety and avoids contact with pipelines or underground utilities. Extreme caution must be used at all times during ground disturbance activities.

A Ground Disturbance is defined as any work, operation or activity that results in a disturbance of the earth, including without limitation, excavating, digging, trenching, plowing, drilling, tunneling, auguring, back-filling, blasting, topsoil stripping, land leveling, peat removing, quarrying, clearing, grading and fencing.

It is not a ground disturbance if it can be proven that the ground disturbance is less than 30 cm and does not result in a reduction of the earth cover over the pipeline to a depth less than the cover provided when the pipeline was installed.

HAZARDS & CONTROLS

HAZARDS	HAZARD CONTROLS
Contact with underground pipelines or electrical and communication cables	Individuals selected to act as Ground Disturbance Supervisor must have sufficient experience and background to supervise Ground Disturbance activities
Hydrocarbon & Possible H2S Exposure	H2S awareness training and personal multi-head gas detector
Fire and Explosions	Hazard Assessment and Gas Detector
Personal Injury	Communication system; emergency response plans in place.
SPECIAL EQUIPMENT	N/A

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENT:

- Refer to Pengrowth Corporation Safety Handbook or as Hazards dictate.

RESPONSIBILITIES

Ground Disturbance Supervisor: The **Ground Disturbance Supervisor** is responsible for ensuring that all aspects of the ground disturbance work is carried out in a safe manner.

Individuals selected to act as Ground Disturbance Supervisor must have sufficient experience and background to supervise Ground Disturbance activities. They must be familiar with the provisions of this guideline and related ground disturbance procedures. It is a requirement that the supervisor receive formalized and specific training on supervising ground disturbances. E.g. Global Ground Disturbance Level II.

Specific responsibilities of the Ground Disturbance Supervisor include the following:

- Initiate the **Ground Disturbance Record** ensuring that it is complete, signed by all parties involved and on site before any excavation begins. The record will be kept in the project or pipeline repair Q / A file for a minimum of two years.
- Arrange for site survey using a reputable and competent line locating company to locate the underground facilities.
- Ensure that where searches and locates indicate no buried facilities within **5 m** of the proposed disturbance, the **Ground Disturbance Record** indicate that the checks have been made and the contractor is clear to proceed. (This record will be kept for a minimum two years)
- Completion of Safe Work Agreements.

Surveyors / Locators:

- The locator will electronically sweep the area using at a minimum, four separate grid patterns to ensure maximum detection capabilities.
- Markers for Pengrowth pipelines or other underground facilities shall be as follows:
 1. Spaced no more than **5 m** apart and extend to **30 m** beyond the work site. Where line follows a curve, decrease spacing to accurately show curvature.
 2. If the line crosses the proposed ground disturbance, mark with a cross at the intersection.
 3. Where a line parallels within **30 m** of a line, the line must be staked to show:
 - point of entry into search area
 - at points which clearly show alignment



- anywhere there is a tee intersection
- point of exit from search area
- increase mark frequency near bends or wherever locates are not definite.

Owners of Pipelines:

- Must, upon request, provide the person undertaking the ground disturbance any available information on their pipelines within **30 m** of the proposed ground disturbance.
- Must locate the pipeline and mark the surface position. In Alberta, this will be at no cost to the company creating the ground disturbance. The company creating the ground disturbance can do the locating and marking but, the owner must inspect his pipeline before commencement of the ground disturbance to ensure that the locating and marking has been properly carried out.
- Owner must carry out inspections that are necessary to ensure the continued safety of the pipeline (**See Crossing / Backfill Form**). This would mean as a minimum ensuring capable personnel are on site, terms of the crossing are understood and proper procedures in place for exposing and crossing the lines.
- A representative of the owner shall be present at the time of mechanical excavation within **5 m** of the buried facility, upon request by the person undertaking the ground disturbance.
- In Alberta, upon a notification, no less than 24 hours prior to back filling, the owner representative shall inspect the exposed pipelines and complete a written record of the inspection. The representative must have the experience and knowledge to assess the crossing. The record shall be retained for the life of the pipeline.
- The pipeline owner is responsible for reporting any damage of the pipelines to the government agencies. The work must be stopped until approval to recommence is given by the Owner. If approval can not be reasonably obtained from the permittee or licensee, then obtain approval from the appropriate Provincial authority.

GENERAL PROCEDURE

Record Search and Notification

A **Search** involves checking records for buried facilities within 30 meters of the proposed ground disturbance. It does not include a physical search of the affected area.

Notification is advising owners of foreign facilities within the search area that we will be creating a ground disturbance and requesting them to confirm location of their facility.

The Search and Notification could include:

- A search may be carried out by the Surveyor / Line Locator or other technical group with all facilities shown on a construction plan along with a search confirmation.
- Certificate of Title for freehold land or the Public Standing Report for Crown land will show all encumbrances on the land.
- Check ERCB (Alberta) "Pipeline Base Map" or other records for pipelines and co-op lines in search area. Normally done by the Surveyor / Line Locator or other technical groups.
- Check with area operating personnel, particularly in congested areas or older areas where records are suspect.
- During landowner notifications, check for any buried facilities they may be aware of.
- All facility owners within **30 m** of the proposed ground disturbance must be notified no more than 7 days or less than 2 days, excluding Saturdays, Sundays and holidays, before the ground disturbance, or as otherwise stipulated in the crossing agreement.
- Alberta or BC One-Call can be used for notification (**see Appendix 1**). Also, check One Call listing against owners noted by the search. Not all companies are registered with the first call system.

Pre-Disturbance

- A crossing agreement is required with the owner of any right-of-way or lease which will be affected by the ground disturbance.
- The approved crossing agreement must be on site prior to starting the ground disturbance. **Verbal notification is not acceptable.** For Pengrowth crossing Pengrowth facilities, the Ground Disturbance Record shall serve as the approval to cross.
- Proximity agreements may be utilized when working outside of the right of way but within the 30 meter controlled area.
- Often the terms of the agreement are more stringent than the regulations and should be reviewed. The most stringent terms of this guide, the regulations or the crossing agreement, shall be used.
- An area at least **30 m** around the proposed ground disturbance area must be electronically swept to determine whether buried facilities exist in this area.
- A second survey / line locate will be conducted in congested areas or when uncertainty exists in the accuracy of the first survey.
- Check for pipeline or utility markers and any other visible markers such as depressions or changes in the vegetation. On lease sites, consider cathodic protection beds, electrical, telephone cabling, sewer and water piping. Remember some utilities such as cabling can be plowed in and be invisible within days.

Disturbance

- All facilities within **5 m** of the proposed ground disturbance shall be hand exposed or use Hydro-Vac prior to using mechanical equipment within **5 m** of the located line.
- Do not operate any mechanical equipment within **60 cm** of a buried line or as stipulated in the crossing agreement, except under the direct on-site Ground Disturbance Supervisor or competent designate of the owner.
- Excavate by hand or use Hydro-Vac to a minimum depth of **30 cm** below normal excavation depth to ensure foreign facilities are not stacked on top of one another.
- Where the site is too congested to properly search and locate all facilities, a site specific procedure can be used where the entire perimeter of the ground disturbance is hand exposed or use Hydro-Vac to **30 cm** below the proposed excavation
- When ditching parallel to and within **5 m** of an existing facility, the existing facility must be exposed at least every **30 m** or wherever there is concern for proximity



(bends etc.), If a facility parallels closer than **3 m** a site specific work procedure must be prepared.

- If in doubt as to the number or location of lines in the area, Hydro-Vac across the entire right-of-way.
- Care must be exercised when using high pressure Hydro-Vac in proximity to fiberglass lines and fiber optic cables.
- Any damage to the foreign pipe or coating must be reported to the owner. Even very slight coating damage must be repaired.

Post-Disturbance

- A Pipeline Crossing / Backfill Inspection Report is to be completed for every crossing of a Pengrowth buried facility. **(Backfill Form)** This form will be kept on file for the life of the pipeline.
- Pipeline owner should inspect the crossings before and during burial. Provide at least 24 hours notice prior to backfill. A person does not commit an offense if he has made all reasonable efforts to procure the owners backfill inspection.
- Request copy of foreign owner's backfill report. If owner does not witness backfill or is unable to provide a report, document person who authorized backfill on the Pengrowth Backfill Inspection Record.
- Check if crossing agreement requires select backfill, cathodic test leads and note minimum line separation.



AREA (SITE) SPECIFICS

Irrigation Canals (E.g. Enchant Area)

Irrigation canals are facilities, and as such, owner of the canal must be notified if a ground disturbance is created within 30 meters. Before crossing, disturbing, or entering the right-of-way, an approval must be obtained from the Irrigation Authority.

Survey Expiry

Provincial One-Call programs use a two week period as a guideline for expiry of a locate survey. There may be situations where Pengrowth Corporation requires an extension of the survey timeline. This involves the need for control over the site. Control may be achieved by the following:

Continuous Site Work:

1. Regular daily construction activities (weekends and rain-out days included) direct control of the site is maintained by virtue of daily review to ensure that flags are staying up and that only planned construction related changes have occurred.
2. Documentation requirements are satisfied by our Safe Work Agreements and Ground Disturbance Records. In this case, construction may continue to job completion without further locates unless we see evidence that something may have been missed or changed.

Intermittent Site Work:

1. Maintain "control" over a site by conducting regular surveillance when construction on the site is intermittent. Documentation must be kept on file including the dates of surveillance, a statement that all conditions have remained the same since the locate, and the name (including signature) of the individual performing the check.
2. At a minimum, a photocopy of the locate sketch with the above information handwritten on. Photos would also provide strong evidence. In terms of what constitutes "regular surveillance". (Weekly visits would be a minimum)

*****END*****

ATTACHMENTS

Appendices 1, Provincial One-Call Systems
Ground Disturbance Record
Pipeline Crossing / Backfill Inspection Report



Appendix 1

PROVINCIAL ONE-CALL SYSTEM LISTINGS

The following provinces have a One-Call System that should be called whenever a ground disturbance is undertaken:

B.C. One-Call (Burnaby, BC)

Toll Free Number: 1-800-474-6886

Fax Notification: 604-451-0344

Notice Required: Two (3) full working days

Internet: www.bconecall.bc.ca

Alberta One-Call Corporation (Calgary, AB)

Toll Free Number: 1-800-242-3447

Fax Notification: 1-800-940-3447

Notice Required: Two (2) full working days

Internet: www.alberta1call.com

Saskatchewan One-Call

Toll Free Number: 1-866-828-4888

Fax Notification: 1-866-455-5559

Notice Required: Two (2) Full working days

Internet: www.sask1stcall.com

Manitoba One-Call

Manitoba currently does not have a One-Call System

ADDITIONAL REFERENCES:

Pengrowth – COP 011 H2S and Hydrocarbon

Pengrowth – COP 023 Working Safely – Near Power Lines

Pengrowth – COP 024 Working Alone

CONTENT CONTRIBUTORS: Safety Coordinators

DOCUMENT CUSTODIAN: Manager, Safety

REVISION # (2) January 16, 2010

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The information presented here is intended for general use and may not apply to every circumstance. It is not a definitive guide to government regulations and does not relieve persons using this information from their responsibilities under applicable legislation. Consult your local provincial legislation for further information.

Site Location: _____ Date Staked 1 st Survey: _____ Name: _____ One Call Confirmation #: _____	Project Activities: <input type="checkbox"/> New Installation <input type="checkbox"/> Tie-in/Re-entry <input type="checkbox"/> Repairs <input type="checkbox"/> Reclamation <input type="checkbox"/> Construction <input type="checkbox"/> Abandonment
-----------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Ground Disturbance Scope of Work: _____

RECORD SEARCH / NOTIFICATION

	YES	NO	N/A	Initials
1. Do you have a copy of the Construction Plan for the proposed ground disturbance area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
2. Do you have a copy of the Survey Sketch for the proposed ground disturbance area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
3. Have underground facilities been discussed with landowner?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
4. Do you have a line list, or crossing list?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
5. Do you have a copy on site of the crossing agreements for all foreign facilities within 5m of the dig area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
6. Did you adhere to crossing notifications requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
7. Did you contact local Pengrowth Corporation and foreign production offices and review scope of work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
8. Have all pipelines, power lines and utility lines been identified (for the dig area plus 30m)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
9. Has ground disturbance area been electronically swept for buried facilities? (Name: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
10. Is a second survey required? (Name : _____) of locator. Date: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
11. Has One Call System been notified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
12. In Alberta, have you referenced a copy of the ERCB Pipeline Base Map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
13. Did you reference a copy of the certificate of title for freehold land/Public Land Standing report for crown?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
14. Has ERCB been notified of proposed construction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
15. Has right of access to location been confirmed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____

PRE-DISTURBANCE

16. Has the surrounding area been checked for facility marker signs (ditches, crossing fence lines, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
17. Are all buried pipelines, power lines, cables and utilities identified on Survey Drawing and/or Sketch, and are they staked on the ground in proposed dig area plus 30m outside the dig area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
18. Are overhead power line and road crossing caution signs in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
19. Are there any signs of new ground disturbances within the working area? Such as vegetation color changes or growth, buildings, signs, in the proposed working area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
20. Are there any pipelines, power lines, cables or utilities cables being crossed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
21. Are all the conditions of the crossing agreements being met?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
22. Did you conduct a pre-job meeting with the foreman and equipment operator to discuss the scope of the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
23. Have pipeline isolation points been identified and tagged?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
24. Are Emergency Response plans and contacts in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____

DISTURBANCE

25. Have all underground facilities been hand exposed or Hydro-Vac used as per the company requirements, crossing agreements and regulations? (Those within 5 meters of excavation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
26. Have all equipment operators been notified that no mechanical excavation is permitted within _____ (min 60cm) of exposed pipe lines or utilities? (check crossing agreement for more stringent distance)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
27. Ground Disturbance Supervisor or competent designate (Name _____) required to be present when excavating lines. (Designate must have current Ground Disturbance Training)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
28. Is foreign owner of underground facilities required to be present when excavating or exposing lines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____

POST-DISTURBANCE

29. Has fencing or flagging been placed around excavations where required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____
30. Has a written backfill report been completed and signed by the owner for all pipeline crossings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	____/____

*** Note: If "NO" is checked off on any box, an explanation as to the reason why must be noted in the comments section below!**

THIS PERMIT MUST BE REISSUED IF THE GROUND DISTURBANCE SUPERVISOR CHANGES OR THE SCOPE OF THE WORK CHANGES.

COMMENTS: _____

CONTRACTOR SUPERVISOR: _____ Date: _____

GROUND DISTURBANCE SUPERVISOR: _____ Date: _____



Crossing Agreement Number: _____

IMPORTANT: PIPELINE MUST BE HAND EXPOSED BEFORE COMMENCING MECHANICAL EXCAVATION WITHIN 5 M OF LINE. PENGROWTH REPRESENTATIVE MUST BE PRESENT DURING BACKFILL.

The diagram illustrates the measurement of the thickness of a book cover. A ruler is placed against the cover, and the thickness is measured in centimeters. The measurement is labeled as "SURFACE" and "cm."

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FALL PROTECTION

Purpose: This fall protection Code of Practice is designed to provide guidance on fall hazards, prevention and protection to workers. This ensures that workers (other than emergency workers who are training or engaging rescue services) who may be exposed to fall hazards have been properly protected through hazard elimination and or control measures. The development of a task specific fall protection plan is also required when there is a potential to workers of falling a height of three meters or more where no guardrails are in place.

Regulations & Codes: Provincial legislation requires fall protection systems to be used for temporary and permanent work areas; 1.2 meters for a permanent and 3 meters for temporary structures. The minimum standards for use of fall protection are the same for BC, AB and SK. Requirement for the Fall Protection Plan may vary by jurisdiction consult your local provincial legislation for further details.

Hazards & Controls: Fall hazards can be of varying degrees and nature. The following list represents typical fall hazards identified in a hazard assessment however the list does not include every fall hazard that may be present. Examples of when fall protection may be required include:

HAZARDS	HAZARD CONTROLS
<ul style="list-style-type: none">Elevated work on platforms, aerial devices, man baskets	<ul style="list-style-type: none">5 point full body harness and shock absorbing or retractable lanyard
<ul style="list-style-type: none">Roofing, tank tops (tank roofs need to be UT performed and plywood laid out prior to accessing)	<ul style="list-style-type: none">Fall restraint system
<ul style="list-style-type: none">Open holes in floors or grating or exposed edges without adequate guard railing protection	<ul style="list-style-type: none">Fall restraint system
<ul style="list-style-type: none">Structural steel erection	<ul style="list-style-type: none">5 point full body harness and shock absorbing or retractable lanyard, orFall restraint system
<ul style="list-style-type: none">hazards below the work area (i.e. rebar, chemicals)	<ul style="list-style-type: none">Guard Rails or Fall restraint system

Personal Protective Equipment Requirements:

- Refer to Pengrowth Corporation Safety Handbook or as Hazards dictate.

Notes & Cautions: A proper and thorough hazard assessment, preplanning for each specific fall protection hazard must take place.



Fall Protection Education Basics: In order for a fall protection plan to be effective a worker must be competent; possessing knowledge on the basic fall protection gear including selection, inspection, use, care and maintenance of personal protective equipment and its related components. If a worker is not competent in these basics, further training is strongly recommended.

Site Specific Fall Protection Plan: A site specific fall protection plan must be developed and utilized for each unique fall hazard identified during the hazard assessment phase of work activities. This document provides basic information to anyone who is required to assess, use, maintain or issue fall protection equipment in conjunction with appropriate training to assist in making fall protection decisions.

The plan must specify:

1. the fall hazard for the work site and more specifically for the work activity.
2. protection system to be used.
3. procedure to assemble, maintain, inspect and use and disassemble the fall protection system.
4. rescue procedures to be used if a worker falls, and is suspended by a personal fall arrest system and needs to be rescued.

This plan must be available at the work location before work begins. See **attached** Fall Protection Planning Record template form to ensure fall protection requirements are met.

Legislation requires fall protection systems to be used for temporary and permanent work areas; 1.2 meters for a permanent and 3 meters for temporary structures. The minimum standards for use of fall protection are the same for BC, AB and SK. Consult your local provincial legislation for further details.

*****END*****

Additional References:

Content Contributors: Safety Coordinators

Document Custodian: Manager, Safety

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Printouts are Uncontrolled Copies

***Refer to the Insider/HSE for the most current copy**

Page 2 of 4



Site Specific Fall Protection Planning Record

Work activity location:	Work task(s):
Date(s) of Work:	
Name(s) of employees protected by this plan and authorized to execute the work task	
Name	Company
Competent person responsible for fall protection plan	Professional Engineer (if required) for system approval or engineered anchor points.
Print _____	Print _____
Sign _____	Sign _____
Date _____	Date _____

STEP 1: Assess the Fall Hazard

- ☐ Greater than 3 meters/10 feet ☐ Landing Hazard
☐ Greater than 7.5 M 25 ft BC

(Check only items applicable)

<input type="checkbox"/> Open Sides: <input type="checkbox"/> Floors or Platforms <input type="checkbox"/> Stairs <input type="checkbox"/> Catwalks <input type="checkbox"/> Scaffolds <input type="checkbox"/> Unguarded machinery	
<input type="checkbox"/> Wall Openings: (specify)	
<input type="checkbox"/> Floor Openings: <input type="checkbox"/> Hatchway <input type="checkbox"/> Manhole <input type="checkbox"/> Excavation <input type="checkbox"/> Tank <input type="checkbox"/> Shaft <input type="checkbox"/> Skylight	
<input type="checkbox"/> Leaving the guarded floor surface of a <input type="checkbox"/> Manlift (any type) <input type="checkbox"/> Scaffold <input type="checkbox"/> Catwalk <input type="checkbox"/> Platform	
<input type="checkbox"/> Working from inside a properly guarded man-lift: (Scissor, Boom, Bucket, Articulating)	
<input type="checkbox"/> Working from a Suspended Platform: ↑	<input type="checkbox"/> Catwalk <input type="checkbox"/> Man basket <input type="checkbox"/> Swing Stage <input type="checkbox"/> Boatswain's Chair <input type="checkbox"/> Appropriate Harness
<input type="checkbox"/> Fixed Ladder: <input type="checkbox"/> Working with Both Hands	
<input type="checkbox"/> Portable Ladder: <input type="checkbox"/> Working with Both Hands	
<input type="checkbox"/> Working on Steeply Sloping Roofs or Surfaces (> 4:12 pitch)	
<input type="checkbox"/> Structural Erection and Climbing: (Bridges, Roof Truss, Towers, Drilling Rigs, Pile Drivers)	
<input type="checkbox"/> Activities Where a Fall Arrest System is NOT Practicable: ↑ Describe in detail:	



STEP 2: Select a Fall Protection System (Check fall protection to be used)

<input type="checkbox"/> Eliminate the Hazard or the Reason for Being There
<input type="checkbox"/> Traditional Fall Protection: (Guardrails/Ladder Cages/Slide Guards)
<input type="checkbox"/> Floor/Hole/Hatch Cover: (Secured in Place, Marked)
<input type="checkbox"/> Fall Restraint System: (Harness/Belt, Lanyard/Lifeline & Anchorage)
<input type="checkbox"/> Fall Arrest System: <input type="checkbox"/> Direct Coupled to Anchor (Lanyard) <input type="checkbox"/> Ladder Climbing System <input type="checkbox"/> Vertical Lifeline System <input type="checkbox"/> Self Retracting Lifeline System <input type="checkbox"/> Horizontal Rigid Rail System <input type="checkbox"/> Safety Net <input type="checkbox"/> Permanent Horizontal Lifeline System <input type="checkbox"/> Temp. Horizontal Lifeline System
Fall Protection Plan: (specify instructions)

STEP 3: Select & Record Details of the Fall Protection System (check all applicable controls)

<input type="checkbox"/> Guardrails: 1.07m (42") high <input type="checkbox"/> Ladder Cages:
<input type="checkbox"/> Floor/Hole Hatch covers: (2 x Heaviest Worker, Vehicle or other Load, or Minimum 200 lbs.)
<input type="checkbox"/> Slide Guards:
<input type="checkbox"/> Select Anchorage: <input type="checkbox"/> > 5000 lbs. (specify) _____ <input type="checkbox"/> > 800 lbs. (specify) _____ Travel Restraint ONLY <input type="checkbox"/> Certified by Professional Engineer (name) _____
<input type="checkbox"/> Body Support: <input type="checkbox"/> Full Body Harness, Dorsal Attachment to the Fall Arrest System <input type="checkbox"/> Waist Belt (<i>only for ladder climbing/work positioning systems</i>)
<input type="checkbox"/> Estimate Required Clearance calculation: (____ ft. LL*)+(____ ft. EAD*)+(____ ft. HD*)+(3 ft. SF*) = ____ ft. *Lanyard Length + Energy Absorber Deployment + Height of D-ring + Safety Factor of 3 ft.
<input type="checkbox"/> Measure Available Clearance: ____ ft. <input type="checkbox"/> Exceeds estimated clearance requirement (Safe) <input type="checkbox"/> Less than estimated clearance requirement (precautions) _____
<input type="checkbox"/> Fall Protection Plan: <input type="checkbox"/> Written Work Procedures Posted (Available at the Worksite) <input type="checkbox"/> Controlled Access Zone Defined by: <input type="checkbox"/> Warning Line System <input type="checkbox"/> Other: _____ Safety Watch: _____
<input type="checkbox"/> Rescue & Emergency Provisions: <input type="checkbox"/> Communication system/number _____ <input type="checkbox"/> Ladder <input type="checkbox"/> High angle rescue <input type="checkbox"/> Aerial Lift <input type="checkbox"/> Man basket <input type="checkbox"/> Other Emergency Egress System or Plan: (Details of Equipment/Procedures/Personnel on-site) _____ _____

STEP 4: Qualifications/Inspections/Approvals

<input type="checkbox"/> Inspect all equipment and systems prior to each use	<input type="checkbox"/> All personnel trained and briefed
<input type="checkbox"/> Selected/approved or installed by a competent person	<input type="checkbox"/> Designed or approved by a P. Eng.

COP- 014	CODE OF PRACTICE	Rev # (2) – January 2010
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LOCK OUT / TAG OUT

Purpose: The purpose of this Code of Practice is to manage and control hazardous energy sources during service or maintenance work while complying with various OH&S Regulations and Codes.

Following this Code of Practice and the development of site specific “Lock-out / Tag-out” procedures, will protect workers from injury resulting from the unexpected start-up of equipment or machinery or from the sudden release of stored energy

Regulations and Codes: OH&S Regulations require the use of “Personal Locks” in order to place responsibility on individuals involved in lock-outs. There-by reducing the likelihood of energy isolation devices being inadvertently unlocked by others not directly involved in the work.

Definitions:

“Lock-out” means the use of a lock or locks to render machinery or equipment inoperable or to isolate an energy course in accordance with a written procedure.

“Personal lock” means a lock for the use by a worker to ensure personal lockout protection such that each lock when applied is operable only by a key in the workers possession, and by a key under the control of the Foremen or Supervisor in charge.

“Lock-out Boxes or Boards” are designated stations equipped with Locks, Chains, Tags, Flagging & Lock-out Sheets.

“Lock-out sheets or Check-lists” Detailed lockout sheets / check lists are developed and placed on the lock-out box of larger equipment. Smaller equipment lock-outs will require a sheet be made up as needed. **(Completed sheets forwarded to field administrators for filing 3 years minimum)**

“Key Securing Device” consists of a small lock box / cabinet or the lock box itself, used to control access to the “Master Key(s).



Pre-Job Site Hazard Assessment (SHA): Workers involved in the Lock-out must participate in a documented SHA. This may be the completion of a Safe-work Agreement, Work Order or SHA short form.

Workers are to identify all sources of energy to be isolated before work begins. Upon completion of the SHA, affected workers will have an increased awareness of equipment isolation requirements. Workers will be able to identify the various types of hazardous energy, to isolate equipment, and to safely lock-out and tag-out applicable equipment.

Important: More than one energy source (Electrical, Mechanical, or Hydraulic etc.) may be present.

TYPICAL HAZARDS AND CONTROLS:

HAZARDS	HAZARD CONTROLS
Hazardous Energy Sources (i.e. stored pressure, mechanical, hydraulic)	Double Block & Bleed, Blinding, Lock-out + Tag-out systems
Unexpected start-up or movement of equipment	Lock-out of starting air, starting motors, main breakers and Local On-Off switches
Spills/Splashes of Chemicals	Use of appropriate PPE while Depressurizing / Draining & Containing all liquids.
Electrocution	Lock-out main breaker and local on-off switches
Hydrocarbon & Possible H2S Exposure	H2S awareness training and personal multi-head gas detector.
Fire and Explosions	Pre-Job Hazard Assessment and Gas Detector
Line of Fire	Pre-Job Hazard Assessment and Body Positioning
SPECIAL EQUIPMENT	Lock-out Box or Board equipped with Locks, Chains or Cables, Tags, Flagging & Lock-out Sheets
	Key Securing Device for "Master Key(s)" May consist of a small lock box / cabinet or the lock box itself.
	Lock-out Sheet / Check list, attached to lockout box Dated and signed by Operations, Maintenance and/or Contractors.
	Colored Group Locks assigned to controlled number of Work-Group or Trade Representatives
	Non Colored Locks are keyed alike, located inside equipment lockout boxes and placed on equipment
	Personal locks which are traceable to the installer by a unique marking or an attachable ID tag.



Lock Definition:

Colored Group Locks - are keyed alike and assigned to a controlled number of Trade or Department Representatives. Example: White for Operations, Black for Mechanics or Pink for Shut Downs etc.

Non Colored Isolation Locks – are keyed alike, located inside equipment lockout boxes or on boards and placed to isolate equipment.

Personal locks – key is unique to individual and traceable to the installer by a unique marking or an attachable ID tag. All Trades and Contractors will have personal locks.

Additional Requirements:

Notify affected workers and contactors: Other workers or contactors in the area, which may be affected by the shutdown or isolation of the energy source, must be notified of the worker's intentions to use lockout/tagout procedures.

Shut down the equipment or machinery: Determine which equipment is to be taken out of service and shut down the equipment using normal procedures (e.g. depress stop button, open toggle switch, etc) When the equipment has completely stopped, isolate the energy sources. This may involve turning off electrical power, blocking movable parts, venting trapped vapor pressure, bleeding hydraulic lines, or releasing spring tension energy.

Attach locks: Attach locks to all energy sources (e.g. breaker, switchboxes, valves, and controls) along with instructions on how the worker can be contacted if necessary. Multi-lock devices (i.e. Multi-lock holders, chains, cables, bars) are acceptable to use provided they are applied in a manner that effectively renders the locked equipment inoperative.

Tags: Tags are to be placed on main breakers and local start/stop switches. Tags are never to be used as a stand alone substitution in lieu of the lockout & tag-out combination. The minimum information required on the completed tag includes the full, legible, printed name & signature of the person who performed the lockout, the date, and reason for the lockout, preferably all written in indelible ink pen.

Test equipment: Test the equipment's local start/stop switch or other appropriate means to verify that it has been correctly isolated.

(Note: The following steps are general in scope. Site Specific Critical Procedures for Lockout / Tag-out may be required)

General Procedure: (Securing by individual workers)

- Worker involved must attach his / her own personal lock to the energy isolating device(s) and retain their key.
- Worker who has placed a lock is also responsible for verifying that the energy source has been effectively isolated.

Printouts are Uncontrolled Copies

***Refer to the Insider/HSE for the most current copy**



- A “Lock-out Sheet / Check list” will then be completed. (Dated, Initialed and signed by worker involved).
- “Do Not Operate” or similar tags will be placed on main breakers and start/stop switches as required. Insuring to Date & Sign Tags!
- Worker is responsible for the unlocking and re- energizing of the equipment. (*Refer to “Placing equipment back into safe operation”!*)

General Procedure: (Securing by a group)

- First designated worker (in most cases Operations Personnel) – is responsible for de-energizing and properly locking out the equipment. This authorized individual will lock the equipment with a isolation lock attached to each of the energy isolating devices. He/She must then secure the isolation lock key(s) into a Key Securing Device, Lock Box or equivalent.
- Operator will place his/her Dept. Lock onto the Key Securing Device.
- A “Lock-out Sheet / Check list” will then be completed and attached to. The Lockout Box. (Dated, Initialed and signed by Operations, Maintenance and/or Contractors involved.)
- “Do Not Operate” or similar tags will be placed on main breakers and start/stop switches as required. Insuring to Date & Sign Tags!
- Contractor or Maintenance Dept. representative (Designated Worker with Personal Lock) will be walked through the lockout with operations verifying the lockout and signing off the Lockout Sheet. Then place his/her personal lock onto the “Key Securing Device” and retain their key.
- All workers directly involved in the particular lock-out will attach their personal lock to the Key Securing Device and sign onto the lock-out sheet. (It is highly recommend that a workers supervisor have secured spare keys for each workers personal locks on-site)
- Last designated worker (in most cases Operations Personnel) – is responsible for the unlocking and re- energizing of the equipment.
(*Refer to “Placing equipment back into safe operation”*)

Note: If a worker transfers authority for an area, facility, or work location to another worker; the locking and tagging devices must also be transferred.

Procedures must be implemented for shift or personnel changes, including the orderly transfer of control of locked out energy devices between outgoing and incoming workers.

General Procedure: (Securing by complex group control)

Complex Group Lock-out procedures must be approved by Pengrowth Safety Dept. as well as applicable OH&S regulators. – See Shutdown Complex Group Lockout Procedure

Removing Worker Lock(s): Worker’s Supervisor or designate, may remove a worker’s locks & Tagging devices if **all** of the following conditions apply:



- a) The worker is unavailable to remove the locking device when it is necessary to restart or function test the equipment.
- b) Reasonable attempts have been made to contact the worker.
- c) All affected personal have been notified.
- d) The lock-out sheet has been checked and the equipment is safe to operate
- e) Placing equipment back into safe operation steps have been followed.

Note: In an emergency (business need) where the original person is not available and spare key is not located, a competent worker designated by the Foreman or Supervisor may remove the workers lock.

(Bolt cutters may be used on these occasions)

Placing Equipment Back into Safe Operation:

- Thoroughly inspect the work area and notify all effected workers.
- Remove loose or stray tools and parts, replacing missing equipment guard(s), and ensure all workers are advised of the intent to re-activate equipment and that they are in the clear.
- Only the worker that attached the personal lock and tag may remove the lock(s). In case of an emergency or original worker is not readily available, then the site supervisor or designate may assign a competent worker to ensure safety prior to re-activation and remove another workers lock and tag, as described in the removing locks section..
- Remove all locking and tagging devices.
- Restore energy to the equipment and return it to normal operations. Re-check the equipment to ensure it is operating properly and safely.

END:

ADDITIONAL REFERENCES:

Pengrowth – COP #011 H2S and Hydrocarbon

Pengrowth – COP #022 Venting or Draining Hydrocarbon Liquids

Pengrowth – COP #013 Isolation of Piping and Vessels

CONTENT CONTRIBUTORS: Safety Coordinator

DOCUMENT CUSTODIAN: Manager, Safety

REVISION # (2) DATE: January 2010

ORIGINAL ISSUE DATE: January 17, 2008

The information presented here is intended for general use and may not apply to every circumstance. It is not a definitive guide to government regulations and does not relieve persons using this information from their responsibilities under applicable legislation. Consult your local provincial legislation for further information.

8th Floor Labour Building
10808 - 99 Avenue
EDMONTON, Alberta, Canada T5K 0G5
Telephone (780) 427 2687 Fax (780) 422 0014
www.worksafely.org

October 26, 2007

Mr. Phil Goldsney
Pengrowth Corp
2900-240-4 Ave. SW
Calgary, AB T2P 4H4

Dear Mr. Goldsney:

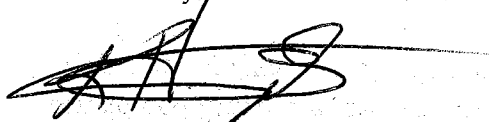
This is further to your application for approval of a complex group hazardous energy control process as required by Section 215.1(1) of the Occupational Health and Safety (OHS) Code 2006.

Your document **Pengrowth Shutdown Complex Group Lockout Procedure** (as of September 25, 2007) has been reviewed against the criteria listed in section 215.1(3) of the OHS Code as have the hazard assessment documents you submitted. It is considered that these meet the requirements of section 215.1 of the OHS Code. Consequently, your application is approved subject to the following:

- (a) any significant changes to the **Lockout Procedure** will require a new approval;
- (b) this approval remains in effect until it is rescinded or legislative changes make it unnecessary; and
- (c) this approval must be communicated to workers who may be affected by it.

As we discussed this approval does NOT include Pengrowth's Olds facility where a separate application would be required.

Yours truly,



Kenn Hample, P. Eng.
Designated a Director of Inspection



PENGROWTH SHUTDOWN COMPLEX GROUP LOCKOUT PROCEDURE

Objective: To Manage and Control Hazardous Energy in order to Protect Workers while Complying with AB. OH&S Code Part 15, Complex Group Control.

This procedure will safely ensure clear, concise communication between all work groups before, during, and after the plant shutdown inclusive of any tasks as well as steel inspections .i.e. meter run isolation, valve removal for servicing etc.

Note: Section 215.1(3) b (ii) of the Code allows for designated workers (Group Leads or Representatives) to place locks and sign on/off of permits for crews or teams of workers.

Hazards & Controls: (See Completed Hazard Assessment Sheets Attached.)

Group / Departmental Colored Locks:

- There will be 6 main workgroup locks used. They are; PINK for shutdown, WHITE for Operations, BLUE for Pipe-shop, YELLOW for Electrical, GREEN for Instrumentation, and BLACK for Maintenance.

Personal Locks:

- Personal locks shall be traceable to the installer/group leader by a unique marking or an attachable ID tag.
- Key for locks are unique to the individual

Designated Worker Qualifications & Accountability:

- Only a limited number of qualified and competent individuals within a work group or department are allowed keys for the group's colored locks. These workers are trained and their competence verified before being given a group key.

Operations Sponsor:

- Experienced Senior Operator
- Thoroughly familiar with affected processes, procedures & equipment
- Adept in the Pengrowth Hazard Assessment & Control Systems
- Knowledgeable in all plant emergency equipment & procedures

Shut-Down Coordinator:

- Experienced Senior Projects Coordinator
- Knowledgeable in all of Pengrowth Corporations HSE Systems
- Adept in Emergency Response planning and execution.



Contractor Representative / Lead:

- Experienced and competent Lead / Foremen
- Knowledgeable in Pengrowth HSE Requirements
- Adept in Emergency Response planning and execution.

Procedure:

- Operations will be responsible for the isolation, draining, de-pressuring, and locking out of the plant. All locks used will be the PINK shutdown locks.
- Operations Sponsor will apply an operations lock to the lock out box securing the key for the pink locks. (Signing onto the Lock-out sheet)
- Pengrowth Shutdown Coordinator for each site will verify the effectiveness of the isolation and apply their lock to the lockout box that is securing the key for the pink locks. (Signing onto the Lock-out Sheet)
- A Contractor Representative / Lead will be walked through each specific area with operations visually verifying the lockout. (Signing onto the Lock-out Sheet)
- Each Contractor Representative / Lead will apply their personal lock on the lockout box that is securing the key for the pink locks. (All workers represented by the Contractor Lead will sign on and off of the lock-out sheet)
- Day shift to remove their lock and Night shift will install their lock at the end of each shift that is securing the key for the pink locks. (Lock-out sheet signatures will be amended as required)
- For all separate jobs unrelated to the steel inspection and plant lockout, there will be a separate lockout sheet completed for that specific task. The work groups directly involved in the specific job will sign off the lockout sheet (i.e., mech., contractor ,ops) and that sheet will be attached to the main lockout box in that area with the appropriate lock. Once the job has been completed, the work group affected will sign off the sheet as work completed and remove their lock. This lockout sheet will remain with the lockout box until plant start up and the operations rep in the area will then remove the locks for all jobs and sign off each lockout sheet. (There may be several sheets in certain areas).
- All PSV servicing and removal requiring lockouts, will be done with the PINK shutdown locks and verified with the appropriate work group involved. The operations contact for the psv servicing will have a separate lockout sheet for all psv's.
- Any work to a piece of equipment not related to the shutdown, the normal lockout procedure will apply and use "local" lockout sheets and boxes.



Deviation from Procedure:

- During the shutdown, any deviation to the lock-outs, or procedure will require approval from the Shutdown Co-coordinator, the Operations Sponsor in the area affected and the work group directly involved.
- Note: Each worker involved in the lock-out must be allowed the option of placing their personal lock on to the key securing device and verifying effective isolation.
215.1(4)

Removing Workers Lock(s):

Worker's Supervisor or designate, may remove a worker's locks & Tagging devices if **all** of the following conditions apply:

- a) The worker is unavailable to remove the locking device when it is necessary to restart or function test the equipment.
- b) Reasonable attempts have been made to contact the worker.
- c) All affected personal have been notified.
- d) The lock-out sheet has been checked and the equipment is safe to operate
- e) Placing equipment back in into safe operation steps have been followed.

Note: If a worker transfers authority for an area, facility, or work location to another worker; the locking and tagging devices must also be transferred.

Placing Equipment Back into Safe Operation:

- Thoroughly inspect the work area and notify all effected workers.
- Remove stray tools and parts, replacing missing equipment guards(s), and ensure all workers are advised of the intent to re-activate equipment and that they are in the clear.
- Only the worker that attached the lock and tag may remove. In case of emergency or original worker is not readily available, then the site supervisor or designate may assign a competent worker to ensure safety prior to re-activation and remove another workers lock and tag, as described above.
- Remove all locking and tagging devices.
- Restore energy to the equipment and return it to normal operations. Re-check the equipment to ensure it is operating properly and safely.

Note:

This procedure will be reviewed by all affected workers before work begins!
(All workers directly affected with the lock-out will sign on & off of the lock-out sheet)

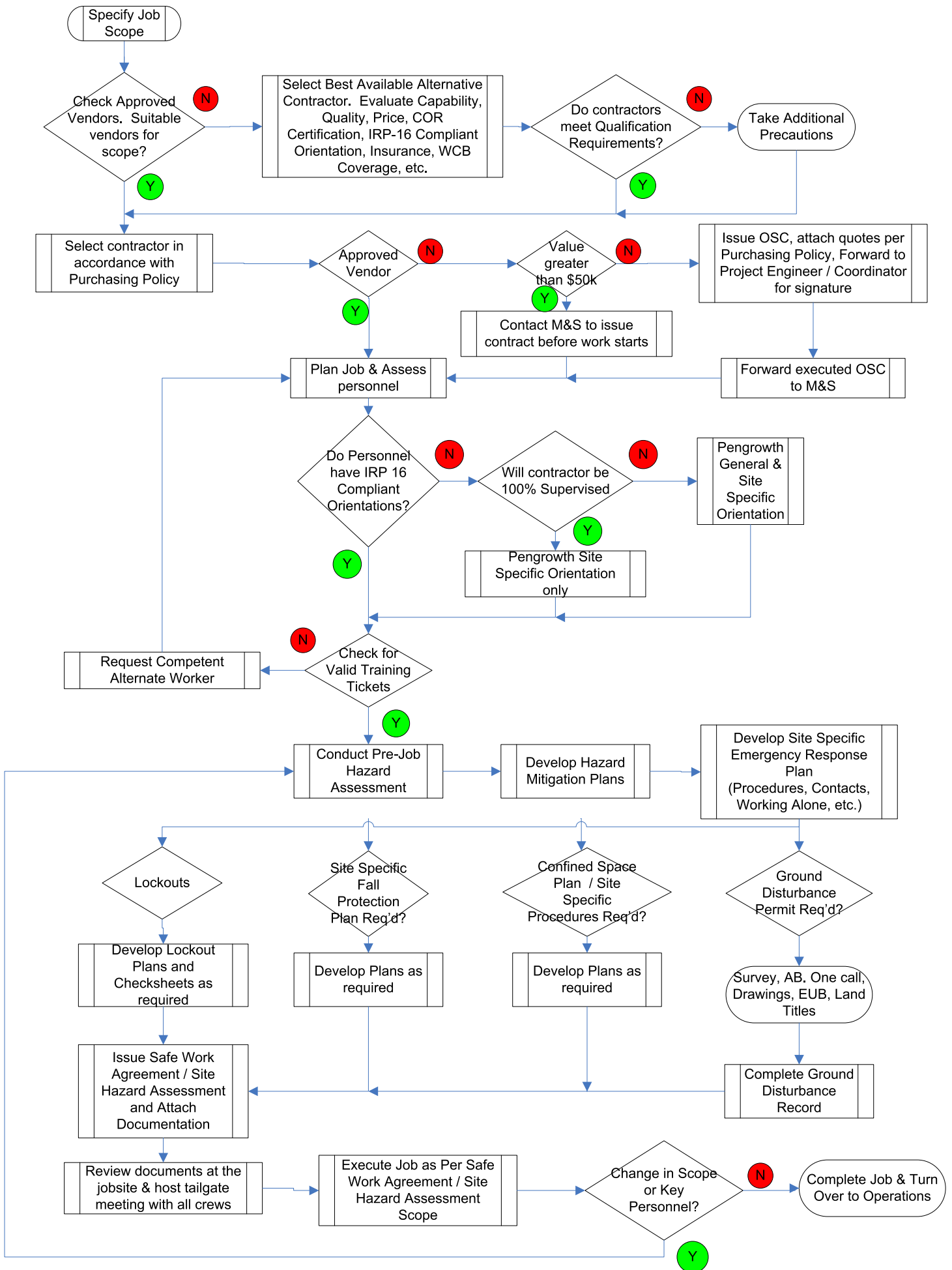


Hazard Assessment

HAZARDS	HAZARD CONTROLS
Hazardous Energy Sources (i.e. stored pressure, mechanical, hydraulic)	Double Block & Bleed, Blinding, Lock-out + Tag-out systems
Unexpected start-up or movement of equipment	Lock-out of starting air, starting motors, main breakers and On-Off switches
Spills/Splashes of Chemicals	Use of appropriate PPE while Depressurizing / Draining & Containing all liquids.
Electrocution	Lock-out main breaker and local on-off switches
Hydrocarbon & Possible H2S Exposure	H2S awareness training and personal multi-head gas detector.
Fire and Explosions	Hazard Assessment and Gas Detector
Personal Injury	Emergency Response Plans in place.
SPECIAL EQUIPMENT	Main Lock-out or “S/D Box” equipped with Locks, Chains, Tags, Flagging & Lock-out Sheets
	Key Securing Device for “Master Key(s)” May consist of a small lock box or cabinet on the side of the main S/D box. Or the lock box itself.
	Colored Group Locks assigned to controlled number of Work-Group / Trade Representatives
	Personal locks which are traceable to the installer/group leader by a unique marking or an attachable ID tag.
	Function Tested and Calibrated Gas Detectors or Personal Monitors

Note: All of the above identified hazards have been deemed to be in the Black or High on the Pengrowth Corp. Risk Assessment Framework.

PENGROWTH JOB EXECUTION



Site Supervision Job Execution Requirements Checklist

Commercial Requirements:

1. Inform contractors that all invoices shall be directed to the attention of the Pengrowth Engineer/Coordinator (not the engineering consultant).
2. Inform contractors that the correct job name must be shown on all correspondence, tickets and invoices.
3. Inform contractors that the correct AFE/Cost Centre coding must be shown on all invoices and tickets.
4. All contractor tickets must be signed by the Site Supervisor prior to invoice submission
5. Advise contractors to submit invoices through ADP "Open Invoice" digital invoicing application if possible for that contractor.
6. Site Supervisor shall maintain and submit daily reports complete with estimated daily cost commitments on a form provided by Pengrowth.
7. Comply with the requirements of Pengrowth's Purchasing Policy.
8. Retain contract services as directed by Project Engineers / Coordinators in accordance with the Purchasing Policy. Where an Oilfield Services Contract (OSC) is required by the Purchasing Policy, fill out the OSC and forward to the Project Engineer / Coordinator for signature.

Technical (Facilities Specific) Requirements:

9. Verify engineering documents have Quality Assurance numbers. Remind the Project Engineer / Coordinator if no QA number is shown.
10. Site Supervisor is responsible for receiving the Quality Control file from the Contractor and submitting to the Pengrowth Project Engineer/Coordinator in a timely fashion. Don't sign final tickets until the QC file is turned over.
11. New Vessel/PSV/Tank Inspection Reports must be submitted promptly after installation to the Project Engineer/ Coordinator (who will forward to the Asset Integrity group). These forms must be completed for ALL new installations of pressure vessels, PSVs and tanks.
12. MT's (material & equipment transfer forms) for surplus equipment transfers must be submitted promptly to the Project Engineer (who will forward as required).
13. When exposing and inspecting underground facilities, Pengrowth inspection forms must be completed and forwarded to the Project Engineer / Coordinator (who will forward to Asset Integrity personnel).
14. Understand the basics of Pengrowth's Facility Projects Coordination Manual (FPCM) including the 5 phases of project development. Request copies of relevant FPCM documentation for each project, especially the Project Execution Plan (PEP), pre-construction checklist, pre-commissioning checklist and start-up review / turnover documentation. Maintain a construction file in Pengrowth's standard format, which shall be incorporated into the final project file. Complete all required checklists & include in the file.



Construction File Contents

The following information should be returned to the Project Engineer/Coordinator at the close of each job. This information should be kept separate from the quality control files. All other information within your field construction file will already be contained within the project file and duplicates may be destroyed.

- Safe work agreements only if there was an incident on the job
- Safety tickets and proof of orientation for workers on job only if there was an incident
- Anything to do with ground disturbance (ground disturbance record, one call acknowledgements, line locate sketches, backfill inspection reports, photos of exposed lines for crossings or of any other lines that have been exposed, forms from the POMM for suspension of lines and from inspection of lines)
- Red line mark ups of drawings if there are significant changes from original design
- Appropriate confined space entry documentation which is only required for Class A confined spaces
- GPS coordinates for underground connections or any other important underground facilities
- Any written correspondence from third parties who gave us approval to backfill without having a representative on site



Daily Construction/Cost Report AFE Data Sheet

Major CC	Minor CC	Description	AFE Budget Amount	Actuals	To-date	Budget Remaining
9600	647	TANKS	20,000.00	19,000.00	0.00	0.00
9600	660	OVERHEAD			0.00	0.00
9610	646	COMPRESSORS & PUMPS			0.00	0.00
9610	647	DEHYDRATORS & SEPARATORS			0.00	0.00
9610	648	PRESSURE VESSELS			0.00	0.00
9610	650	MOTORS / ENGINES			0.00	0.00
9610	660	OVERHEAD			0.00	0.00
9610	662	CONSTRUCTION SUPERVISION			0.00	0.00
9620	602	SITE PREPARATION-LICENSES/PERMITS/SURVEY			19,000.00	1,000.00
9620	603	LEASE AND ROAD CONSTRUCTION			0.00	0.00
9620	620	EQUIPMENT RENTAL			0.00	0.00
9620	630	TESTING AND ANALYSIS			0.00	0.00
9620	644	PIPES, VALVES, FITTINGS			0.00	0.00
9620	645	INSTRUMENTATION/ ELECTRICAL / METERING			0.00	0.00
9620	649	MISCELLANEOUS			0.00	0.00
9620	660	OVERHEAD	0.00		0.00	
9620	661	HEAD OFFICE / ENGINEERING	0.00		0.00	
9620	662	CONSTRUCTION SUPERVISION	0.00		0.00	
9620	665	NON OPERATED CHARGES	0.00		0.00	
9620	666	COMPANY LABOUR	0.00		0.00	
9620	667	CONTRACT LABOUR	100,000.00		0.00	100,000.00
					0.00	0.00
Totals			\$120,000.00	\$19,000.00	\$19,000.00	\$101,000.00



AFE: **EPC Project Engineer:**

% Complete

Activity Summary

Daily Total Cost:	\$0.00
Cumulative Cost To-Date: (including actuals)	\$19,000.00
Remaining Budget:	\$101,000.00

Weather

Problems/Concerns/Discussions with Land Owners or Third Parties

[illegible]



Pengrowth Site Supervisor Audit Checklist

Site Supervisor Audited: _____
 Audit Completed by: _____
 Date: _____
 Current Project: _____

	Good	Adequate	Needs Improvement	N/A	Comments
Site Conditions					
Housekeeping up to Pengrowth standard					
Excavations meet code / Pengrowth standard					
Equipment condition					
Hazards flagged / barricaded / mitigated					
Safety					
ERP complete and available					
Safe Work Agreement complete					
Site Hazard Assessment complete					
Daily Toolbox Meetings documented					
PPE usage to Pengrowth Standard					
Crew training & orientation certificates verified					
Safety watch in place for critical work					
Alberta First Call complete					
Ground disturbance permit complete					
Ground disturbance procedures followed					
Ground disturbance supervisor present during all critical digs					
Backfill inspection reports complete					
Confined Space Entry Permit complete, if req'd					
Gas Detection in place as required					
Site Safety Inspections completed					
Proactive Reports submitted by crews and supervisor					
Incident reporting completed promptly, if req'd					
Code Requirements					
Spacing guidelines followed					
Secondary containment in place as required					
Construction start notification (ERCB, etc.) complete before work started					
Pipeline test notification complete before test started					
Pipeline damage reported promptly, if encountered					
Copy of OH&S Code available					
Licenses & land packages on site					
Required signs (pipeline, facility, etc.) in place					
Supervisor demonstrates adequate knowledge of regulations (i.e. ERCB D66)					



Site Supervisor Audited: _____

Date: _____

	Good	Adequate	Needs Improvement	N/A	Comments
Business Requirements					
Contracts in place for all contractors					
Daily reports current, costs accurate					
QC documentation up to date					
Safety documentation neatly assembled					
Ground disturbance documentation available					
Copies of field tickets, packing slips					
Project drawings available, as built mark-ups					
Correct coding, job name, Pengrowth contact shown on all field tickets					
Landowner contacts completed before start of work					
Third parties contacted prior to crossings					
Ongoing communication with Operations					
Construction as per drawings (installation, inspection & testing)					
All contractors have current service agreement or OSC					
New vessel/PSV/tank inspection reports complete					
MET's complete for surplus material relocated					
Crew on site on time and ready to work					
Site Supervisor Personal Qualifications					
Verbal communication is appropriate & clear					
Written communication is appropriate & clear					
Evidence of professional, respectful working relationships					
Demonstrates adequate knowledge & experience for scope of work					
Evidence of adequate safety training & adherence to best practices					
Demonstrates high ethical standards					
# Action Items			Follow-up date		Follow-up Complete date
1					
2					
3					
4					
5					
6					
7					



Project Supervision Memorandum

To: Pengrowth Site Supervisors
CC: Area Foreman, File (Site Supervisor Manual)
From: Pengrowth Project Group
Date: 04/12/2006
Re: Project Communication

This note provides a reminder of the expectations for communications between Project personnel and Operations staff. The Project Group constantly strives to promote consistency throughout the operated areas and to emphasize the critical importance of open and frequent communication combined with proper use of procedures. This is essential to maintaining a safe and effective workplace. A few key reminders follow:

- **At the outset of every job, the Area Foreman and the Site Supervisor must agree on the frequency and type of communication necessary.** At all times, the Foreman or designate should know where crews are working within their areas, what the work involves and have a good idea of what stage the work is at. To a large extent, communication between Operations and Projects personnel will depend on the nature and location of the work. For example, work within a live facility such as a battery or compressor station will require direct Operations involvement in each day's tailgate meeting and hazard assessment in addition to co-signing of the safe work agreement. The Foreman (or designate) will work as part of the Project Team to the extent necessary to ensure proper communication and hazard identification. Work that has less process-related risk such as pipelining (when not in close proximity to facilities) and lease construction will require less Operations involvement, but clear understanding of communication expectations must be in place prior to work beginning. Ultimately Operations takes ownership of the facilities that Projects constructs (as well as existing facilities), so it is critical that they have a high level of involvement in planning and execution of all jobs.
- **In the event of an incident, communication is once again crucial.** Obviously the scene must be controlled, but it is also necessary to inform the Area Foreman, Project Engineer / Coordinator and the Safety Coordinator as soon as possible. Normally, the Site Supervisor will first contact the Area Foreman and then the Project Engineer / Coordinator. The Foreman will contact the Area Manager and the Project Engineer / Coordinator will contact

the Safety Coordinator and the Manager – Projects or Team Lead – Project Engineering (as appropriate). If either of the Area Foreman or the Project Engineer / Coordinator cannot be reached, the Site Supervisor must take responsibility for contacting the Safety Coordinator and the appropriate Managers, either directly or by delegation to one of the primary contacts. After notifications are complete, the Site Supervisor will promptly complete a Supervisor's Investigation Report (SIR) and the contacts will initiate any further response required.

- **When people come on to the work site, all parties are responsible to ensure that ongoing activities are communicated and planned activities do not impact the ongoing work or vice versa.** As appropriate, a separate hazard assessment and renewal of the Safe Work Agreement complete with co-signer involvement may be required. The expectation is that workers understand who is entering the job site and why and that people entering the job site understand what activities are ongoing so that mutual understanding of how conditions are changing is reached.

The Project Group cannot over-emphasize the importance of effective communication combined with good judgment in promoting a safe and efficient workplace. As always, comments and suggestions for improvements are welcomed and may be directed to any member of the Projects organization.



Project Supervision Memorandum

To: Pengrowth Site Supervisors
From: Pengrowth Project Group
Date: 07/19/2007
Re: Regulatory & Policy Clarification – Ground Disturbance

Past incidents have highlighted the need for Pengrowth to give clearer direction to our Site Supervisors acting as Ground Disturbance Supervisors with regard to use of One-Call systems and regarding the standard of supervision when excavating in close proximity to underground facilities.

Supervision in Proximity to U/G Facilities

After investigation of certain incidents it was found that although the Site Supervisor and the contractor's crew were properly trained in ground disturbance procedures, they lost visual sight of the previously hand exposed pipeline due to sloughing but continued excavation without again exposing the pipeline by hand. This practice was and is in contravention of accepted regulatory, industry and Pengrowth ground disturbance procedures.

On all projects, it is the Site Supervisor's responsibility to do the following:

- Ensure proper site hazard assessments are completed and re-evaluated through out the entire job as the scope may change due to ground instability, etc.
- Stress the importance of having a site representative with at least Level II ground disturbance at location for the entire time the work has been completed around the underground facility.
- If for any reason the Site Supervisor is required to leave the site, they must turn over the site to a Level II Ground Disturbance qualified representative for complete review and sign off on the Ground Disturbance Permit to transfer primary responsibility. The work must stop immediately if this does not occur.
- Promote increased awareness of the importance of ground disturbance procedures by making it a primary topic of tailgate meetings and hazard assessments, and safety meetings as directed by Pengrowth's Project Group.

“One-Call” Systems

In certain instances previously, the appropriate “One-Call” agency has not been contacted prior to commencing ground disturbance. This practice is unacceptable.

All Ground Disturbance Supervisors must use the "One-Call" system whenever completing a Ground Disturbance Record. Site Supervisors are advised to make it their first step taken when planning the project.

Pengrowth recognizes that there are differing opinions as to the usefulness of the information obtained (not all facility owners are One-call members). However, the regulators state in a number of sources what their expectations are when anyone proposes a Ground Disturbance. The following are just a few examples:

1) The Alberta Pipeline Act states in Part 6: 31.1(1):

"A person proposing to undertake or undertaking a ground disturbance shall, before commencing any work, operation or activity,

(a) take all precautions reasonably necessary

(i) to ascertain whether or not a pipeline exists within

(A) the area in which he proposes to undertake or undertaking the ground disturbance,
(Work Area) and

(B) the distance, prescribed in the regulations, from the area referred to in paragraph (A)
(30 meter Search Area)

(ii) to determine who is the licensee of a pipeline in existence within the area"

2) The EUB “Guideline for Safe Construction Near Pipelines” states:

"Anyone planning to carry out a Ground Disturbance **anywhere**, must first look for pipelines in the following records:

- Call Alberta One-Call,
- Check EUB records for existence of pipelines,
- Check with local utility services,
- Check land title for easements that may indicate the location of pipelines,
- Pipeline signs etc. etc."

3) The “Alberta Pipeline Regulations” section 60 (2) states:

"A person proposing to undertake a ground disturbance within the controlled area of a pipeline, **shall contact Alberta One-Call** prior to conducting the Ground Disturbance"

4) The “Alberta OH&S Code 447” (1) Locating Buried Facilities, directs the employer to:

“(a) contact the owner.”

5) The “Global Ground Disturbance Level II” states on page 19 of the training manual:

"The following, at a minimum must always be checked to see if an underground facility exists" (# 2 on the list is "One-Call" after Certificate of Title.)

Pengrowth takes the stance that the only time that the "One-Call" could be marked "No" or "N/A" on the Ground Disturbance form, would be:

1) An emergency situation

OR

2) The "One-Call" had been used very recently on the same site and no foreign facilities found etc. (This all needs to be documented in detail)

Please keep in mind that if Pengrowth ever needed to build a "due diligence" defense after a major utility strike or fatality, replying "No" when asked about the "One-Call" system would diminish our credibility.

Project Supervision Memorandum

To: Pengrowth Site Supervisors
From: Pengrowth Project Group
Date: 03/12/2008
Re: Regulatory Alert # 2 – Ground Disturbance

The ERCB's stance with regard to pipelines and Ground Disturbance is that it is Pengrowth's responsibility to maintain control over our sites **no matter what the circumstances**.

A consistent root cause in previously experienced pipeline strikes has been failure to follow Pengrowth & industry accepted procedures. Pengrowth is responsible even if a backhoe operator disobeys instruction and ignores proper procedures, as was a recent case. As a result of trying to increase performance, this individual did the wrong thing. Since a similar set of circumstances has occurred on more than one occasion, **we have a duty to reinforce proper practices**.

It is a joint responsibility between the Project Engineers/ Coordinators and you, our Site Supervisors to create an on site culture where people will not even consider contravening our Ground Disturbance policy (or other critical policies).

In order to reinforce how seriously Pengrowth regards safety, especially related to Ground Disturbance, The Project Group wishes to provide some very clear direction, as follows:

- All Site Supervisors are expected to clearly communicate the following to crews that are about to commence a Ground Disturbance for Pengrowth:

"Pengrowth has zero tolerance for any deviation from our Ground Disturbance policy. This means that anyone who does not properly follow accepted Ground Disturbance procedures will no longer be working on our sites. Pengrowth also expects contractors working for us to demonstrate this same commitment to safety".

- Proper Ground Disturbance procedures should be well known in industry and Pengrowth's expectations are very reasonable. It is each and every one of your responsibilities, acting as Pengrowth Site Supervisors to help promote the site safety culture that Pengrowth stands behind.

Pengrowth would prefer to avoid presenting ultimatums of this sort, but we cannot afford tolerance of deliberate contraventions of safety policies and practices.

Project Supervision Memorandum

To: Pengrowth Site Supervisors
From: Pengrowth Project Group
Date: 09/04/2008
Re: Construction Practices during tie-ins

Pengrowth Corporation experienced a recent pipeline failure directly related to poor construction practices during tie-in to an existing operating pipeline. After properly isolating, depressuring and pigging the pipeline clean, a weep hole (cold tap) was drilled in the pipeline to ensure that no condensate or other production fluids remained. Construction operations were suspended at this point due to inclement weather. When the pipeline was cut on a subsequent shift, the weep hole was not cut out with the segment removed. The markings around the weep hole were obscured or washed away due to conditions in the excavation, the hole was drilled low down on the pipeline and personnel involved changed over the course of the job. As a result, the weep hole was missed when new pre-tested risers were installed and two forms of non-destructive examination performed. Under these circumstances, a hydro-test was not necessary so the line was backfilled and placed back into service without a leak check. Within a few days, the leak was identified and reported to the regulatory authorities.

According to ERCB Directive 66 (Requirements and Procedures for Pipelines), this is classified as "Poor construction practices resulting in failure within one year's service/operation." This is a high risk non-compliance in the Pipeline category and exposes Pengrowth to elevated regulatory risk. The ERCB has the authority to shut in production, delay or deny regulatory applications, and specify other remedial action for any company found to be in Persistent Non-compliance. Pengrowth will take all necessary steps to ensure compliance with regulations and to ensure that we are not subject to elevated enforcement action.

To prevent future similar incidents, Pengrowth wishes to explicitly state our policy in this regard. Pengrowth's policy is as follows: following any intentional breach of a pipeline (including cold taps for safety purposes), the final cuts required shall be made **before the end of the same shift, regardless of inconvenience**. The initial breach of the pipe wall shall be included in the portion of pipe removed. All aspects of the work shall comply with Section 10.10.3 of CSA Z662 "Piping Replacements." After the final cuts have been made, a full visual inspection shall be made of the remaining exposed portion of the pipeline to ensure that no damage is evident. If installation of the permanent tie-in piping is not practical within the same shift, the open ends of the pipeline shall then be secured with temporary caps and made water-tight. As always, Pengrowth policies such as Lock-out Tag-out and Ground Disturbance must be complied with completely to ensure safety. The construction crew shall make all reasonable efforts to complete construction of the final piping as soon as possible thereafter.

Further, a full visual inspection of the exposed pipeline shall be conducted at completion of the activities, just prior to backfill and in accordance with Pengrowth's Ground Disturbance procedures. These requirements should be applied to all projects involving pressure containing equipment – in all cases involving modification or construction of pressure containing equipment steps should be taken to safely conduct the work, to secure and make obvious temporary breaches in the equipment, and to perform a full visual examination of the completed project prior to testing and placing the equipment into service.



Project Supervision Memorandum

To: Pengrowth Site Supervisors
From: Pengrowth Project Group
Date: 06/16/2008
Re: Wildlife Habitat and Sensitive Landscapes

Pengrowth Corporation is fully committed to environmental protection. In accordance with this fundamental policy, we have identified a need to clarify our expectations with regard to protection of wildlife habitat and sensitive landscapes.

Our responsibilities in this regard can be broken down into the categories of regulatory compliance, landowner relations and proper environmental stewardship.

trees are a hot button issue for landowners - before you cut them down, ask

check with landowners - is there anything we should be watching for besides what is written in the ROW agreement, dens, livestock, special landscape

watch out for wildlife of all kinds, especially with respect to habitat – (federal – Canada Wildlife Act – protects endangered species and wildlife on certain federal lands – penalties from tickets up to 250k and 5 years in prison, penalties are cumulative), species at risk (including plants, attach list?- federal – Species at Risk Act -), larger carnivores, ungulates (protected habitat), fish (federal – Fisheries Act – provisions regarding protection of habitat – no harmful alteration of fish habitat (deleterious substances) – penalties range from tickets up to 1MM, 3 years prison) & birds (federal – Migratory Birds Convention Act and assoc regs, particular focus on non-disturbance of nests, no dogs and cats or harmful activity to birds, eggs, nests or habitat allowed in sanctuaries, lots more rules not related to our operations, no harmful substances can be deposited in areas frequented by migratory birds– penalties range from tickets up to 1MM, 3 years prison, penalties are cumulative – applies to waterfowl, cranes, rails, shorebirds, pigeons, migratory insectivorous birds likes robins and swallows, and other migratory non-game birds) have specific legislation protecting them, archaeology, minimal disturbance, Special Areas, native prairie, special interest groups (ducks unlimited), fisheries, water act, noxious weeds and pests (federal-Plant Protection Act and assoc regs), clubroot, protected areas (hay-zama, etc.)

watch out for erosion issues - re-stabilizing soil can be a multi-year, problematic, expensive issue

very important to scout out these issues during survey - plan for alternative construction practices, different routing, temporary access to skirt sensitive areas, etc.



be prepared to stop the job or that portion of the job if you do come across anything in this regard not identified and appropriately dealt with beforehand



PENGROWTH Administrative Policies and Practices

Page
1 of 5

Purchasing

PREPARED BY MATERIALS & SERVICES	AUTHORIZED BY  PRESIDENT	PROCESS OWNER  PRODUCTION AND OPERATIONS	EFFECTIVE DATE March 3, 2009	DATE OF NEXT REVISION September 3, 2010
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POLICY

The purpose of this Policy is to provide guidance and direction for purchasing goods and services for Pengrowth Corporation. It is Pengrowth's goal to purchase goods and services in a competitive, fair and ethical manner, ensuring the maximization of value for Pengrowth with respect to price, quality, service and operational performance.

This Policy applies to the following types of Pengrowth purchases:

- materials & services used in the operation and maintenance of our field facilities.
- materials & services used in the capital development and enhancement of our field assets.
- information technology services and equipment.
- head office facilities services and equipment.
- materials & services imported or exported from Canada, or which require customs clearance.

All contracts, agreements or similar documents entered into in the ordinary course of Pengrowth's business for the purchase of goods and services must be entered into and documented in accordance with this Policy.

1. PRINCIPLES

Goods and services shall be acquired for Pengrowth according to the following principles:

- Planning** - Goods and services should be acquired after consideration of needs, alternatives, timing, and availability of funds.
- Sourcing** - The process by which vendors compete for Pengrowth business shall be open, fair, consistent, and non-discriminatory.
- Purchasing** - Goods and services shall be acquired competitively from qualified vendors to meet specified needs and to achieve the best value for money expended.
- Accountability** - Approvals shall be obtained and documentation shall be retained for review and auditing.

2. RESPONSIBILITY AND AUTHORITY

This Policy applies to all Pengrowth employees, consultants, and contractors ("team members") including, but not limited to, those participating directly or indirectly in the purchasing of goods or



Purchasing

services outlined above. All purchases must be made pursuant to this Policy and must comply with the Code of Business Conduct & Ethics and with applicable legislation.

Materials & Services (M&S) is responsible for the creation and administration of processes and guidelines by which goods and services are acquired by Pengrowth. M&S is responsible for carrying out the competitive bidding process for the acquisition of the goods and services required by Pengrowth, and M&S shall continually seek new sources of supply in order to increase competition thus minimizing expenditures for goods and services.

3. APPROVED VENDOR LIST

Materials & Services shall be responsible for establishing, reviewing and maintaining Pengrowth's "Approved Vendor List". Recommendation for including new vendors on the list will be accepted from any internal Pengrowth business group. M&S, working with the requesting business group, will confirm the business need for the proposed new vendor and will ensure the addition of the proposed vendor is appropriate with respect to existing contractual commitments. All "Approved Vendors" must meet the ethical, safety and business standards desired by Pengrowth. Upon successful negotiations and agreement, the selected vendor will be added to the Approved Vendor List. Removal of a vendor from the Approved Vendor List will be determined by M&S, in conjunction with the internal end-user groups, based on a review of vendor performance, business need and any contractual or other commitment.

4. PREFERRED SUPPLIER

Materials & Services, in conjunction with the appropriate stakeholders and in accordance with local or regional needs and competitive bidding, may appoint a "Preferred Supplier" on the Approved Vendor list. A Preferred Supplier should receive first call for applicable work and such purchases do not requiring a single source justification. If the Preferred Supplier is not able to provide the applicable goods or services, the end-user can obtain quotes from and utilize one of the additional listed Approved Vendors, or if no Approved Vendors are available then the process as listed under 8(b)(iv), below, will apply.

5. REQUEST FOR PROPOSAL

Request for proposals from vendors may be made as per the request for proposals procedure and any proposal awarded to vendors shall be approved by personnel with the proper level of authority as per the Delegation of Authority matrix (DOA).

6. SOLE/SINGLE SOURCE PROCESS

Sole/single source is a purchase of goods or services without carrying out competitive bids/proposals, for which there might or might not be alternative sources available, but for which it would not be feasible, practical or cost effective to seek competitive proposals. A sole/single source justification form must be completed as per the sole/single source procedure and must be signed by two team members, one of them the originator (requestor) and the second one must be an authorized personnel with the proper level of authority as per the DOA.



Purchasing

7. EMERGENCY

In emergency situations where the immediate response of a service provider currently not under contract to Pengrowth is required, the one-time use of that service provider to remedy the emergency is acceptable. Emergency situations may include where Pengrowth property is or will be at risk or where there is a life-threatening situation to any person.

8. AUTHORIZATION FOR THE PURCHASING OF GOODS AND SERVICES

Purchases must be approved by personnel authorized by the DOA, and only up to the limits specified in the DOA.

(a) Purchasing Goods (for locations equipped with the Maintenance & Materials Management Software)

For those facilities equipped with the Maintenance & Materials Management Software inventory ordering system, all maintenance material purchasing requirements shall be processed using the Materials Management on-line requestor tool.

(b) Purchasing Goods (for locations not equipped with the Maintenance & Materials Management Software) **and Purchasing Services** (for all locations)

- (i)** Any one time purchases commitments of goods above \$25,000 and/or services with combined annual spend above \$250,000 must be made through or pre-approved by M&S in accordance with this Policy (except Drilling Rig Contracts, below).
- (ii)** Personnel can purchase Goods up to \$25,000 and Services up to \$100,000 from vendors with a fully executed standing service agreement and listed on the Approved Vendor listing subject to using any Preferred Suppliers if available. Services up to \$250,000 can be purchased directly by personnel from vendors with a fully executed standing service agreement and listed as a Preferred Supplier on the Approved Vendor listing.
- (iii)** Drilling Rigs. Due to the quick turn around required on securing drilling rigs, the Drilling Manager can approve, in accordance with his DOA, drilling rig contracts issued utilizing the Canadian Association of Drilling Companies Contract template. A copy of the signed drilling rig contract will be send to M&S upon approval for processing it into the Approved Vendor list.
- (iv)** For one-time requirements that are not available from or supported by any of the Approved Vendors, the business end user shall follow the process below. Vendor selection shall be made based on quality, lowest overall total cost, best on-time availability and delivery. Post-invoice follow-up may be performed by M&S.
- (v)** Any amounts in this policy refer to the total value of the package / group / bundle of goods being purchased. It is NOT acceptable to split the purchase into small parcels in order to avoid obtaining quotations or avoid using an approved vendor (e.g. splitting a



Purchasing

purchase of six pieces of equipment with a total value of \$27,000 into six purchases of \$4,500 each).

Requirements for One-Time Purchases of Goods

	Up to \$10,000	From \$10,000 – \$25,000
Process	A written or verbal quotation from the vendor	At least 2 written quotes or sole/single source process
Documentation	Quotes information	Written quotes or sole/single source justification
Documentation Retention	Business End User	Business End User

Requirements for Use of One-Time Field Services

	Up to \$10,000	From \$10,000 to \$50,000	From \$50,000 to \$100,000	From \$100,000 to \$250,000
Process	A written or verbal quote	At least 2 written quotes	RFP process or sole/single source process	RFP by M & S or sole/single source process
Documentation	Quotes info and OSC. Copy of OSC to M&S.	Written quotes to be attached to OSC. Copy of OSC to M&S	RFP process or sole/single source justification. M & S to issue formal contract	RFP process or sole/single source justification. M&S to issue formal contract
Documentation Retention	M&S to keep documentation	M&S to keep documentation	M&S to keep documentation	M&S to keep documentation

9. SERVICES CONTRACTING

Materials & Services is responsible for maintaining and administering all active service contracts, ensuring strict compliance to Pengrowth's contractual requirements for liability insurance, indemnification, Workers' Compensation Board coverage, fixed rate schedules and required regulatory documentation. All active service contracts will be found under the M&S Contracts Approved Vendor listing.

10. MAINTENANCE OF RECORDS

For purchases not processed through M&S, team members must ensure that they maintain all purchasing documentation with in their files and in accordance with the Records Management Policy. Such files are to be retained for legal, audit and financial review purposes and will be made available to M&S and/or audit personnel on an as required basis.

Pricing information contained in vendor quotations and purchase contracts shall be treated as confidential information.



Purchasing

11. POLICY REVIEW AND CHANGES

This Policy will be reviewed and updated from time to time on an as needed basis. Any recommended changes to this Policy will require the approval of the President.

12. PERSONAL ACQUISITIONS

The use of Pengrowth's purchasing processes or resources for the purchase of personal items or services is not permitted under any circumstances. The misuse of Pengrowth's identity for personal reasons is also not permitted.

13. EXCEPTIONS AND COMPLIANCE

Any deviation from this Policy, other than as set out in section 7, will be on a limited exception basis and will require prior written approval from the Vice President, Production and Operations or the Vice President of the business unit seeking to procure goods and services. Requests for deviations to this Policy must outline the business reasons for the deviations.

Team members are governed by policies on conflict of interest which prohibit the acceptance of gifts or gratuities in any form from vendors doing business with, or soliciting business from, Pengrowth. All such offers shall be reported to the Manager, Materials & Services or Legal Services.

It is the responsibility of every team member to comply with this Policy. Violation of this Policy will result in discipline by Pengrowth, up to and including termination of employment or engagement with Pengrowth.

14. RELATED POLICIES

This policy is one of a series of related policies addressing team member conduct and safety, including:

- Fleet Vehicles Policy
- Software Licensing Policy
- Records Management Policy and Records Retention Schedule
- Legal Services Policy
- Privacy Policy
- Anti-Corruption Policy

and the Code of Business Conduct & Ethics.

PENGROWTH CORPORATION

(Contractor)

(Address)

(Contractor's Representative)

(WCB Account Number)

(Vendor Code)

Contractor and Owner agree as follows: Contractor shall, in accordance with schedule terms, perform all work and provide all services, supervision, equipment and materials required for the successful and safe completion of work as described in Work Specification (Work) at or to _____ (Work Site).

Contract means this agreement and the documents referenced in Work Specification. In event of conflict between this agreement and any documents referenced in Work Specification, this agreement shall govern. This agreement means the terms and conditions on both sides of this form. Contractor's undertaking of Work shall be deemed Contractor's acceptance of Contract where Contractor's signature not provided.

No.:

03581

Contract Date:

Schedule terms are:

1. Scheduled Start Date:

2. ☐ Scheduled Completion Date,

☐ Delivery Date, ☐ Contract Term:

Work Specification:

Submit 2 copies of
invoice with
Contract No. to:

1. Contract Price is:

F.O.B.

Ship Via:

Tax/Duty Status:
See Article 4
for application

Provincial Sales Tax Applicable:
Duty Applicable:

☐ Yes ☐ No
☐ Yes ☐ No

End Use (if applicable)

Owner:

Contractor:

By:

By:

Print Name and Title

Print Name and Title

DISTRIBUTION: 1 - Contract File, 2 - Contractor, 3 - Accounting, 4 - Project/Job File, 5 - Originator

Charge Code:

2. Invoices will be paid on a net thirty day basis after receipt of invoice together with supporting documentation, at address shown, subject to Owner's retentage of holdback of _____ % of Contract Price until _____ days after acceptance of Work by Owner.

3. Contract Price shall not exceed \$ _____ without prior written authorization of Owner.

Condition Codes:

A – New
 B – Used/Mint
 C – Used/Good
 D – Used/Minor Repairs
 E – Used/Major Repairs



PENGROWTH

Material Transfer

MT #: Date: Reference MT:
(if applicable)

****Once completed, select the 'SUBMIT' button at the bottom of the form for processing.**

From: Name: <input style="width: 90%;" type="text"/> LSD: <input style="width: 90%;" type="text"/> Cost Centre/AFE: <input style="width: 60%;" type="text"/> GL: <input style="width: 30%;" type="text"/>	To: Name: <input style="width: 90%;" type="text"/> LSD: <input style="width: 90%;" type="text"/> Cost Centre/AFE: <input style="width: 60%;" type="text"/> GL: <input style="width: 30%;" type="text"/>
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Reason for Transfer: <input style="width: 95%;" type="text"/>	End Use: <input type="checkbox"/> Oil Battery <input type="checkbox"/> Gas Facility <input type="checkbox"/> Compressor Stn <input type="checkbox"/> Well <input type="checkbox"/> Other: <input style="width: 80%;" type="text"/>
Equipment Status: <input type="checkbox"/> Surplus (to be sold) <input type="checkbox"/> Idle (internal use)	Material Use Desc: <input type="checkbox"/> Stock Item <input type="checkbox"/> New Installation <input type="checkbox"/> Replacement <input type="checkbox"/> Upgrade

Material Description (S/N, A#, M/N, Insp #, Pressure, Approx Size and any other pertinent info (for tubing give size specs))	Qty	Unit of Measure (U of M)	Equipment Age	Condition Code	New Price	Current Market Value	WHSE Handling (tubular only at 2.5%)	MT VALUE
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Check if: ☐ Vessel ☐ PSV ☐ TanksTotal MT Value

Shipping Date: <input style="width: 90%;" type="text"/> Carrier/Contract: <input style="width: 90%;" type="text"/> Ticket #: <input style="width: 90%;" type="text"/>	Comments: <input style="width: 95%; height: 60px;" type="text"/>
Originator: <input style="width: 60%;" type="text"/> Date: <input style="width: 30%;" type="text"/>	Approver: <input style="width: 60%;" type="text"/> Date: <input style="width: 30%;" type="text"/>

[Procedures to Complete MT Form](#)

			Document Type:		
			Guideline and Procedures		
Group: Integrity (Pipeline Operations Excerpt)			Location: Site Supervisor Manual		
Document Title: Pipeline Operation Maintenance Manual Integrity Functions					
Document ID: Site Supervisor Training Informative					
<p style="text-align: center;">CONTENTS GUIDELINES AND PROCEDURES</p> <ul style="list-style-type: none"> • A.2.1 Pipeline Sample Retrieval Procedure (Failures and Corrosion Assessments) • A.2.2 Pipeline Commissioning and Resumption • A.2.3 Pipeline Suspension, Discontinuation and Abandonment Guidelines <p>This guideline of procedures has been compiled from the Pengrowth POMM for inclusion in the Site Supervisor Training Manual to promote consistency and awareness.</p> <p>Any questions in regards to these procedures should be directed to the Project Coordinator or to the Area Integrity Coordinator (AIC).</p> <p>ALL DOCUMENTATION IN REGARDS TO INTEGRITY WORK SHALL BE DIRECTED TO THE AIC ASAP, AND IS NOT TO BE DELAYED AND SENT AS PART OF THE QA PACKAGE</p>					
C	2011/01/17	2011 Update	S. Tiessen	R. Watts	
			Pipeline Specialist	Chief Inspector	
B	2010/01/13	Released	M. Lema	S. Tiessen	
			Team Lead, Integrity	Sr. Integrity Coordinator	
A	2010/01/07	Site Super Draft	M. Lema	S. Tiessen	
			Team Lead, Integrity	Sr. Integrity Coordinator	
Revision	Date yyyy/mm/dd	Reason for Issue/Revision	Originator	Checked	Approved
Document Use Disclaimer		An approved version of this document has the following characteristics: Revision number greater or equal to 0 (letters represent draft versions, A, B, C, etc.) Reason for issue or revision will contain the codes IFR, IFA, IFI, IFE Approved field contains the signature of the authority. All rights reserved.			

Appendix 2

Intent

The following excerpt is from the Pipeline Operations Maintenance Manual and is included in the Site Supervisor Training Manual to communicate requirements for pipeline specific activities that are either executed by Operations or other commissioned parties through different groups within Pengrowth.

Changes to the 2011 version of this appendix are as follows:

- Further clarification for pipeline cut-out sampling and requirements for proper identification of pipeline specific criteria to the anomaly being assessed, as well as inclusion of “appurtenances” when considering fixtures attached to failed samples.
- Taking and including pictures when taking samples and cut-outs.
- Removal of “QM4” from verbiage as this is no the Pengrowth Pipeline Data System (PPDS).
- Change in the status amendment form to include abandonment activities.
- Inclusion of the requirements for self-disclosure of non-compliances (i.e. when we reactivate lines that are overdue on licensing).

Procedures

The following procedures will be used and referenced, as outlined in the Pipeline Operation and Maintenance Manual (POMM):

- A.2.1 Pipeline Sample Retrieval Procedure (Failures and Corrosion Assessments)
- A.2.2 Pipeline Commissioning and Resumption
- A.2.3 Pipeline Suspension, Discontinuation and Abandonment Guidelines

A.2.1 Pipeline Sample Retrieval Procedure

The purpose of this document is to lay out a procedure for securing a cut-out section of piping from a pipeline system, either for failure analysis or cut-outs for integrity assessment.

Note: If retrieving a sample due to a failure where 3rd party inspection is required, and there are appurtenances (fixtures, fittings etc.) attached that may be either damaged or broken; they are to be included and undisturbed in order to maintain the integrity of any investigation.

Consultation with the Area Integrity Coordinator in all cases when recovering a sample shall be mandatory.

1. Marking of the Sample

- All markings to be made with permanent marker and shall be legible
- Label direction of flow and the top and bottom of the pipe
- Identify the location of the failure site (LSD, NTS or GPS coordinates)
- Identify the license and segment number of the pipe
- Identify pipe as owned by "Pengrowth" and date obtained
- Identify Pengrowth contact (Area Integrity Coordinator or Operations Foreman) on pipe (name, phone number)

2. Sample Retrieval and Preservation

- Ensure the failure location is preserved (minimal disturbance of the failure location – no poking or scraping)
- Take pictures of the failure site and forward to the Area Integrity Coordinator
- Cut a minimum of a three foot length of pipeline/piping, encompassing the failed section
- Secure any scales in the sample (cold cutting must be done; torch cutting close to failure location is not permitted)
- If **internal corrosion** is the suspected cause of failure, attain the following items, if possible:
 - If liquid or solids are present at the failure location, contact area Chemical Vendor to secure an uncontaminated sample (using a sample bottle), and send for analysis (samples are to be collected as soon as possible and all efforts made to promote qualitative analysis)
 - If the piping or pipeline has been pigged to isolate and clean for repair, take a liquid/solid sample from the pig receiver
- Wrap sample in protective coating (plastic wrap) to ensure minimal atmospheric contamination
- For composites, or where external scale needs to be maintained for evaluation and analysis, wrap the pipe in an impact resistant membrane (i.e. cardboard or bubble wrap) to minimize external damage and impacts

3. Evaluation of Sample

- Contact the Area Integrity Coordinator for direction and instructions for sample evaluation (sample analysis of fluids, 3rd party evaluation of the failed pipe, etc.)
- Sample evaluation may include a formal 3rd party analysis, or direct analysis by the Area Integrity Coordinator or designate
- The sample evaluation requirements are determined by the following:
 - Regulatory requests for 3rd party analysis
 - Requirements within the POMM (Incident, Failure and Accident Investigation Flowchart)

A.2.2 Pipeline Commissioning and Resumption Guidelines

This document is a guide to support effective and safe management for pipeline commissioning and resumption of shut-in, suspended, discontinued and abandoned pipelines. [Section 6.5 – Inventory Changes and Management](#) (POMM) includes the overarching requirements for pipeline commissioning and resumption, and the requirements for regulatory correspondence and documentation.

For commissioning of new pipelines, or resumption of service, an MOC shall be generated by Operations, and include the Pipeline Area Integrity Coordinator; to review requirements for pre-commissioning batch and operating chemical mitigation plan, and review the impacts of the production changes to the remaining system.

Cautionary Notes for Pressure Tests and Hydrostatic Tests:

- In no case shall the pipeline be brought to a pressure above the pipeline MOP (either for pressure test or hydrostatic test) without express regulatory approval as well as approval from the Area Integrity Coordinator or Team Lead, Integrity. This does not apply to the construction and testing of new pipelines where DDS submission is complete and the requirements of CSA are being met.
- Regardless of the test pressure, pressure tests or hydrostatic tests will be tested with water or a non-expansible fluid media. Testing with expansible media (air, gas, etc.) is hazardous and may require regulatory approval and approval from the Team Lead, Integrity or from a Project Engineer for new construction. The Alberta Pipeline Regulations state that regulatory approval is required to test with expansible media for any test volume greater than 125m³. Typically, testing with expansible media will only be approved on low pressure polyethylene installations with test pressures <2900 kPa, where the tests are managed through the Projects engineering group.

A.2.2.1 Commissioning of New Pipelines and Resumption of Service

For unprotected steel pipelines, a pre-commissioning corrosion inhibition batch shall be applied following the post-hydrostatic test dewatering process for all new and/or resumptions. As outlined in the [Pipeline Construction and Installation Specification](#), this may be completed by Operations or under the direction of the Site Supervisor and must be documented on the [Pipeline Start-Up Form](#).

The Site Supervisor (if required) will consult with Operations and the Chemical Vendor to determine the appropriate batch chemical and volumes for the pre-commissioning batch.

Ongoing chemical inhibition requirements beyond the initial batch treatment shall be managed by the Area Integrity Coordinator and appropriate Operations personnel. Operations will provide data, including the anticipated rates or well test production volumes and compositions to the Area Integrity Coordinator, who will work with the Chemical Vendor to establish an appropriate go-forward corrosion inhibition program, if required.

A.2.2.2 Resumption of Service for Shut-In Pipelines

Note: If a pipeline's production has been suspended for 12 months or longer, and no physical suspension activities or regulatory status change have been undertaken, the pipeline is considered to be in "low-risk" non-compliance. In this case, there is a requirement to work through the D56 Self-Disclosure process followed by DDS notification of hydro-testing, if required, in order to receive permission for reactivation. (Proper explanation of the details around reactivation and integrity testing requirements should be included on the DDS submission.) Guidance is also given below in regards to the internal processes required for different scenarios and should always be discussed with the Area Integrity Coordinator in conjunction with the self-disclosure.

- **A.2.2.2.1** For pipelines that have been [shut-in for a time not in excess of the allowable timing without treatment or suspension](#) (per [A.2.3 Pipeline Suspension, Discontinuation and Abandonment Guidelines](#)), operation of the pipeline can be resumed without formal evaluation or documentation. The chemical and corrosion inhibition programs, if applicable, shall be reinstated once the pipeline is returned to operation.

- **A.2.2.2.2** For pipelines that have been shut-in for a time exceeding the allowable timing without treatment or suspension (per [A.2.3 Pipeline Suspension, Discontinuation and Abandonment Guidelines](#)), the following steps are required before operation can be resumed:

1. Review of pipeline history and integrity before the pipeline was shut-in, including;
 - a. Operating parameters
 - b. Corrosion mitigation programs
 - c. Corrosion monitoring and inspection programs and results
 - d. History of failures, repairs or integrity issues
2. If the information review does not provide confidence in the condition of the pipeline, one of the following actions is required to confirm integrity:
 - a. Inspect the pipeline (target inspection digs and direct assessment/cut-outs or inline inspection)
 - b. Leak test of the pipeline to the **lesser** of 150% of the **operating** pressure **or** 100% of the pipeline MOP, and inspect the right-of-way.
3. A right-of-way (ROW) inspection for the pipeline
4. Resume operation of the pipeline
5. Review and implement/reinstate chemical and corrosion inhibition programs, if applicable

Note: If a pipeline has been shut in for 12 months or longer, and no suspension activities have been undertaken, and the pipeline is susceptible to low-risk enforcement due to improper status, notification to the ERCB through the self-disclosure process will be required, as well as following the resumption guidelines for discontinued pipelines (Section A.2.2.4).

A.2.2.3 Resumption of Service for Suspended Pipelines (Status with Regulator is “Operating”)

- **A.2.2.3.1** For pipelines that have been properly suspended, and where documentation is available, the following steps are required before operation can be resumed:
1. Review the suspension documentation ([Pipeline Lay-Up Form](#)) to determine if adequate measures were taken to preserve the integrity of the pipeline.
 2. Complete Self-Disclosure for Non-Compliance for occurrences where 12 months throughput production has lapsed.
 3. If adequate measures were taken, the following steps shall be taken:
 - a. Update the pipeline status in the Pengrowth Pipeline Data System (PPDS)
 - b. Batch the pipeline, if applicable
 - c. Resume operation of the pipeline
 - d. Review and implement/reinstate chemical and corrosion inhibition programs, if applicable
- **A.2.2.3.2** For pipelines which are thought to have been suspended, but no records of suspension activities are available, the following steps are required before operation can be resumed:
1. For piggable pipelines, with a pig receiver at the end of the pipeline, pig the pipeline and check the fluid coming from the pipeline.

- a. If fluids are air, nitrogen, sweet gas, inhibited fluid or crude oil (i.e. something other than normal produced fluids), assume the pipeline was suspended properly, and proceed as outlined in steps 1 and 2 (Section A.2.2.3.1).
- b. If normal produced fluids are found, or there are no means to determine whether the pipeline was properly suspended, follow the guidelines for resumption of shut-in pipelines (Section A.2.2.2.2).

A.2.2.4 Resumption of Service for Discontinued Pipelines

- **A.2.2.4.1** For pipelines that have been properly discontinued, and where documentation is available, the following steps are required before operation can be resumed:
 1. Review the suspension documentation ([Pipeline Lay-Up Form](#)) to determine if adequate measures were taken to preserve the integrity of the pipeline.
 2. If adequate measures were taken, the following steps shall be taken:
 - a. Obtain regulatory approval to resume operation of the pipeline
 - b. Update the pipeline status in the Pengrowth Pipeline Data System (PPDS)
 - c. Batch the pipeline, if applicable
 - d. Resume operation of the pipeline
 - e. Review and implement/reinstate chemical and corrosion inhibition programs, if applicable
- **A.2.2.4.2** For pipelines that were placed into “Discontinued” status, but discontinuation steps are not known or documented, the following steps are required before operation can be resumed:
 1. For piggable pipelines, with a pig receiver at the end of the pipeline, pig the pipeline and check the fluid coming from the pipeline.
 - a. If fluids are air, nitrogen, sweet gas, inhibited fluid or crude oil (i.e. something other than normal produced fluids), assume the pipeline was suspended properly, and proceed as outlined in steps 1 and 2 (Section A.2.2.4.1).
 - b. If normal produced fluids are found, or there are no means to determine whether the pipeline had been properly suspended, proceed to step 2 (below)
 2. Review the pipeline history and integrity before the pipeline was shut-in, including;
 - a. Operating parameters
 - b. Corrosion mitigation programs
 - c. Corrosion monitoring and inspection programs and results
 - d. History of failures, repairs or integrity issues
 3. If the information review does not provide confidence in the condition of the pipeline, one of the following actions are required to confirm integrity:
 - a. Inline inspection of the pipeline, and verification/calibration digs
 - b. Hydrostatically test the pipeline (to code required pressure – based on the original code year and addenda used for construction – ensure regulatory notifications are completed (VSD and DDS), and inspect the right-of-way
 - c. Cut-outs of the pipeline (See [A.2.1 Pipeline Sample Retrieval Procedure](#))
 4. A right-of-way (ROW) inspection for the pipeline
 5. Obtain regulatory approval and ensure proper notifications are completed to resume operation of the pipeline
 6. Batch the pipeline, if applicable

7. Resume operation of the pipeline
8. Review and implement/reinstate chemical and corrosion inhibition programs, if applicable

A.2.2.5 Resumption of Service for Abandoned Pipelines

For pipelines that have been abandoned, the following steps are required before operation can be resumed:

1. Review the pipeline history and records to determine if adequate measures were taken to preserve the integrity of the pipeline. These records may include:
 - a. Pipeline Lay-Up Form
 - b. Operating parameters
 - c. Corrosion mitigation programs
 - d. Corrosion monitoring and inspection programs and results
 - e. History of failures, repairs or integrity issues
 - f. Cathodic protection on the system, if applicable
 - g. Steps taken to ensure the pipeline has been left in a safe and compliant manner
2. If the information review does not provide confidence in the condition of the pipeline, one of the following actions is required to confirm integrity:
 - a. Inline inspection of the pipeline, and verification/calibration digs
 - b. Discuss options to verify integrity and obtain guidance from the ERCB field center of jurisdiction for the reactivation.
 - c. Hydrostatically test the pipeline (to code required pressure – based on the original code year and addenda used for construction – ensure regulatory notifications are completed), and inspect the right-of-way.
 - d. Cut-outs of the pipeline (See A.2.2.6 Pipeline Cut-Out Sampling Guidelines)
3. Perform an engineering assessment (internal or 3rd party) to evaluate fitness for reinstatement into service.
4. A right-of-way (ROW) inspection for the pipeline
5. Obtain regulatory approval and ensure proper notifications are complete to resume operation of the pipeline
6. Batch the pipeline, if applicable
7. Resume operation of the pipeline
8. Review and implement/reinstate chemical and corrosion inhibition programs, if applicable

A.2.2.6 Pipeline Cut-Out Sampling Guidelines

At present, there are no set rules for the number of section cut-outs; however, experience with the ERCB indicates we should look at one sample per kilometer of line being re-licensed. If the pipeline is greater than six kilometers in length, we can consider representative sampling. Samples should reflect areas with the most significant corrosion potential (e.g. low lying areas where water can be trapped). Past failure history and operating conditions must also be considered.

Samples should have a girth weld in the centre for assessments and should have at least one foot on either side of the girth weld for test samples (CSA requires minimum overall length of 3 feet).

Samples shall be taken as outlined in the [A.2.1 Pipeline Sample Retrieval Procedure](#).

Laboratory requirements for cut-out analysis:

1. Visual inspection of the pipe, externally examining coating condition and signs of corrosion.
2. Possible external corrosion product identification (XRD analysis).
3. Internal visual inspection after the pipe is cut open (cold cut) looking for any signs of corrosion or deposits.
4. Identification of type of corrosion (i.e. potential need for corrosion products testing (XRD analysis)).

A.2.3 Pipeline Suspension, Discontinuation and Abandonment Guidelines

This document is a guide to support effective and safe management of pipeline suspensions, discontinuations and abandonment. [Section 6.5 – Inventory Changes and Management](#) (POMM) includes the overarching requirements for pipeline commissioning and resumption, and requirements for regulatory correspondence and documentation.

Methods other than those outlined in the table may be used, if they are acceptable to Operations and the Pipeline Integrity Coordinator.

Pigging

- Pigging operations and timing to get the pipeline clean are usually determined by prior pigging history knowledge or knowledge of the product trying to be removed. It may be necessary in some cases to assess the fluids within the system via sampling by the chemical vendor to ensure the correct solvency is determined and the cleaning process is effective. Other means of assisting the cleaning process such as hot oiling maybe used however care and attention to the fluid temperature is required according to the external protection product used on the pipeline. Multiple pig runs maybe required to ensure the pipeline is cleaned when going to “Discontinued” status or when we are preparing the pipeline for Inspection tools etc.

For all status changes affecting production within a system, an MOC may have been generated by Operations, and include the Pipeline Area Integrity Coordinator; to ensure the required lay-up documentation is complete, and review the impacts of the production changes to the remaining system.

Note: The intended usage of the [“Pipeline Lay-Up”](#) and [“Pipeline Status Change”](#) forms are as follows:

- For abandonment specific activities where the pipeline has been considered not to be used again and the ends may have been removed, or where return to status would require proper QA for the reattachment of fittings etc., the intended form to be used is the [“Pipeline Status Change Form”](#)
- For discontinuation-specific activities where the pipeline may have potential use and has been identified through Operations and the Area integrity Coordinator to have the integrity maintained for possible future use, the intended form to be completed is the [“Pipeline Lay-Up Form”](#). Once completed, this form would be forwarded to the Area Integrity Coordinator for review and sign-off, and then the AIC would complete the [“Pipeline Status Change Form”](#). Operations would require an engineering assessment.

Operations and Site Supervisors are required to complete the forms and submit them to the Area Integrity Coordinator as soon as possible (30 days) to promote routine submission of applications to the ERCB.

Pipeline Suspension, Discontinuation and Abandonment Guideline Table

Status Legend: S – Suspension, D – Discontinuation, A – Abandonment
The number(s) following the status code indicate which methods are acceptable

Procedure

- Determine the Line Type and Service;
- Determine the intended status;
- Refer to the table below to select the proper suspension method to be followed (e.g. S-3 means suspension using method 3; D-1/2 means discontinue using either method 1 or 2).

Type of Pipeline	Steel	Cement & Cement Lined	Fiberglass & FG Lined (See Note 4)	Polyethylene & PE Lined (See Notes 3, 4)	Aluminum (See Note 1)	Composite (See Note 4)	Other Internal Coatings (See Note 4)	Allowable Time Without Treatment (Suspension) (See Note 5)
Sour Natural Gas (Wet)	S - 1/2 D - 1/2 A - 4	N/A	N/A	N/A	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	N/A	2 weeks
Oil Well Effluent (Group and Flowline)	S - 1/2 D - 1/2 A - 4	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	N/A	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	2 weeks
Salt Water (Produced)	See Note 2	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	2 weeks
Natural Gas (Sweet, Wet)	S - 1/2 D - 1/2 A - 4	N/A	N/A	N/A	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	N/A	1 month
Sour Natural Gas (Dehydrated)	S - 1/2 D - 1/2 A - 4	N/A	N/A	N/A	N/A	N/A	N/A	1 month
Crude Oil (Treated, Spec Oil)	S - 1/2 D - 1/2 A - 4	N/A	N/A	N/A	N/A	S - 4 D - 4 A - 4	N/A	1 months
Natural Gas (Sweet, Dehydrated)	S - 1/2/3 D - 1/2/3 A - 4	N/A	N/A	N/A	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	N/A	2 months
High Vapor Pressure (HVP or NGL)	S - 2/3 D - 2/3 A - 4	N/A	N/A	N/A	N/A	N/A	N/A	2 months
Low Vapor Pressure (LVP or condensate)	S - 2/3 D - 2/3 A - 4	N/A	N/A	N/A	N/A	N/A	N/A	2 months
Fuel Gas	S - 2/3 D - 2/3 A - 4	N/A	N/A	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	N/A	N/A	3 months
Fresh Water	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	S - 4 D - 4 A - 4	3 months

General Notes

- Do not use glycol in aluminum lines without proper additives.
- Pipelines conveying produced water through an unprotected steel pipeline need to be reviewed immediately and should be avoided, as they are an extremely high risk.
- HDPE Liner Suspension – Bleed off vents and dewater the line. The liner itself will provide adequate protection of the pipe wall.
- When a corrosion resistant pipeline material is used, but is connected to unprotected steel risers, the pipeline suspension and discontinuation shall be treated per the guidelines for steel in the above table.
- Additional considerations should be taken in determining the allowable shut-in time before treatment and suspension measures are taken, such as consequence of failure due to water crossings of environmentally sensitive areas.

Lay-Up Methods

[Method 1 – Inhibited Glycol Batch \(piggable systems\)](#)

[Method 2 – Vapor Phase Inhibition \(piggable and non-piggable systems\)](#)

[Method 3 – Glycol Batch \(dehydrated, non-corrosive systems with pigging facilities\)](#)

[Method 4 – Remove Hazardous Environment \(piggable and non-piggable systems\)](#)

Lay-Up Methods:

Method 1 – Inhibited Chemical or Glycol Batch (piggable systems)

1. Pig line with air or sweet natural gas to remove all liquids. This may require multiple pig runs, and possibly installation of temporary pigging facilities.
2. Batch pig the pipeline with ethylene glycol (EG) between multi-disk pigs. The minimum initial EG concentration should be 80% glycol and 20% water. The 20% water provides lower viscosity.

Use enough EG to obtain a 5-10 mil thickness as per the equation below (using the greater of the two calculated volumes):

$$\text{Volume (liters)} = \text{Line Length (kms)} \times \text{ID (mm)} \times \text{Film Thickness (5 mils)} \times 0.08$$

OR

$$\text{Volume of 6 meter long slug (liters)} = r^2 \text{ (mm)} \times 0.0188 \quad (\text{Note: } r = \frac{1}{2} \text{ ID})$$

3. Measure the water quality of the first glycol treatment with an anti-freeze tester as it exits the pipeline. This will indicate the quantity of the water that is still in the line. If the water is difficult to remove, check the interference fit of the multi-disk pig(s) and then repeat steps # 1 and # 2 above.
4. Continue to pig the pipeline until the solution leaving the pipeline has a glycol concentration of 60-70%.
5. Purge with nitrogen.

Note 1: Purging with nitrogen is the preferred media to leave in the pipeline. By performing most of the work with air or sweet gas, the amount of nitrogen required is minimal. Air may be used as the final purge media for any pipeline except sour gas pipelines. Nitrogen **must** be used for sour gas pipelines. It is not permissible to leave sweet gas as the final purge media because the pipeline is deemed to be left in an unsafe condition).

Note 2: This procedure involves the use of inhibited ethylene glycol (EG) for suspension and discontinuations. Prior procedures typically used an oil soluble inhibitor with a hydrocarbon carrier. Experience has shown that water may be left behind, perhaps because of improperly sized pigs, and the oil soluble inhibitor does not provide adequate protection. The EG should contain 2% diethanolamine (DEA) or methyldiethanolamine (MDEA) for improved corrosion inhibition. 100% EG may be used in warm weather; however it may be too viscous for use in cold weather. A solution of 80% EG and 20% water provides lower viscosity.

6. Install blinds for positive isolation; ensure depressurization as well as cathodic bonding if required.

Method 2 – Vapor Phase Inhibition (piggable and non-piggable systems)

1. Remove produced fluids from the pipeline:
 - If piggable, pig and batch the pipeline to remove all fluids and deposits and provide immediate protection against a corrosive environment (push pig with sweet natural gas, nitrogen or air).
 - If not piggable, flush the pipeline with fresh water and attempt to remove as much fluid as possible by means of sweeping with sweet natural gas, air or water; gravity drainage; or vacuum trucks.
2. Isolate and depressure the pipeline; if possible, install blinds for positive isolation.
3. Add a vapor phase inhibitor at one end of the pipeline to elevate the pH of any remaining fluids in the pipeline. The volume of vapor phase inhibitor required is based on the following:

$$\text{Volume (L)} = 0.0002356 \times \text{Line Length (kms)} \times \text{ID}^2 \text{ (mm)} \quad (\text{Assuming 300 PPM target concentration})$$

Note: Ensure Volumes appropriate are confirmed with the Chemical Vendor.

4. Sweep the vapor phase inhibitor with air to promote dispersion, and if possible leave approximately 100 kPa pressure on the pipeline.
5. Allow 10 to 30 days for the vapor phase inhibitor to equalize across the pipeline, test the pipeline for adequate concentration (using the vapor phase inhibitor test kit) on the opposite end of the pipeline to which the vapor phase inhibitor was placed.

The vapor phase inhibitor test kit includes: "Draeger" sampling tool, amine "Draeger" tube(s).

Ensure the concentration of vapor phase amine is no less than 200 PPM, but ideally at 300 PPM or higher. If the concentrations are below 200 PPM, add more vapor phase inhibitor (per calculation above) to increase the concentration to 300 PPM.

6. Field sampling for the presence of amine upon completion of the suspension or discontinuation procedure shall be based on the following guidelines:
 - Monthly on lines where isolation is obtained only through isolation valves; and isolation is not confirmed or is unreliable.
 - Semi-annually for lines where isolation is obtained only through isolation valves; and isolation is confirmed and reliable.
 - Annually for all other lines.

Method 3 – Glycol Batch (dehydrated, non-corrosive systems with pigging facilities)

1. Pig line with air or sweet natural gas to determine if there are any liquids or corrosion products in the line.
2. If there are no liquids or corrosion products in the line, run a single - 100% glycol batch between pigs, then purge with nitrogen.

Note: If there are liquids or corrosion products in the line, use Method 1 or 2.

Method 4 – Remove Hazardous Environment (piggable and non-piggable systems)

1. Remove produced fluids from the pipeline:
 - If piggable, pig the pipeline to remove all fluids and deposits (pig with air, sweet natural gas or nitrogen)
 - If not piggable, flush the pipeline with fresh water and attempt to remove as much fluid as possible, by means of sweeping with sweet natural gas, air or water; gravity drainage; or vacuum trucks.
2. Purge the line with air or nitrogen.

Guidelines to Minimize Internal Corrosion of Pipelines Shut-In at Turnaround or Short Duration Shutdowns (Less Than 2 Months)

1. If flowlines are on continuous inhibition:
 - Learn or know the inhibitor chemical filming persistency. If the film persistency is adequate, the line should be acceptable for 2-3 weeks.

- If inhibitor is changed, or if persistency is unknown, follow the procedures below. This can be done on several sites, but does not need to be done on all sites.

Note: Corrosion rates for long term exposure are known through regular coupon pulls. Each location should also at some point in time have a corrosion curve built that shows the usual accelerated corrosion rate that occurs at 2, 4, 6, 8, 16 and 32 day pulls. This data will be related to pressure and temperature and can be used to evaluate inhibitors.

- If the film persistency is not adequate for the length of downtime, follow the procedure below for batch inhibition (including coupon testing). If this has been done, and the damage is too great, initiate one or more of the following methods to reduce corrosion damage:
 - Perform a one-time inhibitor batch treatment with a different inhibitor
 - Reduce the corrosion rate by depressurizing the pipeline
 - Purge with sweet gas
 - Suspend the line
2. If the flowline is not on continuous inhibition, then it should be on batch inhibition. A batch should be run immediately before the line is shut in, and the coupons changed. Coupons can then be pulled and evaluated when the line is brought back on to determine if any damage was done.
 3. If the line is high risk and/or high consequence, internal corrosion can be reduced by following the above procedures. A further reduction in corrosion rate can be accomplished by:
 - Depressurizing the line
 - Purging the line with sweet gas

Pigging Procedure for Suspending, Discontinuing and Abandoning Pipelines

If the line is to be **abandoned**:

1. Ensure that there has been land owner notification at minimum 90 days prior to the execution of the physical work (work through with the Pengrowth Licensing Technician to ensure notification has been completed).
2. Pig the line with air to remove liquids. Use a soft cup type wiper pig, 2% to 5% oversize of the largest pipeline ID, with a Durometer rating of 60. This is a soft pig that should remove the liquids. One pig should be adequate.
3. Ensure proper Isolation as per "Isolation Standards".
4. Ensure the cathodic protection has been removed from the pipeline.
5. Complete the "[Pipeline Internal Status](#)" form and forward to the Area Integrity Coordinator within 30 days.

If the line is to be **discontinued** or **suspended**:

1. Pig the line with air to remove liquids. Use a soft cup type wiper pig, 2% to 5% oversize of the largest pipeline ID, with a Durometer rating of 60. This is a soft pig that should remove the liquids.
2. Run a second, disc type pig, with a Durometer rating of 80. This is a harder rubber that should remove the deposits if there are any. If the first two pig runs go smoothly, without any hang-ups (e.g. surging due to pigs hanging up on deposits or thicker wall pipe) and there are no obvious deposits, then run the inhibitor or glycol slug (Step 4). If the pigs surged a lot or did not appear to run smoothly, or there were a lot of deposits, run a wire brush pig (Step 3).

3. Run a wire brush pig. If the wire brush pig removes a lot of deposit, consider running the brush pig again or another disc type pig.
4. Run the inhibitor or glycol slug. The first or lead pig should be a cup and disc pig, with a front cup and two discs behind. The trailing pig should be a filming pig.
5. Ensure that both ends have the proper Isolation as per ["Isolation Standards"](#).
6. Ensure that the cathodic protection remains on the pipeline via bonded connection (i.e. bond wire, valve left in with blind Spec. U/S)
7. Complete the ["Pipeline Lay-Up Form"](#) and forward to the Area Integrity Coordinator within 30 days.

General Notes and Comments

1. Depending upon the number of changes in wall thickness, the number of 90 degree elbows and the amount of deposits, the pigs may get hung up, come loose and surge ahead. Depending upon the size of the compressor and the length and size of line, it may take some time to build up pressure again. The more surges, the more likely to by-pass water or deposits. For large diameter or long lines or lines with a lot of deposits, it may be advisable to wait until a large capacity compressor can be brought in (possible winter access considerations).
2. Precautions for Purging Pipelines with Air

Purging pipelines with air should be addressed carefully to mitigate the risks of developing a potentially explosive environment. Efforts to mitigate development of an explosive atmosphere may include the following:

- Cleaning the pipeline by pigging to clean the pipeline (remove solids, build-up and remaining fluid).
- Depending on service and scales, solids or deposits present, this may involve a series of pigs being sent down the line, starting with a foamy or ball pig, and eventually working up to a 70 durometer (or higher) scraper pig.
- The pigs can be pushed with natural gas or other media that will not cause development of an explosive atmosphere
- On the final pig run, insert the lead pig, followed by a cushion of Nitrogen, and a pig being propelled by compressed air.
- If practical and feasible, the pig receiver may be tied into available tankage (pop tanks, etc.) or P-Tank via flexible hoses to dispose of the fluids and solids.

NOTE: The risk of developing an explosive atmosphere is low in small bore piping/pipelines where extra caution is needed for larger diameter installations.

POMM – Pipeline Status Change Form R10

General Details		
District:	Area:	Review Date:
Pipeline ID (QM4 ID):	Name (Ops/Projects):	
From Location:	To Location:	Name (AIC):
Pipeline Description:		

Status Change Details		
Operating Status Change:	Operating Status Change required? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Change From: <input type="checkbox"/> Operating <input type="checkbox"/> Discontinued <input type="checkbox"/> Abandoned	
	Change To: <input type="checkbox"/> Operating <input type="checkbox"/> Discontinued <input type="checkbox"/> Abandoned	
License Attribute Change:	License Attribute Change required? <input type="checkbox"/> Yes <input type="checkbox"/> No (Check all that apply)	
	<input type="checkbox"/> MOP Increase <input type="checkbox"/> MOP Decrease <input type="checkbox"/> Self Disclosure <input type="checkbox"/> Physical Removal <input type="checkbox"/> H ₂ S Increase <input type="checkbox"/> H ₂ S Decrease <input type="checkbox"/> Line Split <input type="checkbox"/> Records Correction <input type="checkbox"/> Resumption of Operation <input type="checkbox"/> Liner Installation <input type="checkbox"/> Flow Reversal <input type="checkbox"/> Other:	
	Location Change required? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	From LSD/NTS: Existing: _____ Revised: _____ To LSD/NTS: Existing: _____ Revised: _____	
Substance Change:	Substance Change required? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Existing Substance Code:	Revised Substance Code:
	Re-licensing required? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Original License:	New License:

Pipeline Resumption Details	
Resumption Details: <input type="checkbox"/> Applicable <input type="checkbox"/> Not Applicable	Pipeline Start-Up Form complete? <input type="checkbox"/> Yes <input type="checkbox"/> No
	Regulatory Approval required for resumption? <input type="checkbox"/> Yes <input type="checkbox"/> No
	Date Approved: _____
Comments:	

Pipeline Discontinuation Details	
Discontinuation Details: <input type="checkbox"/> Applicable <input type="checkbox"/> Not Applicable	Pipeline Lay-Up Form complete? <input type="checkbox"/> Yes <input type="checkbox"/> No
	Date physical discontinuation work was completed: _____
	Date Approved: _____
Comments:	

POMM – Pipeline Status Change Form R10

Abandonment Details	
Abandonment Details: <input type="checkbox"/> Applicable <input type="checkbox"/> Not Applicable	Means of Abandonment? <input type="checkbox"/> Left In Place <input type="checkbox"/> Pipeline Removed
	For Abandonment In-Place: Risers cut and capped below grade? <input type="checkbox"/> Yes <input type="checkbox"/> No
	Left in safe condition? <input type="checkbox"/> Yes <input type="checkbox"/> No
	Ends tagged with required identification (per POMM)? <input type="checkbox"/> Yes <input type="checkbox"/> No
	Date physical work was completed: _____
For Abandonment by Removal: Date the pipeline was removed: _____	
Comments:	

Approval to Proceed with Status Change or Amendment

When involved, the Projects of Operations resources will sign the form to verify requirements have been met.

Prior to proceeding with the status change or amendment, the Area Integrity Coordinator will review and sign-off the form to ensure all requirements have been met.

Projects/Operations Sign-Off <i>(if involved)</i>	_____ Name	_____ Signature	_____ Date
Area Integrity Coordinator Sign-Off	_____ Name	_____ Signature	_____ Date

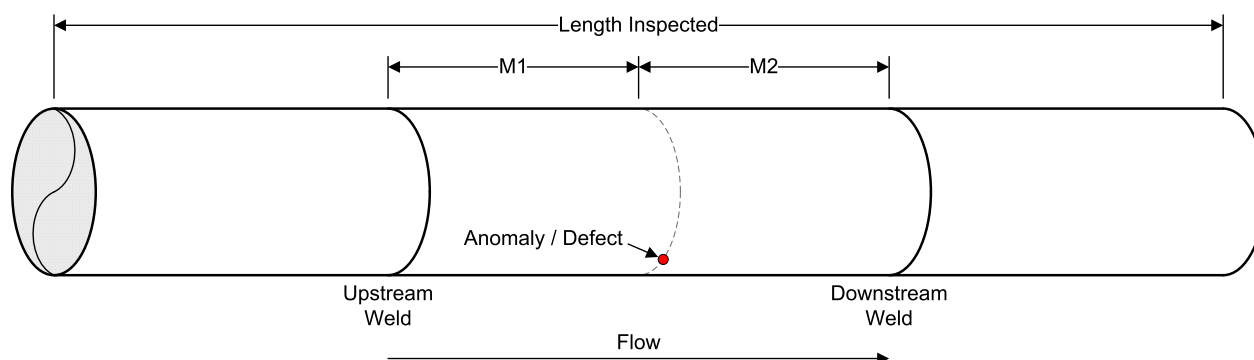
General Data

Inspection Date:	Area:
Pipeline License/Segment:	LSD:
Inspected By: (print)	GPS Coordinates:

Pipe Data

Pipe Diameter (mm):	Wall Thickness (mm):
External Coating: <input type="checkbox"/> YJ <input type="checkbox"/> Tape <input type="checkbox"/> Paint <input type="checkbox"/> Insulated	Condition: <input type="checkbox"/> Good <input type="checkbox"/> Poor

Pipe Anomaly Assessment



Anomaly Type:	<input type="checkbox"/> External Corrosion	<input type="checkbox"/> Internal Corrosion	<input type="checkbox"/> Dent	<input type="checkbox"/> Gouge	<input type="checkbox"/> Crack	<input type="checkbox"/> Arc Burn
Location (O'clock):	Distance from M1 (mm):	Distance from M2 (mm):				
Transition Joint: <input type="checkbox"/> Yes <input type="checkbox"/> No	U/S Transition WT (mm):	D/S Transition WT (mm):				
Corrosion Depth (mm):	Corrosion Area Size (length & width in mm):					
Remaining W.T (mm):						
Length Inspected (mm):	Means of Assessment:	<input type="checkbox"/> RT Shadow Shots	<input type="checkbox"/> UT	<input type="checkbox"/> Direct Inspection / Measurement		
Replacement Required: <input type="checkbox"/> Yes <input type="checkbox"/> No	Reasons:					
Comments / Observations:						

Pipe Supports

Does support exist?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Adequate Support:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Support isolated from piping?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Describe:	
New support required?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Describe:	
Comments / Observations:			

NOTE 1: Fill in the blanks above and submit to the Integrity Coordinator when complete.
NOTE 2: If anomalies are to be left in pipe, consult the Area Integrity Coordinator for approval to resume operation.

PIPELINE RISER INSPECTION

General Data

Inspection Date: _____ Field: _____
 Pipeline License #: _____ Segment #: _____
 Inspected By: (print) _____ LSD: _____

Pipe Data

Wall Thickness (mm): _____ Nominal _____
 Transition Joint: ☐ Yes ☐ No
 Transition W.T.: Upstream (mm): _____ Downstream (mm): _____
 External Coating: ☐ YJ ☐ Tape ☐ Paint ☐ Insulated
 Condition: ☐ Good ☐ Poor
 Shadow Shots: ☐ Yes ☐ No
 Damage: ☐ External Corrosion ☐ Internal Corrosion ☐ Dent ☐ Gouge ☐ Crack ☐ Arc Burn
 Location: _____ O'clock _____
 Corroded Area: ☐ Upstream of Transition Distance (mm): _____ ☐ Downstream of Transition Distance (mm): _____
 Corrosion Depth (mm): _____
 Corrosion Area Size (length & width): _____
 Remaining W.T. (mm): _____
 Replacement Required? ☐ Yes ☐ No Reasons: _____

Pipe Supports

Does support exist? ☐ Yes ☐ No
 Adequate support? ☐ Yes ☐ No
 Support isolated from piping? ☐ Yes ☐ No Describe: _____

 New support required? ☐ Yes ☐ No Describe: _____

 Comments / Observations: _____

NOTE: Fill in the blanks above and submit to the Integrity Coordinator when complete.

POMM – Pipeline Start-Up Form

General Details		
District:	Area:	Review Date:
Pipeline ID (QM4 ID):		Name (Projects / Ops):
From Location:	To Location:	Name (AIC):
Pipeline Description:		

Pipeline Details			
Service Classification	Process Fluid / Gas	Substance Code	Fluid Classification
<input type="checkbox"/> Sweet <input type="checkbox"/> Sour <input type="checkbox"/> N/A			<input type="checkbox"/> Severely Corrosive Service <input type="checkbox"/> Corrosive Service <input type="checkbox"/> Regular Service <input type="checkbox"/> Non-Corrosive Service / Material
MOP (Kpa):	Diameter (mm):	Length (km):	Material Code:

Start-Up Details	
Start-Up Classification:	<input type="checkbox"/> Commissioning (New P/L) <input type="checkbox"/> Resumption (Suspended, Discontinued, or Abandoned P/L)

New Pipeline Commissioning <input type="checkbox"/> Applicable <input type="checkbox"/> Not Applicable					
Requirements for commissioning of a new pipeline:	Verify that the following activities and records are complete before commissioning the pipeline:				
	Yes	N/A	Activity	Yes	N/A Activity
	<input type="checkbox"/>	<input type="checkbox"/>	De-watering	<input type="checkbox"/>	<input type="checkbox"/> Chemical/Mitigation Program established (document in section below)
	<input type="checkbox"/>	<input type="checkbox"/>	Pre-commissioning batch (required for unprotected steel pipelines)	<input type="checkbox"/>	<input type="checkbox"/> Cathodic protection established or verified
	<input type="checkbox"/>	<input type="checkbox"/>	Quality control documentation	<input type="checkbox"/>	<input type="checkbox"/> Acceptable pressure protection and control devices installed and tested
	<input type="checkbox"/>	<input type="checkbox"/>	Hydrostatic test	<input type="checkbox"/>	<input type="checkbox"/> MOC evaluation complete to determine effects of existing infrastructure
		<input type="checkbox"/> Pre-commissioning checklist (Field Project Coordination Manual)	<input type="checkbox"/>	<input type="checkbox"/> Regulatory approval to commission the pipeline	
Details:					

Resumption of Operation (Re-Commissioning) <input type="checkbox"/> Applicable <input type="checkbox"/> Not Applicable					
Requirements for resuming operating of a pipeline (re-commissioning):	Verify that the following activities and records are complete before resuming operation of the pipeline:				
	Yes	N/A	Activity	Yes	N/A Activity
	<input type="checkbox"/>	<input type="checkbox"/>	Integrity of the pipeline has been verified (describe methods below)	<input type="checkbox"/>	<input type="checkbox"/> Cathodic protection established or verified
	<input type="checkbox"/>	<input type="checkbox"/>	Pre-commissioning batch (required for unprotected steel pipelines)	<input type="checkbox"/>	<input type="checkbox"/> Acceptable pressure protection and control devices installed and tested
	<input type="checkbox"/>	<input type="checkbox"/>	Hydrostatic test (if required by Regulator)	<input type="checkbox"/>	<input type="checkbox"/> MOC evaluation complete to determine effects of existing infrastructure
	<input type="checkbox"/>	<input type="checkbox"/>	Mitigation Program resumed (document in section below)	<input type="checkbox"/>	<input type="checkbox"/> Regulatory approval to commission the pipeline
	Method(s) of Integrity Verification:		<input type="checkbox"/> Acceptable review of Lay-Up Documents <input type="checkbox"/> Hydrostatic test (per CSA Z662 regulations) <input type="checkbox"/> Pressure test at _____ Kpa for _____ hours <input type="checkbox"/> Cut-outs and laboratory analysis	<input type="checkbox"/> In-line inspection <input type="checkbox"/> Digs and direct assessment (NDE) <input type="checkbox"/> Sampling of removed pigged fluids indicate line had been properly laid-up <input type="checkbox"/> Review of CP records indicate adequate CP had been maintained	
	Details:				

POMM – Pipeline Start-Up Form

Mitigation Program Details		<input type="checkbox"/> Mitigation Program Required <input type="checkbox"/> Not Required (non-corrosive materials, etc.)	
Pre-commissioning or pre-resumption batch: <input type="checkbox"/> Required <input type="checkbox"/> Not Required	Chemical Used (product name):	Diluent Used:	
	Chemical Volume (L):	Diluent Volume (L):	
	Application Date:	Completed By:	
	Details:		
Pigging Program: <input type="checkbox"/> Required <input type="checkbox"/> Not Required	Pigging Program Objective: <input type="checkbox"/> Corrosion Control <input type="checkbox"/> Hydrate Control <input type="checkbox"/> Cleaning <input type="checkbox"/> Wax Control <input type="checkbox"/> Unloading Pipeline (Flow Optimization)		
	Pigging Interval (Days):	Pig Type(s) Used: <input type="checkbox"/> Cup <input type="checkbox"/> Foamie <input type="checkbox"/> Ball <input type="checkbox"/> Wire	
	Operating Procedure for Pigging:		
	Details:		
Batch Program: <input type="checkbox"/> Required <input type="checkbox"/> Not Required	Batching Interval (Days):	Application Method: <input type="checkbox"/> Pig / Batch / Pig <input type="checkbox"/> Slug Batch	
	Chemical Used (Product Name):	Diluent Used:	
	Chemical Volume (L):	Diluent Volume (L):	
	Operating Procedure for Batching:		
	Details:		
Continuous Chemical Program: <input type="checkbox"/> Required <input type="checkbox"/> Not Required	Corrosion Inhibitor: <input type="checkbox"/> Required <input type="checkbox"/> N/R	Chemical Used (product name):	Injection Rate (L/day):
	Demulsifier: <input type="checkbox"/> Required <input type="checkbox"/> N/R	Chemical Used (product name):	Injection Rate (L/day):
	Scale Inhibitor: <input type="checkbox"/> Required <input type="checkbox"/> N/R	Chemical Used (product name):	Injection Rate (L/day):
	Paraffin/Wax Inhibitor: <input type="checkbox"/> Required <input type="checkbox"/> N/R	Chemical Used (product name):	Injection Rate (L/day):
	Asphaltene Dispersant: <input type="checkbox"/> Required <input type="checkbox"/> N/R	Chemical Used (product name):	Injection Rate (L/day):
	Oxygen Scavenger: <input type="checkbox"/> Required <input type="checkbox"/> N/R	Chemical Used (product name):	Injection Rate (L/day):
	H2S Scavenger: <input type="checkbox"/> Required <input type="checkbox"/> N/R	Chemical Used (product name):	Injection Rate (L/day):
	Biocide <input type="checkbox"/> Required <input type="checkbox"/> N/R	Chemical Used (product name):	Injection Rate (L/day):
	Methanol (Hydrate Control): <input type="checkbox"/> Required <input type="checkbox"/> N/R	Chemical Used (product name):	Injection Rate (L/day):
	Glycol (Hydrate Control): <input type="checkbox"/> Required <input type="checkbox"/> N/R	Chemical Used (product name):	Injection Rate (L/day):
Details:			

Approval to Commission or Resume Operation of the Pipeline

The review and sign-off is to be complete by the Operations or Project Representative and the Area Integrity Coordinator once all requirements have been met.

Projects / Operations Sign-Off	_____	_____	_____
	Name	Signature	Date
Area Integrity Coordinator Sign-Off	_____	_____	_____
	Name	Signature	Date
Date Pipeline Commissioned or Resumed:			

POMM – Pipeline Lay-Up Form

General Details			
District:		Area:	Review Date:
Pipeline ID (QM4 ID):		Name (Projects / Ops):	
From Location:	To Location:	Name (AIC):	
Pipeline Description:			

Pipeline Details			
Service Classification	Process Fluid / Gas	Substance Code	Fluid Classification
<input type="checkbox"/> Sweet <input type="checkbox"/> Sour <input type="checkbox"/> N/A			<input type="checkbox"/> Severely Corrosive Service <input type="checkbox"/> Corrosive Service <input type="checkbox"/> Regular Service <input type="checkbox"/> Non-Corrosive Service
MOP (Kpa):	Diameter (mm):	Length (km):	Material Code:

Lay-Up Details	
Lay-Up Timing and Future Use:	Date of Last Production:
	Intended Future Use: <input type="checkbox"/> Planned Future Use <input type="checkbox"/> Possible Future Use (undetermined) <input type="checkbox"/> No Future Use Planned
	Planned Suspension Duration:
	Regulatory Status Change Required: <input type="checkbox"/> Yes <input type="checkbox"/> No Intended Status: <input type="checkbox"/> Discontinued <input type="checkbox"/> Abandoned
Isolation:	<input type="checkbox"/> Blinded (spec. blinds at equip or system): <input type="checkbox"/> Locked Double Block & Bleed <input type="checkbox"/> Riser Cut and Capped <input type="checkbox"/> Spools Dropped Out
	Details:
	Compliant with the Isolation Standard? <input type="checkbox"/> Yes <input type="checkbox"/> No Comments:
Equipment De-Pressured:	<input type="checkbox"/> Yes (de-pressured/zero-energy state) <input type="checkbox"/> No (pressure maintained) If YES : Describe how zero-energy state verified (pressure gauge, open vent, etc.) If NO : Describe below what pressure is maintained at, for what reason, and pressure protection in place
	Details:
Cleaning:	<input type="checkbox"/> Pigged Type of pig and details:
	<input type="checkbox"/> Flushed Details (flushed with):
	<input type="checkbox"/> Purged Details (purge gas):
	Details:
Corrosion Mitigation or Lay-Up Activities:	<input type="checkbox"/> None Required <input type="checkbox"/> Inhibited Glycol Batch <input type="checkbox"/> Corrosion Inhibitor Batch <input type="checkbox"/> Vapour Phase Corrosion Inhibitor
	<input type="checkbox"/> Purged (Nitrogen) <input type="checkbox"/> Purged (Natural Gas) <input type="checkbox"/> Purged (Air) <input type="checkbox"/> CP Maintained
	<input type="checkbox"/> Fresh H ₂ O Flush <input type="checkbox"/> Inhibited H ₂ O Flush <input type="checkbox"/> Other:
	Details:

POMM – Pipeline Lay-Up Form

Lay-Up Details

**Re-Commissioning
of Pipeline:**

- ☐ Applicable
☐ Not Applicable

Regulatory status change required?

☐ Yes ☐ No

Details:

Work required to place pipeline back in-service:

Lay-Up Plan and Documentation Sign-Off

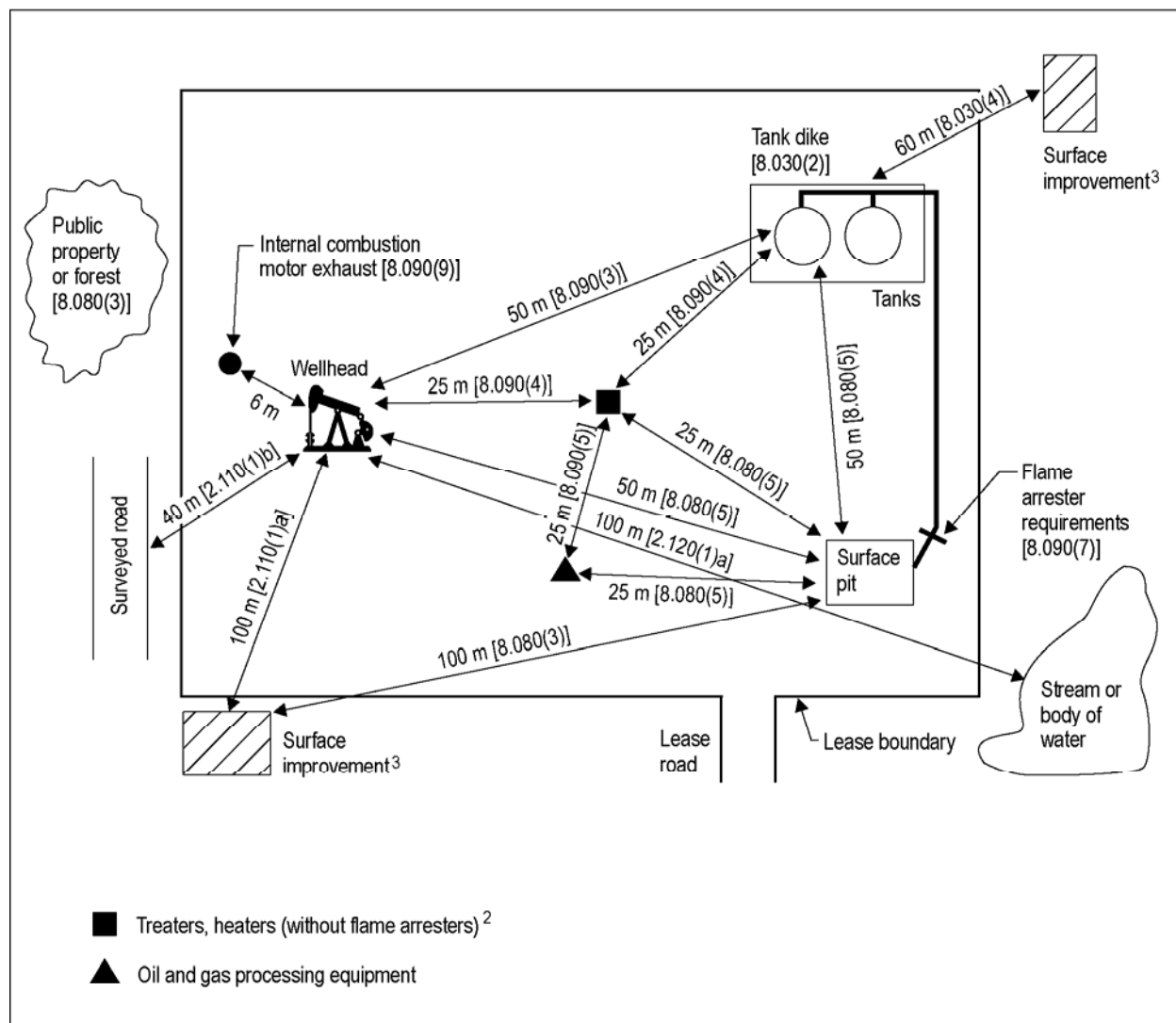
Date Lay-Up Complete:

Details:

The review and sign-off is to be complete by the Operations Representative and the Area Integrity Coordinator (AIC) once lay-up work is complete.

**Projects / Operations
Sign-Off**_____
Name_____
Signature_____
Date**Area Integrity
Coordinator Sign-Off**_____
Name_____
Signature_____
Date

Appendix 7 Spacing Diagram



¹ The spacing requirements illustrated here are as specified in the *Oil and Gas Conservation Regulations* sections indicated within square brackets alongside or underneath each measurement.

No person shall smoke within 25 m of a well, separator, oil storage tank or other unprotected source of ignitable vapour or on a rig or derrick at a well site Section 8.120(1).

² No flame type equipment shall be placed or operated within 25 metres of any process vessels unless, where such is applicable, the flame type equipment is fitted with an adequate flame arrester [8.090(5)]. No flame type equipment shall be located in the same building as any process vessel or other source of ignitable vapour, unless a) the air intakes and flues of all burners are located outside the building, b) relief valves, safety heads, and other sources of ignitable vapours are vented outside the building and discharged above roof level, and c) the building is adequately cross ventilated [8.090(6)a,b,c].

³ "Surface improvement" means a railway, pipeline or other right-of-way, road allowance, surveyed roadway, dwelling, industrial plant, aircraft runway or taxiway, building used for military purposes, permanent farm building, school or church [1.020(1)28].

Compressors (electrically or engine driven) that are permanent and housed in a building must be located 25 m from wells, oil storage tanks, or unprotected sources of ignitable vapours. Compressors that are nonpermanent (on wheels or skid mounted) must be placed such that the air intakes and exhaust must be no closer than 6 m from a well. Nonpermanent electrically driven compressors must comply with the current edition of *Code for Electrical Installations at Oil and Gas Facilities*, Safety Codes Council (Alberta).



SURFACE EQUIPMENT SPACING GUIDELINE

	WELLHEAD	FLARE	BOILER, STEAM GENERATING EQUIPMENT, TEG*	PRODUCED WATER TANK	OTHER SOURCES OF IGNITABLE VAPOURS	SEPARATOR	FLAME TYPE EQUIPMENT	PRODUCED FLAMMABLE LIQUIDS CRUDE OIL & CONDENSATE TANKS	SURFACE IMPROVEMENTS
WELLHEAD		50	25	NS	NS	NS	25*	50	80
FLARE	50		NS	25	25	25	25	50	80
BOILER, STEAM GENERATING EQUIPMENT, TEG*	25	NS		25	25	25	25	25	NS
PRODUCED WATER TANK	NS	25	25		NS	NS	25*	NS	NS
OTHER SOURCES OF IGNITABLE VAPOURS	NS	25	25	NS		NS	25*	NS	NS
SEPARATOR	NS	25	25	NS	NS		25*	NS**	NS
FLAME TYPE EQUIPMENT	25*	25	25	25*	25*	25*	T	25*	NS
PRODUCED FLAMMABLE LIQUIDS CRUDE OIL & CONDENSATE TANKS	50	50	25	NS	NS	NS**	25*		60
SURFACE IMPROVEMENTS	80	80	NS	NS	NS	NS	NS	60	

NOTE: ALL DISTANCES IN THE TABLE ARE IN METERS (m)

NS - NOT SPECIFIED

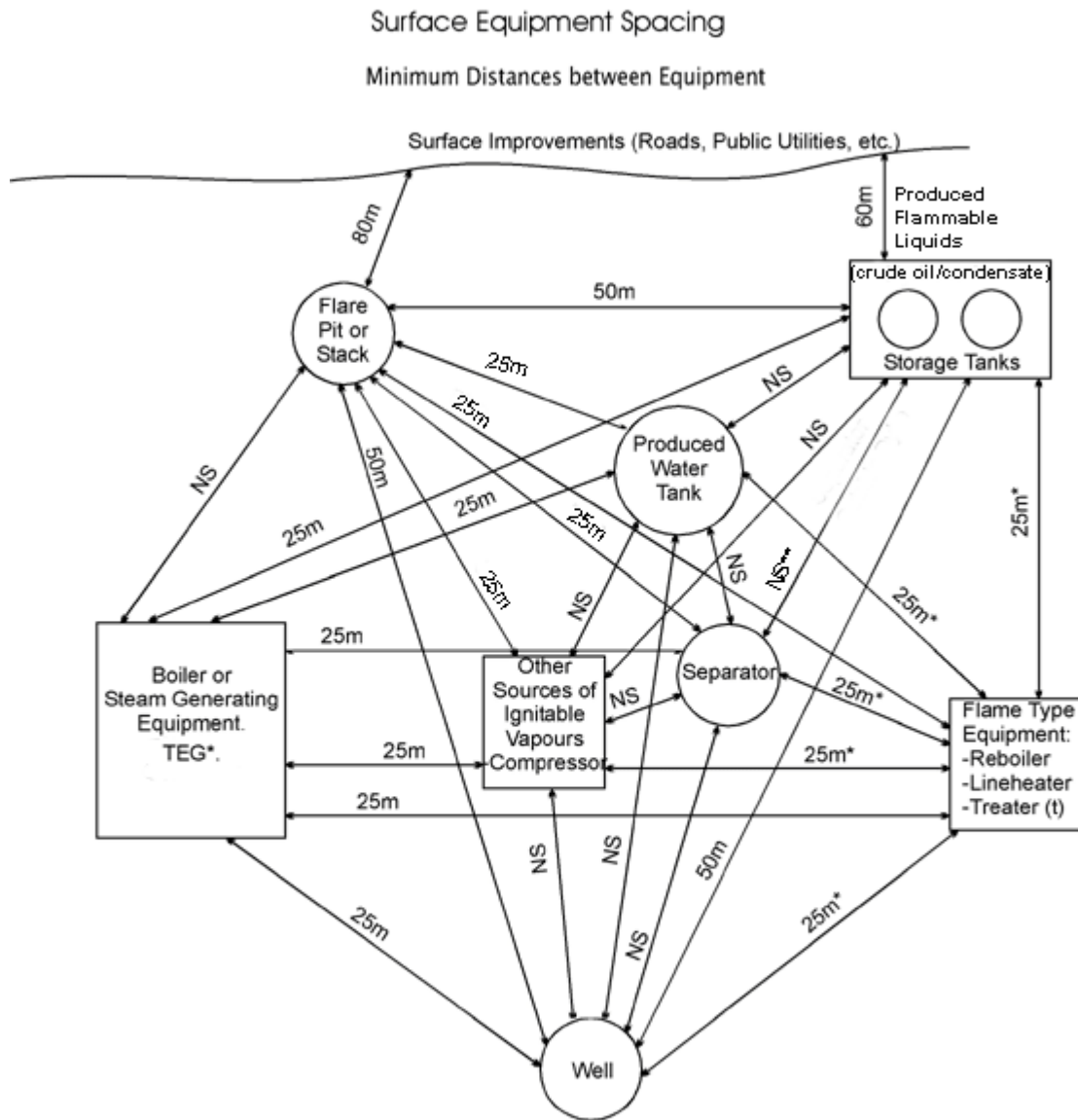
*** - 25m WITHOUT FLAME ARRESTOR, NOT SPECIFIED WITH FLAME ARRESTORS**

**** - SEPARATOR CANNOT BE IN THE SAME DYKE**

T - TREATERS MUST BE AT LEAST 5m (SHELL TO SHELL) FROM OTHER TREATERS

NOTES:

- Boilers etc. include steam generating equipment, electric generators and TEG units
- Other sources of ignitable vapours include compressors
- Flame type equipment include:
 - Treaters
 - Reboilers
 - Line Heaters
- Surface improvements include public roads, public utilities, etc.
- All electrical installations must conform to the latest Canadian Electrical Code



All electrical installations must conform to the Canadian Electrical Code.

(t) Treater must be at least 5m (shell to shell) from other treaters

*25m without flame arrestors, not specified with flame arrestors.

**separator outside dyke

NS - Not Specified.

Representation is NOT to Scale.

APPENDIX 2 EQUIPMENT SPACING REQUIREMENTS

Equipment Spacing Distances (m)	Oil or Gas well	Water supply of Water source well	Flare	Oil Storage tanks	Salt water storage tanks	***Portable water tanks	**Process Equipment	*Flame type equipment with flame arrester	*Flame type equipment without flame arrester	Compressor with permanent footing	Internal combustion engine exhaust
Oil or gas well		na	50	50	50	25	25	25	25	50	6
Water supply, water injection or water disposal well	na		25	50	na	na	na	na	na	25	na
Flare	50	25		50	50	50	25	25	25	25	na
Oil storage tanks	50	50	50		na	na	na	25	25	25	na
Salt water storage tanks	50	na	50	na		na	na	25	25	25	na
***Portable water tanks	25	na	50	na	na		na	25	25	25	na
**Process Equipment	25	na	25	na	na	na		na	25	na	na
*Flame type equipment with flame arrester	25	na	25	25	25	25	na		25	na	na
*Flame type equipment without flame arrester	25	na	25	25	25	25	25	25		25	na
Compressor with permanent footing	50	25	25	25	25	25	na	na	25		na
Internal combustion engine exhaust	6	na	na	na	na	na	na	na	na	na	

* **Flame type equipment** includes any open flame equipment, other heating device or electrical device that has open ignition and/or could potentially cause a fire or explosion. For the purpose of equipment spacing, flame type equipment includes, but is not limited to, steam boilers, free water knock-outs, dehydrators, generators, heaters, treaters, diesel engines without automatic air shut offs and heated water tanks on a skid.

** **Process equipment** includes any non-flame type equipment used in the upstream petroleum recovery or treatment process such as, but not limited to, amine tank, pop tank, flare knockout drum (N/A with appropriate overfill protection and flame arrestor), scrubber, sweetener and separator. Process equipment generally does not have a permanent footing.

*** **Portable Water tanks** are skid mounted, less than 65m³ and are not heated.



Facilities Legislative Requirements

Alberta

Directive 64:

The facility check sheet used by an ERCB inspector has the following major categories

- Measurement
- Equipment
- Environment
- Other
- Enforcement

Within each category there are numerous items that will be deemed satisfactory, low risk unsatisfactory, high risk unsatisfactory.

The following items will be deemed high risk unsatisfactory and are in direct control of Pengrowth as a whole. If any of the following are suspected contact the appropriate Pengrowth representative.

Equipment

Spacing

- Flame-type equipment without workable flame arrester less than 25m from a process vessel. Check to ensure flame arrester has all bolts, is not saturated with oil, is properly fitted, and has gasket where required
- Air intake of flues for a burner inside a building containing a pressure vessel
- Flare stack less than 100 m from an occupied residence

Flare System

- No flare stack where required
- Sour pressure relief valves not tied into flare system where required
- No flame arrester on line from tank to flare stack where required
- Pilot/ignition devices not available/operable (intermittent sour and acid gas flares)
- Insufficient fuel gas to acid gas or sour gas flare
- Operating procedures and/or automatic shutdowns not in place to control major sour/acid gas flaring events
- Venting practices not conducted in accordance with Directive 60.

Emergency Shutdowns

- No surface shutoff valve where required
- No subsurface shutoff valve where required

Compressor Installation

- No approval for permanent compressor
- Temporary approval for compressor expired
- No approval for temporary compressor (operating more than 21 days)

General Storage Practices (Section 3, Directive 55)

- Temporary single walled aboveground tank not diked (unless operation qualifies for it to be optional)
- Contaminated material stored directly on the ground

Aboveground storage tank(s) with internal volume equal to or greater than 5 m³

- No tank dike where required

Underground storage tank(s) including associated piping

- No leak detection and secondary containment where required
- Underground storage tank(s) not double walled (tanks installed after January 1, 2002)
- Newly installed tank(s) and associated piping not tested prior to service
- Underground tank(s) not tested at the required three-year frequency/operator cannot demonstrate tank integrity.

Note: Integrity test required only for pre 1996 sites that do not have full secondary containment. Option is to verify integrity and repeat every three years or retrofit tank with full secondary containment

Bulk pads for the storage of solid materials

- Not constructed of compacted clay, synthetic liner, concrete, or asphalt

Vapor Recovery (facilities greater than 10 mol/kmol or where required)

- Vapor recovery equipment inadequate/not operable (e.g. Flame arrester plugged, thief hatch not dealing, venturi not working, vapor recovery compressor down)

Environment

Odor Emissions

- H₂S emissions off lease (identify source and cause)
- Maximum permissible concentration for H₂S/SO₂ being exceeded. (identify source and cause)
- Failure to immediately notify the ERCB of H₂S emissions off lease

Noise Emissions

- Facility exceeding permissible sound levels

Waste Management (references are to Guide 58)

- Waste disposal to facility not authorized to accept it (section 2.1)
- Dangerous oilfield waste (DOW)/dangerous waste/hazardous waste imported to EUB approve facilities from outside Alberta. Other wastes (non-DOW) accepted at facility without prior ERCB approval (Section 3.0)
- Oilfield wastes mixed for the purpose of dilution to avoid regulatory requirements (Section 5.5)
- Banned oilfield wastes injected into pipeline system (Section 6.1)
- Land treatment area at approved facilities received more than one application
- Land treatment area at approved facility :
 - Received waste not susceptible to biodegradation and/or creates offensive odors at site boundaries

- Slope exceeds 5 per cent and area less 100 m from any permanent body of water used more than five years
 - Application of waste occurred between October 15 and April 30, during rainfall periods or when soil is saturated with water, ice covered, snow covered or frozen
- Banned Small batch feed incinerator on lease
 - Not designed in accordance with Section 17.4.3
 - Burning wastes other than waste types I, II, and III
 - Burning other disposable filters
 - Incineration occurring within 1.5 km of any residence or public facility (without EUB approval) (Section 17.4)
- Oily by-products from other than heavy oil production applied to road surfaces

Spills

- Spill on/off lease not adequately controlled/cleaned up
- Unaddressed spill into water
- No notification of reportable spill to EUB

Pits

- Pit containing produced fluids or process chemicals
- Disposal of precipitation from pit unsatisfactory as per Directive 58

Surface Runoff Control

- Spill Lease not (diked where required)
- Release criteria in Directive 55/Directive 58 not met prior to release

Other

Compliance with Other ERCB Requirements

- Facility operating without approval
- Flare reductions during planned shutdowns and emergency events not in compliance with flaring requirements (oil batteries/solution gas plants) (Directive 60, Section 2.1.6)
- No personal/public notification where required

Emergency Response Plan (s)

- No approved site-specific ERP where required
- ERP manual not updated yearly, exercises not conducted, or details not documented
- Copy of ERP not readily available
- On-site operator representative not familiar with ERP
- No corporate-level ERP where required

There are numerous low risk unsatisfactory items that are identified in Appendix 1 of Directive 64. Further clarifications of non compliance items can be found in Section 2 of Directive 64.

Saskatchewan and British Columbia

Under construction

If in doubt default to the guidelines for Alberta to be safe.

Manual 001

September 15, 2010

Facility and Well Site Inspections

The Energy Resources Conservation Board (ERCB/Board) has approved this manual on September 15, 2010.

<original signed by>

Dwayne Waisman
Executive Manager
Field Surveillance and Operations Branch

A Gas Facilities

1 Equipment

1.1 Gas Measurement

Manual #	Result	Description
1.1.5.5	High Risk	No gas delivery point (sales) measurement. [OGCR 7.004, 14.040; <i>Directive 017</i> (1.7.2(i)), (4.1), (9.3), (Appendix 3)]
1.1.5.10	High Risk	Produced gas (plant inlet, total battery/group gas) not metered. [OGCR 7.004, 14.040; <i>Directive 017</i> (1.7.1(i)), (1.7.2(iii)), (4.1), (4.2.1 - 4.2.4), (5.5), (7.1.1), (12.3.2)]
1.1.5.15	High Risk	Flared/vented gas not measured. [OGCR 14.040; <i>Directive 017</i> (4.1), (4.3.5.1), (4.3.5.2), (4.3.5.3); <i>Directive 060</i> (10.1), (10.2)]
1.1.5.20	Low Risk	Fuel gas not measured. [<i>Directive 017</i> (4.1), (4.2.2), (4.3.5.2), (4.3.5.3)]
1.1.5.22	High Risk	Acid gas not metered. [OGCR 14.200; <i>Directive 017</i> (4.2.4), (11.1), (11.4.4.1), (11.4.4.3); <i>Directive 060</i> (10.1(1)(b))]
1.1.5.23	High Risk	Acid gas stream does not have continuous temperature measurement. [<i>Directive 017</i> (4.3.1), (11.2); <i>Directive 060</i> (10.1)]
1.1.5.24	High Risk	Dilution gas volumes not metered. [<i>Directive 017</i> (4.3.5.2); <i>Directive 060</i> (10.1(1)(c))]
1.1.5.25	Low Risk	Design, installation, and operation of measurement system is not in accordance with requirements. [OGCR 14.070, 14.080; <i>Directive 017</i> (4.3.1), (4.3.4), (4.3.5)]
1.1.5.28	Low Risk	Gas well effluent measurement test taps installed upstream of the well effluent meter. [<i>Directive 004</i> (4.2); <i>Directive 017</i> (7.4)]
1.1.5.30	Low Risk	Meter not calibrated/proved since installation, following repairs, or calibration/proving expired. [OGCR 14.040; <i>Directive 017</i> (2.5.1), (2.5.2.1)]
1.1.5.35	Low Risk	Calibration procedures not in accordance with requirements. [<i>Directive 017</i> (2.5)]
1.1.5.40	Low Risk	Gas meter internal components are unsatisfactory. [OGCR 14.070; <i>Directive 017</i> (2.5.2), (4.3.1)]
1.1.5.45	Low Risk	Gas meter internal components not checked in accordance with requirements. [<i>Directive 017</i> (2.5.2), (2.5.2.1)]
1.1.5.50	Low Risk	Flowing gas temperature not determined in accordance with the requirements. [OGCR 14.060(2), 14.080; <i>Directive 017</i> (4.3.1)]
1.1.5.55	Low Risk	Sensing lines between orifice meter and recording device not designed in accordance with requirements. [OGCR 14.060; <i>Directive 017</i> (4.3.4.1), (4.3.4.1(a))]
1.1.5.60	Low Risk	Chart recorder not suitably winterized to prevent sensing lines and other piping from freezing and disrupting measurement. [<i>Directive 017</i> (4.3.4.1)]
1.1.5.65	Low Risk	Improper chart drive speed/inappropriate use of multiday charts. [OGCR 14.070(1), (2); <i>Directive 017</i> (4.3.1), (5.4.1), (6.5), (7.3.1), (7.4.1)]

Manual #	Result	Description
1.1.5.68	Low Risk	Wells within Gas Proration Battery not tested at required frequency. [<i>Directive 017</i> (7.2.3), Table 7.1, (7.3.1), (7.4.1)]
1.1.10.5	Low Risk	No estimation of produced gas. [<i>OGCR</i> 7.004, 14.040; <i>Directive 017</i> (4.3.5)]
1.1.10.10	High Risk	Gas production not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4); <i>Directive 017</i> (13.2.2)]
1.1.10.15	Low Risk	Gas production determined using measurement by difference practices that are not in accordance with requirements. [<i>Directive 017</i> (5.5)]
1.1.10.20	High Risk	Flared/vented gas not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4(6)); <i>Directive 017</i> (4.3.3.1(5), (6)), (11.4.4.1), (11.4.4.3); <i>Directive 060</i> (10(1))]
1.1.10.25	Low Risk	Fuel gas not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4(6)); <i>Directive 017</i> (4.3.3.1(8), (10))]
1.1.10.28	Low Risk	Acid gas not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4(1)); <i>Directive 017</i> (4.3.3.1(5)), (11.4.4.1 - 11.4.4.3)]
1.1.10.30	Low Risk	Measurement not in accordance with approval. [<i>Directive 017</i> (5), (5.1), (5.2); see specific approval]
1.1.10.35	Low Risk	Meter calibration/proving tag or detailed report does not meet requirements. [<i>Directive 017</i> (2.3(Exceptions 1)), (2.5.2), (2.5.2.1(2), (3), (4), (8)), (2.5.3), (2.5.4)]
1.1.10.40	Low Risk	Incorrect or insufficient information recorded on chart. [<i>OGCR</i> 14.070(4); <i>Directive 017</i> (4.3.3.1(2)), (4.3.4.2)]

1.2 Hydrocarbon Liquids Measurement

Manual #	Result	Description
1.2.5.3	Low Risk	No hydrocarbon liquid measurement at plant inlet or group measurement point. [<i>Directive 017</i> (4.2.2), (4.2.4), (7.1.1), (7.3), (7.4), (13.2.1)]
1.2.5.5	High Risk	No hydrocarbon liquid delivery point measurement. [<i>Directive 017</i> (1.7.2(ii)), (9.3), (10.1), (10.2), (10.3), (13.2.1), Appendix 3]
1.2.5.10	Low Risk	Metering system not designed, installed, or operated as required. [<i>OGCR</i> 14.180(2); <i>Directive 017</i> (2.6(1)), (2.8.1), (2.8.2), (6.3.1), (13.2.1)]
1.2.5.15	Low Risk	Meter installed downstream of snap-acting dump valve. [<i>Directive 017</i> (2.6(1)), (2.8.1), (2.8.2), (2.9), (13.2.1)]
1.2.5.20	Low Risk	Measurement device not calibrated/proved since installation, following repairs, or calibration/proving expired. [<i>OGCR</i> 14.090(2)(a), (2)(b), 14.110(1), (3), 14.120(1), (4); <i>Directive 017</i> (2.6), (2.8.1), (2.8.2), (2.9), (2.12), (2.13), (2.14), (13.2.1)]
1.2.5.25	Low Risk	Prover tap size or location not in accordance with requirements. [<i>Directive 017</i> (2.6(2)), (13.2.1)]
1.2.5.30	Low Risk	Procedures for the proving/calibration of measurement device/system are not in accordance with requirements. [<i>Directive 017</i> (2.6), (2.7), (2.8), (2.9), (2.11), (2.12), (2.13), (13.2.1)]

Manual #	Result	Description
1.2.5.35	Low Risk	Tank gauging procedures not in accordance with requirements. [<i>Directive 017</i> (6.3.1.2), (6.3.1.2(b) - (d)), (13.2.1)]
1.2.10.5	High Risk	Hydrocarbon liquid production not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4); <i>Directive 017</i> (13.2.2)]
1.2.10.10	Low Risk	Measurement device calibration/proving tag or detailed report does not meet requirements. [<i>OGCR</i> 14.090(2)(c), 14.110(5), 14.120(5); <i>Directive 017</i> (2.6(10), (11), (Exceptions 1 - 3)), (2.7.1(2)), (2.12), (2.13.2), (2.14), (13.2.1)]

1.3 Water/Other Measurement

Manual #	Result	Description
1.3.5.3	Low Risk	No water measurement at plant inlet or group measurement point. [<i>Directive 017</i> (4.2.2), (4.2.4), (7.1.1), (7.3), (7.4)]
1.3.5.5	Low Risk	No water production measurement. [<i>OGCR</i> 14.140 - 14.170; <i>Directive 004</i> ; <i>Directive 017</i> (6.1), (6.2.2.1), (7.1.1), (7.2.1), (7.3), (7.3.1), (7.3.3), (7.4), (7.4.1), (7.4.3)]
1.3.5.10	Low Risk	No measurement of injected/disposed water or other substance(s). [<i>OGCR</i> 14.200; <i>Directive 017</i> (1.7.3(ii), (iv))]
1.3.5.15	Low Risk	Meter or product analyzer not installed in accordance with the requirements. [<i>OGCR</i> 14.180(3); <i>Directive 017</i> (2.6), (6.4.2)]
1.3.5.20	Low Risk	Water meter not proved since installation, following repairs, or meter proving has expired. [<i>OGCR</i> 14.140(3); <i>Directive 017</i> (2.6), (2.10)]
1.3.5.25	Low Risk	Product analyzer calibration expired. [<i>Directive 017</i> (2.11)]
1.3.5.28	Low Risk	Sulphur measurement device/procedure does not exist or does not meet requirements. [<i>Directive 017</i> (2.14), (6.3.1.1), (11.1), (11.3.1), (11.3.2), (11.3.2.1)]
1.3.10.5	Low Risk	Water production not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4)]
1.3.10.10	Low Risk	Injection or disposition of water/other substance not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4)]
1.3.10.15	Low Risk	Measurement device calibration/proving tag/detailed report not attached or does not meet requirements. [<i>OGCR</i> 14.140(3)(c); <i>Directive 017</i> (2.6(10), (11), (Exceptions 1)), (2.10)]
1.3.10.20	Low Risk	Product analyzer tag/detailed report does not meet requirements. [<i>Directive 017</i> (2.11)]

1.4 Spacing

Manual #	Result	Description
1.4.5.5	High Risk	Flare stack or incinerator less than 100 metres from an occupied residence. [<i>OGCR</i> 8.080(3); <i>Directive 060</i> (7.8(2)(b))]

Manual #	Result	Description
1.4.5.10	High Risk	Flare pit, flare stack, or incinerator less than 25 metres from oil or gas processing equipment. [OGCR 8.080(5); Directive 060 (7.8(1)(c))]
1.4.5.15	Low Risk	Flare pit, flare stack, or incinerator less than 50 metres from a well or oil storage tank. [OGCR 8.080(5); Directive 060 (7.8(1)(a), (b))]
1.4.5.20	Low Risk	Flare pit, flare stack, or incinerator less than 100 metres from a surface improvement, except surveyed roadway or road allowance. [OGCR 1.020(2)(28), 8.080(3); Directive 056 Appendix 3; Directive 060 (7.8(2)(a))]
1.4.5.25	Low Risk	Flare or incinerator less than 40 metres to a public roadway. [OGCR 8.080(3); Directive 056 Appendix 3; Directive 060 (7.8(2)(a)), footnote 15]
1.4.5.30	High Risk	Flame type equipment placed or operated within 25 metres of a process vessel without adequate flame arrester. [OGCR 8.090(5), (8)]
1.4.5.35	High Risk	Flame type equipment within 25 metres of a well, oil storage tank, or other source of ignitable vapour. [OGCR 8.090(4); Interim Directive (ID) 91-03 (3.3 (3))]
1.4.5.40	High Risk	Ventilation requirements not met for flame type equipment within the same building as a process vessel or source of ignitable vapour. [OGCR 8.090(6)]
1.4.5.45	Low Risk	Fire within 50 metres of a well, oil storage tank, or other source of ignitable vapour (25 metres for heavy oil/crude bitumen production). [OGCR 8.090(2); Interim Directive (ID) 91-03 (3.3)]
1.4.5.50	High Risk	Smoking within 25 metres of a well, separator, oil storage tank, or other source of ignitable vapour. [OGCR 8.120(1)]
1.4.5.55	Low Risk	Outer perimeter of tank dike to surface improvement (other than public roadway) less than 60 metres. [OGCR 8.030(4)]
1.4.5.60	Low Risk	Oil storage tank(s) to well less than 50 metres (25 metres for heavy oil/crude bitumen production). [OGCR 8.090(3); Directive 055 (3.7); Interim Directive (ID) 91-03 (3.3 (2))]
1.4.5.65	Low Risk	Internal combustion engine exhaust within 25 metres of a well, process vessel, oil storage tank, or source of ignitable vapours, not constructed to prevent flame emergence. [OGCR 8.090(9)(a)]
1.4.5.70	Low Risk	End of exhaust pipe from internal combustion engine is located within 6 metres of the well and/or is not directed away from the well (1 metre for heavy oil production). [OGCR 8.090(9)(b); Interim Directive (ID) 91-03 (3.3(4)(a))]

1.5 Flaring, Incinerating, and Venting

Manual #	Result	Description
1.5.5.5	High Risk	No flare or incinerator stack where one is required. [OGCR 7.060(1) - (3), 7.070(1), (3), (5), (6); Directive 060 (8.1(5)(b)); Interim Directive (ID) 91-03 (3.2(3))]

Manual #	Result	Description
1.5.5.10	High Risk	Operating procedures and/or automatic shutdowns not in place where needed to control sour/acid gas flaring events. [<i>Directive 060</i> (7.5(3))]
1.5.5.15	Low Risk	Stack height or design does not meet requirements. [<i>OGCR</i> 7.060(4)(a), (7), 7.070(5), (6); <i>Directive 060</i> (7.4); <i>Interim Directive (ID) 91-03</i> (3.2(3))]
1.5.5.20	High Risk	Pilot/ignition device(s) not available/operable where required. [<i>OGCR</i> 7.060(4)(c), (10), 7.070(1), 7.070(5); <i>Directive 060</i> (7.3), (7.3.1(1)), Appendix 13]
1.5.5.25	High Risk	Insufficient heating value available to flare. [<i>Directive 060</i> (7.1.1(1))]
1.5.5.30	Low Risk	No wind guard on gas sour/acid flare when exit velocity is not sufficient. [<i>OGCR</i> 7.060(4)(b), 7.070(5)]
1.5.5.35	High Risk	No flame arrester, equivalent safety device, or appropriate engineering and operating practices to prevent backflash where required. [<i>OGCR</i> 8.090(7); <i>Directive 060</i> (7.7(1) - (3)), (8.1(9))]
1.5.5.40	High Risk	No knockout drum or flare separator where required. [<i>OGCR</i> 7.060(4)(d), 7.070(5); <i>Directive 060</i> (7.6(2)), (7.6.1), (8.1(5)(b))]
1.5.5.45	High Risk	Knockout drum or flare separator controls, equipment or design, does not meet requirements. [<i>Directive 060</i> (7.6)]
1.5.5.50	High Risk	Exposed flame from an incinerator. [<i>Directive 060</i> (7.1.2(1)(a))]
1.5.5.55	High Risk	Insufficient exit temperature, no automatic temperature shutdown, or no process temperature control and recording where required for incinerators. [<i>Directive 060</i> (7.1.2(1) - (3))]
1.5.5.60	High Risk	Gas is being vented, not burned, where it could support stable combustion. [<i>OGCR</i> 8.080(1); <i>Directive 060</i> (8.1(2),(5))]
1.5.5.65	High Risk	Venting practices not conducted in accordance with the requirements. [<i>OGCR</i> 8.080(1); <i>Directive 060</i> (8.1(4) - (7))]
1.5.5.70	High Risk	Flare pit containing produced fluids. [<i>OGCR</i> 8.080(4); <i>Directive 060</i> (7.11(1)); <i>Informational Letter (IL) 96-04</i>]
1.5.5.75	High Risk	Flare pit used at facility/well site constructed after July 1, 1996. [<i>OGCR</i> 8.080(2); <i>Directive 060</i> (7.11); <i>Informational Letter (IL) 96-04</i>]
1.5.5.80	Low Risk	Inadequate construction, design, equipment, and/or use of a flare pit at a facility/well site. [<i>OGCR</i> 8.080(3), (4); <i>Directive 060</i> (7.11); <i>Informational Letter (IL) 96-04</i> ; <i>Informational Letter (IL) 94-06</i>]
1.5.5.82	High Risk	Exceeding the annual flare volume limits at a gas plant. [<i>Directive 060</i> (5.2(1) - (3))]
1.5.5.83	High Risk	Exceeding the major flaring events criteria for gas plants (6-in-6). [<i>Directive 060</i> (5.3(2))]
1.5.10.5	High Risk	Failure to conduct dispersion modelling for flaring or incinerating gas with greater than 10 mol/kmol H ₂ S or 1 tonne per day of sulphur. [<i>Directive 060</i> (3.6(1), (2)), (7.12(1), (2))]

Manual #	Result	Description
1.5.10.10	High Risk	Decision tree or economic evaluation not completed or results not implemented for new, existing, and temporary flares, incinerators, and vents as required. [<i>Directive 060</i> (2.3, Figure 2), (2.4(1)(a)(i)(ii)), (2.5(1)(a)), (2.8(1)), (3.1(1), (2), Figure 3), (4.1(5), Figure 5), (5.1, Figure 6), (6.1, Figure 7), (7.11(4)), (8.1(1)), (9.1)]
1.5.10.15	Low Risk	Failure to keep flaring, incinerating, and venting logs as required. [<i>Directive 060</i> (5.3 (3)), (5.5(4)), (10.4(1)(b) - (e), (2))]
1.5.10.20	High Risk	Flaring or incinerating sour gas containing more than 50 mol/kmol H ₂ S without a permit where required. [<i>Directive 060</i> (3.3.1(1)), (3.3.2(2) - (4))]
1.5.10.25	High Risk	Failure to comply with any condition of flaring permit or approval (temporary permits, volume allowance threshold exceedance permits, and blanket permits). [<i>Directive 060</i> (3.3(1))]
1.5.10.30	High Risk	Failure to comply with conditions for flaring or incinerating small volumes of sour gas containing more than 50 mol/kmol H ₂ S when a permit is not required. [<i>Directive 060</i> (3.3.2(2) - (4))]
1.5.10.35	Low Risk	Failure to notify the appropriate ERCB Field Centre of flaring, incinerating, or venting events as required. [<i>OGCR</i> 7.060(9.5)(a); <i>Directive 060</i> (2.9(6)), (2.11.1(3)), (3.9), (4.2), (5.4), (6.4(1) - (3)), Table 1, Table 2]
1.5.10.40	High Risk	No resident notification and/or consultation. [<i>OGCR</i> 7.060(9.5)(b), (c); <i>Directive 060</i> (2.5(1)(c)(i), (6)(c), (6)(d)), (2.9(3), (5), (6)), (2.11.1(3)), (3.9(1), (4) - (7)), (4.2(1)), (5.4(1)), (6.4(1)), Table 1, Table 2]
1.5.10.45	Low Risk	Public information packages or resident notification information do not meet the requirements. [<i>Directive 060</i> (2.9.1), (3.9(4), (5))]

1.6 Signs and Security

Manual #	Result	Description
1.6.5.5	Low Risk	Conspicuous identification sign not posted at the primary entrance to the well or facility. [<i>OGCR</i> 6.020(3), (6); <i>Directive 055</i> (3.8)]
1.6.5.10	Low Risk	Improper identification sign. [<i>OGCR</i> 6.020(3), (5); <i>Directive 055</i> (3.8)]
1.6.5.15	Low Risk	No or improper warning symbol posted adjacent to all entrances to the developed area of wells and facilities. [<i>OGCR</i> 6.020(8) - (13), Schedule 12]
1.6.5.20	Low Risk	No or inadequate fence or alternative security measures where required. [<i>OGCR</i> 8.170, 8.171; <i>Directive 057</i>]

1.7 Emergency Controls and Relief Systems

Manual #	Result	Description
1.7.5.3	High Risk	Sour pressure relief valves in gas facility > 10 mol/kmol H ₂ S not tied into flare system. [<i>OGCR</i> 7.060(1), (3)]
1.7.5.5	Low Risk	Operating gas catalytic heater with inoperable safety shut off. [<i>OGCR</i> 8.090(8); <i>Alberta Regulation 62/2003 Occupational Health and Safety Regulation</i> Part 1, 12(1)]

1.8 Storage

Manual #	Result	Description
1.8.5.5	High Risk	Contaminated materials or materials possessing the potential to leach stored directly on the ground. [OGCR 8.030(1); Directive 055 (3.5)]
1.8.5.10	Low Risk	Aboveground storage tank(s) not constructed or operated appropriately. [OGCR 8.030(1); Directive 055 (5.1), (5.3)]
1.8.5.15	High Risk	No secondary containment as required. [OGCR 8.030(2); Directive 055 (5.1), (5.3.2), (6.1), (8.2), Appendix 2(1), (2.2.1)]
1.8.5.20	Low Risk	No secondary containment (containers and indoor tanks). [OGCR 8.030(2); Directive 055 (5.3.2.3), (7)]
1.8.5.25	Low Risk	Secondary containment not designed, constructed, sized, and maintained as required. [OGCR 8.030(2); Directive 055 (5.3), (5.3.2.1), (5.3.2.1(a)), (5.3.2.1(b)), (5.3.3), (6.1), (7), Appendix 2(1), (2.2.1)]
1.8.5.30	Low Risk	No system to monitor the interstitial space. [OGCR 8.030(2); Directive 055 (5.3.3), (6.2), Appendix 2]
1.8.5.35	Low Risk	Required measures not incorporated to prevent overfilling of tanks. [OGCR 8.030(1); Directive 055 (5.3.1), (5.3.3), (6.1)]
1.8.5.40	Low Risk	Spill control device(s) not used around hose connections at fluid transfer points. [OGCR 8.030(1); Directive 055 (5.3.1), (5.3.3), (6.1)]
1.8.5.45	High Risk	Temporary single-walled aboveground tank not diked where required. [OGCR 8.030(1); Directive 055 (3.5)]
1.8.5.50	High Risk	No leak detection and secondary containment where required (single-walled underground storage tank retrofitted between January 1, 1996, and January 1, 2002). [OGCR 8.030(2); Directive 055 Appendix 2, Appendix 2(2.2.1)]
1.8.5.53	Low Risk	Open-top, nonmetallic aboveground storage tank(s) not constructed or operated appropriately. [OGCR 8.030(1); Directive 055 (5.2)]
1.8.5.55	Low Risk	Aboveground/underground tank(s) out of service do not meet the requirements. [OGCR 8.030(2); Directive 055 (12)]
1.8.5.60	Low Risk	Oilfield wastes/empty barrels stored more than one year. [OGCR 8.030(1); Directive 055 (3.3)]
1.8.5.65	High Risk	Bulk pad not constructed of compacted clay, synthetic liner, concrete, or asphalt. [OGCR 8.030(1), (2); Directive 055 (9)]
1.8.5.70	High Risk	Bulk pad storage area does not incorporate a slope directed to a catchment device. [OGCR 8.030(1), (2); Directive 055 (9)]
1.8.5.75	High Risk	Bulk pad storage area does not incorporate a continuous curb with a minimum height of 15 cm on at least three sides. [OGCR 8.030(1), (2); Directive 055 (9)]
1.8.5.80	High Risk	Bulk pad does not incorporate a leachate collection or leak detection system where required. [OGCR 8.030(1), (2); Directive 055 (9)]
1.8.5.85	High Risk	Stockpiled materials are exceeding capacity of the bulk pad. [OGCR 8.030(1); Directive 055 (9)]

Manual #	Result	Description
2.1.10.25	High Risk	Failure to immediately contact the ERCB after activating internal response resources to confirm the level of emergency and convey the specifics of the incident. [<i>Directive 071</i> (11.1.1(4)), (14.2(4)); <i>Bulletin 2008-15</i> (2.2)]

3 Environment

3.1 Emissions

Manual #	Result	Description
3.1.5.5	High Risk	H ₂ S emissions at any facility that receives gas containing more than 10 mol/kmol of H ₂ S. [<i>OGCR</i> 7.070(1), (3), 9.040(c), 9.050(5); <i>Directive 060</i> (7.1), (8.2); <i>Interim Directive (ID) 91-03</i> (3.2(3))]
3.1.5.10	High Risk	Exceeding Alberta Ambient Air Quality Objectives. [<i>Directive 060</i> (3.3.2(2)(c)), (3.6(6)), (7.12(1)), Appendix 8(5)(b)]
3.1.5.15	High Risk	Sour fluids transported via a non-pressurized tank truck or truck without suitable and functional emissions controls. [<i>Directive 060</i> (8.7(2))]
3.1.5.17	High Risk	Emissions monitoring at a gas plant not in accordance with requirements. [<i>OGCR</i> 9.050(1), (2); <i>Directive 017</i> (11.4.4.1)]
3.1.5.18	Low Risk	Odour emissions other than H ₂ S at a gas plant. [<i>OGCR</i> 9.040, 9.050(6)(b), (c); <i>Directive 060</i> (8.2(3)), (8.5)]
3.1.5.20	High Risk	Failure to meet the permissible sound level at the nearest or most impacted dwelling. [<i>Directive 038</i> (2.1(3)), (2.2(9)), (3.1(3)), (4.4(22)), (5.1(1)), Appendix 1]
3.1.5.25	Low Risk	Routine combustion of gases results in continuous or repeat black smoke emissions. [<i>OGCR</i> 7.040(1), 9.050(6)(d); <i>Directive 060</i> (7.1(2)), (7.2(1)(a))]
3.1.5.30	High Risk	Individual dehydrator(s) or site dehydrator benzene emissions over the limits. [<i>Directive 039</i> (2); <i>Directive 060</i> (8.3(1), (3))]
3.1.5.35	High Risk	Failure of the operator to develop and implement a fugitive emissions program to detect and repair leaks. [<i>Directive 060</i> (8.7(1)); <i>Bulletin 2009-44</i> ; CAPP <i>Best Management Practice: Management of Fugitive Emissions at Upstream Oil and Gas Facilities</i>]
3.1.10.5	Low Risk	Noise complaint response/procedures not conducted in accordance with requirements. [<i>Directive 038</i> (4)]
3.1.10.10	Low Risk	Failure to notify resident(s) within 750 metres of a dehydrator (for new, relocated, or existing glycol dehydrators). [<i>Directive 039</i> (1); CAPP <i>BMP Control of Benzene Emissions from Glycol Dehydrators</i> (Executive Summary, Chapter 11)]
3.1.10.15	Low Risk	Dehydrator Engineering and Operations Sheet (DEOS) not done, incomplete/inaccurate, and/or not posted. [<i>Directive 039</i> (3); <i>Directive 060</i> (8.3(2)(b))]

Manual #	Result	Description
3.1.10.20	Low Risk	Failure to correctly complete the Decision Tree Analysis (for new or relocated glycol dehydrators as of January 1, 2007). [<i>Directive 039</i> (1); <i>Directive 060</i> (8.3(2)(a)); CAPP <i>BMP Control of Benzene Emissions from Glycol Dehydrators</i> (Executive Summary, Appendix A)]
3.1.10.25	Low Risk	Failure of the fugitive emissions program to meet the CAPP best management practice. [<i>Directive 060</i> (8.7(1)(a)); CAPP <i>Best Management Practice: Management of Fugitive Emissions at Upstream Oil and Gas Facilities</i>]

3.2 Waste Management

Manual #	Result	Description
3.2.5.5	Low Risk	Facility not maintained in a clean condition. [<i>OGCR</i> 8.150(4)]
3.2.5.10	High Risk	Waste sent to facility not authorized to accept it. [<i>OGCR</i> 8.150(2); <i>Directive 058</i> (2.1(1))]
3.2.5.15	High Risk	Oilfield wastes are mixed/diluted to avoid regulatory requirements. [<i>Directive 058</i> (5.5); <i>Interim Directive (ID) 99-04</i> (2)]
3.2.5.20	High Risk	Conditions not met for on-site land treatment. [<i>Directive 058</i> (16.2(1) - (3)); <i>Informational Letter (IL) 98-02</i> (4.2)]
3.2.5.25	High Risk	Oilfield waste was not treated according to one-time, on-site biopile/biocell treatment requirements. [<i>Directive 058</i> (16.3(1), (4)(c))]
3.2.5.30	High Risk	One-time, on-site biopile or biocell containment device or leachate collection system is not appropriately designed or operated. [<i>Directive 055</i> (8.1); <i>Directive 058</i> (11.6), (16.3)]
3.2.5.35	High Risk	Small batch feed incinerator or mobile thermal treatment facility not operating according to requirements. [<i>Directive 058</i> (11.6), (17.4), (17.5); <i>Interim Directive (ID) 2000-03</i> (3.1(a), (b))]
3.2.5.40	High Risk	Conditions not met for spreading of oily by-products to roads. [<i>Directive 058</i> (29.3), (29.8); <i>Informational Letter (IL) 99-02</i>]
3.2.5.45	High Risk	Banned oilfield wastes injected into pipeline system. [<i>Directive 058</i> (6), (6.1)]
3.2.10.5	High Risk	Oilfield waste generator not tracking oilfield waste from cradle to grave. [<i>OGCR</i> 8.150(2); <i>Directive 058</i> (7.1), (9.1), (9.2)]
3.2.10.10	Low Risk	Waste tracking system data or manifest copies and supporting documentation not retained for two years. [<i>Directive 058</i> (8.9), (9.2)]
3.2.10.15	Low Risk	ERCB manifests not completed or completed improperly for DOWs transported on public roads. [<i>Directive 058</i> (7.1), (8); <i>Interim Directive (ID) 2000-03</i> (3.4)]
3.2.10.20	Low Risk	Discrepancy on the waste manifest is not reconciled. [<i>Directive 058</i> (8.8)]
3.2.10.25	Low Risk	Biopile or biocell records not kept for two years. [<i>Directive 058</i> (16.3(5)), (11.8)]
3.2.10.30	Low Risk	Small batch feed incinerator or mobile thermal treatment facility does not notify ERCB as required. [<i>Directive 058</i> (17.4), (17.5(3))]

3.3 Spills

Manual #	Result	Description
3.3.5.5	High Risk	Facility closer than 100 metres to the normal high water mark of a body of water or permanent stream without appropriate protective measures. [OGCR 8.060]
3.3.5.10	High Risk	Spill or release not contained/cleaned up. [OGCR 8.050(1), 8.051(b)]
3.3.10.5	High Risk	No notification of a reportable spill or release to ERCB. [OGCR 8.050(2), 8.051(a), 12.140; <i>Informational Letter (IL) 98-01</i> (4.1)]
3.3.10.10	Low Risk	Late notification of a reportable spill or release to ERCB. [OGCR 8.050(2), 8.051(a), 12.140; <i>Informational Letter (IL) 98-01</i> (4.1)]

3.4 Surface Water

Manual #	Result	Description
3.4.5.5	High Risk	Release criteria of collected surface water not met prior to release to adjacent lands. [OGCR 9.050(8)(b); <i>Directive 055</i> (11)]

4 Liability Management

4.1 Abandonment

Manual #	Result	Description
4.2.10.5	Low Risk	No notification of facility abandonment. [<i>Directive 006</i> Appendix 3(1), (2)]

99 Other

Manual #	Result	Description
99.5.5	Low Risk	Noncompliant with other low risk ERCB requirement(s) (see comments for details). [Refer to the applicable ERCB requirement (must be a risk-assessed noncompliance).]
99.10.10	High Risk	Noncompliant with other high risk ERCB requirement(s) (see comments for details). [Refer to the applicable ERCB requirement (must be a risk-assessed noncompliance).]

B Oil Facilities

1 Equipment

1.1 Gas Measurement

Manual #	Result	Description
1.1.5.5	High Risk	No gas delivery point (sales) measurement. [OGCR 7.004, 14.040; Directive 017 (1.7.2(i)), (4.1), (9.3), Appendix 3]
1.1.5.10	High Risk	Produced gas (plant inlet, total battery/group gas) not metered. [OGCR 7.004, 14.040; Directive 017 (1.7.1(i)), (1.7.2(iii)), (4.1), (4.2.1 - 4.2.4), (5.5), (7.1.1), (12.3.2)]
1.1.5.15	High Risk	Flared/vented gas not measured. [OGCR 14.040; Directive 017 (4.1), (4.3.5.1), (4.3.5.2), (4.3.5.3), (12.3.2); Directive 060 (10.1), (10.2)]
1.1.5.20	Low Risk	Fuel gas not measured. [Directive 017 (4.1), (4.2.2), (4.3.5.2), (4.3.5.3), (12.3.2)]
1.1.5.25	Low Risk	Design, installation, and operation of measurement system is not in accordance with requirements. [OGCR 14.070, 14.080; Directive 017 (4.3.1), (4.3.4), (4.3.5)]
1.1.5.30	Low Risk	Meter not calibrated/proved since installation, following repairs, or calibration/proving expired. [OGCR 14.040; Directive 017 (2.5.1), (2.5.2.1)]
1.1.5.35	Low Risk	Calibration procedures not in accordance with requirements. [Directive 017 (2.5)]
1.1.5.40	Low Risk	Gas meter internal components are unsatisfactory. [OGCR 14.070; Directive 017 (2.5.2), (4.3.1)]
1.1.5.45	Low Risk	Gas meter internal components not checked in accordance with requirements. [Directive 017 (2.5.2), (2.5.2.1)]
1.1.5.50	Low Risk	Flowing gas temperature not determined in accordance with the requirements. [OGCR 14.060(2), 14.080; Directive 017 (4.3.1)]
1.1.5.55	Low Risk	Sensing lines between orifice meter and recording device not designed in accordance with requirements. [OGCR 14.060; Directive 017 (4.3.4.1), (4.3.4.1(a))]
1.1.5.60	Low Risk	Chart recorder not suitably winterized to prevent sensing lines and other piping from freezing and disrupting measurement. [Directive 017 (4.3.4.1)]
1.1.5.65	Low Risk	Improper chart drive speed/inappropriate use of multiday charts. [OGCR 14.070(1), (2); Directive 017 (4.3.1), (5.4.1), (6.5), (7.3.1), (7.4.1)]
1.1.10.5	Low Risk	No estimation of produced gas. [OGCR 7.004, 14.040; Directive 017 (4.3.5)]
1.1.10.10	High Risk	Gas production not reported to the Petroleum Registry. [OGCR 12.030(1); Directive 007 (3.4)]

Manual #	Result	Description
1.1.10.15	Low Risk	Gas production determined using measurement by difference practices that are not in accordance with requirements. [<i>Directive 017</i> (5.5)]
1.1.10.20	High Risk	Flared/vented gas not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4(6)); <i>Directive 017</i> (4.3.3.1(5), (6)); <i>Directive 060</i> (10(1))]
1.1.10.25	Low Risk	Fuel gas not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4(6)); <i>Directive 017</i> (4.3.3.1(8), (10))]
1.1.10.30	Low Risk	Measurement not in accordance with approval. [<i>Directive 017</i> (5), (5.1), (5.2); see specific approval]
1.1.10.35	Low Risk	Meter calibration/proving tag or detailed report does not meet requirements. [<i>Directive 017</i> (2.3(Exceptions 1)), (2.5.2), (2.5.2.1(2), (3), (4), (8)), (2.5.3), (2.5.4)]
1.1.10.40	Low Risk	Incorrect or insufficient information recorded on chart. [<i>OGCR</i> 14.070(4); <i>Directive 017</i> (4.3.3.1(2)), (4.3.4.2)]

1.2 Hydrocarbon Liquids Measurement

Manual #	Result	Description
1.2.5.5	High Risk	No hydrocarbon liquid delivery point measurement. [<i>Directive 017</i> (1.7.2(ii)), (9.3), (10.1), (10.2), (10.3), (13.2.1), Appendix 3]
1.2.5.10	Low Risk	Metering system not designed, installed, or operated as required. [<i>OGCR</i> 14.180(2); <i>Directive 017</i> (2.6(1)), (2.8.1), (2.8.2), (6.3.1), (12.2), (12.3), (12.3.4), (13.2.1)]
1.2.5.15	Low Risk	Meter installed downstream of snap-acting dump valve. [<i>Directive 017</i> (2.6(1)), (2.8.1), (2.8.2), (2.9), (12.2), (13.2.1)]
1.2.5.20	Low Risk	Measurement device not calibrated/proved since installation, following repairs, or calibration/proving expired. [<i>OGCR</i> 14.090(2)(a), (b), 14.110(1), (3), 14.120(1), (4); <i>Directive 017</i> (2.6), (2.8.1), (2.8.2), (2.9), (2.12), (2.13), (2.14), (12.2), (13.2.1)]
1.2.5.25	Low Risk	Prover tap size or location not in accordance with requirements. [<i>Directive 017</i> (2.6(2)), (12.2), (13.2.1)]
1.2.5.30	Low Risk	Procedures for the proving/calibration of measurement device/system are not in accordance with requirements. [<i>Directive 017</i> (2.6), (2.7), (2.8), (2.9), (2.11), (2.12), (2.13), (12.2), (13.2.1)]
1.2.5.35	Low Risk	Tank gauging procedures not in accordance with requirements. [<i>Directive 017</i> (6.3.1.2), (6.3.1.2(b) - (d)), (12.2), (12.3), (12.3.4), (13.2.1)]
1.2.5.38	Low Risk	No test oil measurement. [<i>OGCR</i> 7.020; <i>Directive 017</i> (6.5), (12.3)]
1.2.5.43	Low Risk	Wells within an oil proration battery not tested at required frequency. [<i>OGCR</i> 7.030; <i>Directive 017</i> (6.4.4), Table 6.2, (12.2.6), (12.3.4)]
1.2.10.5	High Risk	Hydrocarbon liquid production not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4)]

Manual #	Result	Description
1.2.10.10	Low Risk	Measurement device calibration/proving tag or detailed report does not meet requirements. [<i>OGCR</i> 14.090(2)(c), 14.110(5), 14.120(5); <i>Directive 017</i> (2.6(10), (11), (Exceptions 1 - 3)), (2.7.1(2)), (2.12), (2.13.2), (2.14), (12.2), (13.2.1)]

1.3 Water/Other Measurement

Manual #	Result	Description
1.3.5.5	Low Risk	No water production measurement. [<i>OGCR</i> 14.140 - 14.170; <i>Directive 004</i> ; <i>Directive 017</i> (6.1), (6.2.2.1), (7.1.1), (7.2.1), (7.3), (7.3.1), (7.3.3), (7.4), (7.4.1), (7.4.3)]
1.3.5.10	Low Risk	No measurement of injected/disposed water or other substance(s). [<i>OGCR</i> 14.200; <i>Directive 017</i> (1.7.3(ii), (iv))]
1.3.5.15	Low Risk	Meter or product analyzer not installed in accordance with the requirements. [<i>OGCR</i> 14.180(3); <i>Directive 017</i> (2.6), (6.4.2)]
1.3.5.20	Low Risk	Water meter not proved since installation, following repairs, or meter proving has expired. [<i>OGCR</i> 14.140(3); <i>Directive 017</i> (2.6), (2.10)]
1.3.5.25	Low Risk	Product analyzer calibration expired. [<i>Directive 017</i> (2.11)]
1.3.5.28	Low Risk	No continuous proportional sampler or product analyzer where water cut is > 10 per cent, or the sampler/analyzer is inoperable. [<i>OGCR</i> 14.150; <i>Directive 017</i> (6.4.2)]
1.3.10.5	Low Risk	Water production not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4)]
1.3.10.10	Low Risk	Injection or disposition of water/other substance not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.4)]
1.3.10.15	Low Risk	Measurement device calibration/proving tag/detailed report not attached or does not meet requirements. [<i>OGCR</i> 14.140(3)(c); <i>Directive 017</i> (2.6(10), (11), (Exceptions 1)), (2.10)]
1.3.10.20	Low Risk	Product analyzer tag/detailed report does not meet requirements. [<i>Directive 017</i> (2.11)]

1.4 Spacing

Manual #	Result	Description
1.4.5.5	High Risk	Flare stack or incinerator less than 100 metres from an occupied residence. [<i>OGCR</i> 8.080(3); <i>Directive 060</i> (7.8(2)(b))]
1.4.5.10	High Risk	Flare pit, flare stack, or incinerator less than 25 metres from oil or gas processing equipment. [<i>OGCR</i> 8.080(5); <i>Directive 060</i> (7.8(1)(c))]
1.4.5.15	Low Risk	Flare pit, flare stack, or incinerator less than 50 metres from a well or oil storage tank. [<i>OGCR</i> 8.080(5); <i>Directive 060</i> (7.8(1)(a), (b))]

Manual #	Result	Description
1.4.5.20	Low Risk	Flare pit, flare stack, or incinerator less than 100 metres from a surface improvement, except surveyed roadway or road allowance. [OGCR 1.020(2)(28), 8.080(3); <i>Directive 056</i> Appendix 3; <i>Directive 060</i> (7.8(2)(a))]
1.4.5.25	Low Risk	Flare or incinerator less than 40 metres to a public roadway. [OGCR 8.080(3); <i>Directive 056</i> Appendix 3; <i>Directive 060</i> (7.8(2)(a)), footnote 15]
1.4.5.30	High Risk	Flame type equipment placed or operated within 25 metres of a process vessel without adequate flame arrester. [OGCR 8.090(5), (8)]
1.4.5.35	High Risk	Flame type equipment within 25 metres of a well, oil storage tank, or other source of ignitable vapour. [OGCR 8.090(4); <i>Interim Directive (ID) 91-03</i> (3.3 (3))]
1.4.5.40	High Risk	Ventilation requirements not met for flame type equipment within the same building as a process vessel or source of ignitable vapour. [OGCR 8.090(6)]
1.4.5.45	Low Risk	Fire within 50 metres of a well, oil storage tank, or other source of ignitable vapour (25 metres for heavy oil/crude bitumen production). [OGCR 8.090(2); <i>Interim Directive (ID) 91-03</i> (3.3)]
1.4.5.50	High Risk	Smoking within 25 metres of a well, separator, oil storage tank, or other source of ignitable vapour. [OGCR 8.120(1)]
1.4.5.55	Low Risk	Outer perimeter of tank dike to surface improvement (other than public roadway) less than 60 metres. [OGCR 8.030(4)]
1.4.5.60	Low Risk	Oil storage tank(s) to well less than 50 metres (25 metres for heavy oil/crude bitumen production). [OGCR 8.090(3); <i>Directive 055</i> (3.7); <i>Interim Directive (ID) 91-03</i> (3.3 (2))]
1.4.5.65	Low Risk	Internal combustion engine exhaust within 25 metres of a well, process vessel, oil storage tank, or source of ignitable vapours, not constructed to prevent flame emergence. [OGCR 8.090(9)(a)]
1.4.5.70	Low Risk	End of exhaust pipe from internal combustion engine is located within 6 metres of the well and/or is not directed away from the well (1 metre for heavy oil production). [OGCR 8.090(9)(b); <i>Interim Directive (ID) 91-03</i> (3.3(4)(a))]

1.5 Flaring, Incinerating, and Venting

Manual #	Result	Description
1.5.5.5	High Risk	No flare or incinerator stack where one is required. [OGCR 7.060(1) - (3), 7.070(1), (3), (5), (6); <i>Directive 060</i> (8.1(5)(b)); <i>Interim Directive (ID) 91-03</i> (3.2(3))]
1.5.5.10	High Risk	Operating procedures and/or automatic shutdowns not in place where needed to control sour/acid gas flaring events. [<i>Directive 060</i> (7.5(3))]
1.5.5.13	Low Risk	Failure to meet solution gas reduction requirements during planned shutdowns and emergency events. [<i>Directive 060</i> (2.11.1(1), (2), Table 1), (5.2(4))]

Manual #	Result	Description
1.5.5.15	Low Risk	Stack height or design does not meet requirements. [OGCR 7.060(4)(a), (7), 7.070(5), (6); <i>Directive 060</i> (7.4); <i>Interim Directive (ID) 91-03</i> (3.2(3))]
1.5.5.20	High Risk	Pilot/ignition device(s) not available/operable where required. [OGCR 7.060(4)(c), (10), 7.070(1), 7.070(5); <i>Directive 060</i> (7.3), (7.3.1(1)), Appendix 13]
1.5.5.25	High Risk	Insufficient heating value available to flare. [<i>Directive 060</i> (7.1.1(1))]
1.5.5.30	Low Risk	No wind guard on gas sour/acid flare when exit velocity is not sufficient. [OGCR 7.060(4)(b), 7.070(5)]
1.5.5.35	High Risk	No flame arrester, equivalent safety device, or appropriate engineering and operating practices to prevent backflash where required. [OGCR 8.090(7); <i>Directive 060</i> (7.7(1) - (3)), (8.1(9))]
1.5.5.40	High Risk	No knockout drum or flare separator where required. [OGCR 7.060(4)(d), 7.070(5); <i>Directive 060</i> (7.6(2)), (7.6.1), (8.1(5)(b))]
1.5.5.45	High Risk	Knockout drum or flare separator controls, equipment or design does not meet requirements. [<i>Directive 060</i> (7.6)]
1.5.5.50	High Risk	Exposed flame from an incinerator. [<i>Directive 060</i> (7.1.2 (1)(a))]
1.5.5.55	High Risk	Insufficient exit temperature, no automatic temperature shutdown, or no process temperature control and recording where required for incinerators. [<i>Directive 060</i> (7.1.2 (1) - (3))]
1.5.5.60	High Risk	Gas is being vented, not burned, where it could support stable combustion. [OGCR 8.080(1); <i>Directive 060</i> (8.1(2),(5))]
1.5.5.65	High Risk	Venting practices not conducted in accordance with the requirements. [OGCR 8.080(1); <i>Directive 060</i> (8.1(4) - (7))]
1.5.5.70	High Risk	Flare pit containing produced fluids. [OGCR 8.080(4); <i>Directive 060</i> (7.11(1)); <i>Informational Letter (IL) 96-04</i>]
1.5.5.75	High Risk	Flare pit used at facility/well site constructed after July 1, 1996. [OGCR 8.080(2); <i>Directive 060</i> (7.11); <i>Informational Letter (IL) 96-04</i>]
1.5.5.80	Low Risk	Inadequate construction, design, equipment, and/or use of a flare pit at a facility/well site. [OGCR 8.080(3), (4); <i>Directive 060</i> (7.11); <i>Informational Letter (IL) 96-04</i> ; <i>Informational Letter (IL) 94-06</i>]
1.5.5.83	High Risk	Routine flaring, incinerating, or venting solution gas from an oil/bitumen battery with a GOR greater than 3000 m ³ /m ³ . [<i>Directive 060</i> (2.5(1)(b))]
1.5.10.5	High Risk	Failure to conduct dispersion modelling for flaring or incinerating gas with greater than 10 mol/kmol H ₂ S or 1 tonne per day of sulphur. [<i>Directive 060</i> (3.6(1), (2)), (7.12(1), (2))]
1.5.10.10	High Risk	Decision tree or economic evaluation not completed or results not implemented for new, existing, and temporary flares, incinerators, and vents as required. [<i>Directive 060</i> (2.3, Figure 2), (2.4(1)(a)(i)(ii)), (2.5(1)(a)), (2.8(1)), (3.1(1), (2), Figure 3), (4.1(5), Figure 5), (5.1, Figure 6), (6.1, Figure 7), (7.11(4)), (8.1(1)), (9.1)]

Manual #	Result	Description
1.5.10.15	Low Risk	Failure to keep flaring, incinerating, and venting logs as required. [<i>Directive 060</i> (10.4(1)(b) - (e)), (2)]
1.5.10.20	High Risk	Flaring or incinerating sour gas containing more than 50 mol/kmol H ₂ S without a permit where required. [<i>Directive 060</i> (3.3.1(1)), (3.3.2(2) - (4))]
1.5.10.25	High Risk	Failure to comply with any condition of flaring permit or approval (temporary permits, volume allowance threshold exceedance permits, and blanket permits). [<i>Directive 060</i> (3.3(1))]
1.5.10.30	High Risk	Failure to comply with conditions for flaring or incinerating small volumes of sour gas containing more than 50 mol/kmol H ₂ S when a permit is not required. [<i>Directive 060</i> (3.3.2(2) - (4))]
1.5.10.35	Low Risk	Failure to notify the appropriate ERCB Field Centre of flaring, incinerating, or venting events as required. [<i>OGCR</i> 7.060(9.5)(a); <i>Directive 060</i> (2.9(6)), (2.11.1(3)), (3.9), (4.2), (5.4), (6.4(1) - (3)), Table 1, Table 2]
1.5.10.40	High Risk	No resident notification and/or consultation. [<i>OGCR</i> 7.060(9.5)(b), (c); <i>Directive 060</i> (2.5(1)(c)(i), (6)(c), (6)(d)), (2.9(3), (5), (6)), (2.11.1(3)), (3.9(1), (4) - (7)), (4.2(1)), (5.4(1)), (6.4(1)), Table 1, Table 2]
1.5.10.45	Low Risk	Public information packages or resident notification information do not meet the requirements. [<i>Directive 060</i> (2.9.1), (3.9(4), (5))]

1.6 Signs and Security

Manual #	Result	Description
1.6.5.5	Low Risk	Conspicuous identification sign not posted at the primary entrance to the well or facility. [<i>OGCR</i> 6.020(3), (6); <i>Directive 055</i> (3.8)]
1.6.5.10	Low Risk	Improper identification sign. [<i>OGCR</i> 6.020(3), (5); <i>Directive 055</i> (3.8)]
1.6.5.15	Low Risk	No or improper warning symbol posted adjacent to all entrances to the developed area of wells and facilities. [<i>OGCR</i> 6.020(8) - (13), Schedule 12]
1.6.5.20	Low Risk	No or inadequate fence or alternative security measures where required. [<i>OGCR</i> 8.170, 8.171; <i>Directive 057</i>]

1.7 Emergency Controls and Relief Systems

Manual #	Result	Description
1.7.5.5	Low risk	Operating gas catalytic heater with inoperable safety shut off. [<i>OGCR</i> 8.090(8); <i>Alberta Regulation 62/2003 Occupational Health and Safety Regulation</i> , Part 1, 12(1)]
1.7.5.8	Low Risk	No high level and high pressure shutdown device installed on a separator, treater, or other pressure vessel which receives production from an oil well containing more than 10 mol/kmol H ₂ S. [<i>OGCR</i> 7.060(3.1)]

Manual #	Result	Description
1.7.5.13	Low Risk	No or inadequate/inappropriate pop tank or alternate conditions not adhered to. [OGCR 8.031]

1.8 Storage

Manual #	Result	Description
1.8.5.5	High Risk	Contaminated materials or materials possessing the potential to leach stored directly on the ground. [OGCR 8.030(1); Directive 055 (3.5)]
1.8.5.10	Low Risk	Aboveground storage tank(s) not constructed or operated appropriately. [OGCR 8.030(1); Directive 055 (5.1), (5.3)]
1.8.5.15	High Risk	No secondary containment as required. [OGCR 8.030(2); Directive 055 (5.1), (5.3.2), (6.1), (8.2), Appendix 2(1), (2.2.1)]
1.8.5.20	Low Risk	No secondary containment (containers and indoor tanks). [OGCR 8.030(2); Directive 055 (5.3.2.3), (7)]
1.8.5.25	Low Risk	Secondary containment not designed, constructed, sized, and maintained as required. [OGCR 8.030(2); Directive 055 (5.3), (5.3.2.1), (5.3.2.1(a)), (5.3.2.1(b)), (5.3.3), (6.1), (7), Appendix 2(1), (2.2.1)]
1.8.5.30	Low Risk	No system to monitor the interstitial space. [OGCR 8.030(2); Directive 055 (5.3.3), (6.2), Appendix 2]
1.8.5.35	Low Risk	Required measures not incorporated to prevent overfilling of tanks. [OGCR 8.030(1); Directive 055 (5.3.1), (5.3.3), (6.1)]
1.8.5.40	Low Risk	Spill control device(s) not used around hose connections at fluid transfer points. [OGCR 8.030(1); Directive 055 (5.3.1), (5.3.3), (6.1)]
1.8.5.45	High Risk	Temporary single-walled aboveground tank not diked where required. [OGCR 8.030(1); Directive 055 (3.5)]
1.8.5.50	High Risk	No leak detection and secondary containment where required (single-walled underground storage tank retrofitted between January 1, 1996, and January 1, 2002). [OGCR 8.030(2); Directive 055 Appendix 2(2.2.1)]
1.8.5.55	Low Risk	Aboveground/underground tank(s) out of service do not meet the requirements. [OGCR 8.030(2); Directive 055 (12)]
1.8.5.60	Low Risk	Oilfield wastes/empty barrels stored more than one year. [OGCR 8.030(1); Directive 055 (3.3)]
1.8.5.65	High Risk	Bulk pad not constructed of compacted clay, synthetic liner, concrete, or asphalt. [OGCR 8.030(1), (2); Directive 055 (9)]
1.8.5.70	High Risk	Bulk pad storage area does not incorporate a slope directed to a catchment device. [OGCR 8.030(1), (2); Directive 055 (9)]
1.8.5.75	High Risk	Bulk pad storage area does not incorporate a continuous curb with a minimum height of 15 cm on at least three sides. [OGCR 8.030(1), (2); Directive 055 (9)]
1.8.5.80	High Risk	Bulk pad does not incorporate a leachate collection or leak detection system where required. [OGCR 8.030(1), (2); Directive 055 (9)]

Manual #	Result	Description
2.1.10.25	High Risk	Failure to immediately contact the ERCB after activating internal response resources to confirm the level of emergency and convey the specifics of the incident. [<i>Directive 071</i> (11.1.1(4)), (14.2(4)); <i>Bulletin 2008-15</i> (2.2)]

3 Environment

3.1 Emissions

Manual #	Result	Description
3.1.5.5	High Risk	H ₂ S emissions at any facility that receives gas containing more than 10 mol/kmol of H ₂ S. [<i>OGCR</i> 7.070(1), (3), 9.040(c), 9.050(5); <i>Directive 060</i> (7.1), (8.2); <i>Interim Directive (ID) 91-03</i> (3.2(3))]
3.1.5.10	High Risk	Exceeding Alberta Ambient Air Quality Objectives. [<i>Directive 060</i> (3.3.2(2)(c)), (3.6(6)), (7.12(1)), Appendix 8(5)(b)]
3.1.5.15	High Risk	Sour fluids transported via a non-pressurized tank truck or truck without suitable and functional emissions controls. [<i>Directive 060</i> (8.7(2))]
3.1.5.20	High Risk	Failure to meet the permissible sound level at the nearest or most impacted dwelling. [<i>Directive 038</i> (2.1(3)), (2.2(9)), (3.1(3)), (4.4(22)), (5.1(1)), Appendix 1]
3.1.5.25	Low Risk	Routine combustion of gases results in continuous or repeat black smoke emissions. [<i>OGCR</i> 7.040(1), 9.050(6)(d); <i>Directive 060</i> (7.1(2)), (7.2(1)(a))]
3.1.5.30	High Risk	Individual dehydrator(s) or site dehydrator benzene emissions over the limits. [<i>Directive 039</i> (2); <i>Directive 060</i> (8.3(1), (3))]
3.1.5.35	High Risk	Failure of the operator to develop and implement a fugitive emissions program to detect and repair leaks. [<i>Directive 060</i> (8.7(1)); <i>Bulletin 2009-44</i> ; CAPP <i>Best Management Practice: Management of Fugitive Emissions at Upstream Oil and Gas Facilities</i>]
3.1.10.5	Low Risk	Noise complaint response/procedures not conducted in accordance with requirements. [<i>Directive 038</i> (4)]
3.1.10.10	Low Risk	Failure to notify resident(s) within 750 metres of a dehydrator (for new, relocated, or existing glycol dehydrators). [<i>Directive 039</i> (1); CAPP <i>BMP Control of Benzene Emissions from Glycol Dehydrators</i> (Executive Summary, Chapter 11)]
3.1.10.15	Low Risk	Dehydrator Engineering and Operations Sheet (DEOS) not done, incomplete/inaccurate, and/or not posted. [<i>Directive 039</i> (3); <i>Directive 060</i> (8.3(2)(b))]
3.1.10.20	Low Risk	Failure to correctly complete the Decision Tree Analysis (for new or relocated glycol dehydrators as of January 1, 2007). [<i>Directive 039</i> (1); <i>Directive 060</i> (8.3(2)(a)); CAPP <i>BMP Control of Benzene Emissions from Glycol Dehydrators</i> (Executive Summary, Appendix A)]

Manual #	Result	Description
3.1.10.25	Low Risk	Failure of the fugitive emissions program to meet the CAPP best management practice. [<i>Directive 060</i> (8.7(1)(a)); CAPP <i>Best Management Practice: Management of Fugitive Emissions at Upstream Oil and Gas Facilities</i>]

3.2 Waste Management

Manual #	Result	Description
3.2.5.5	Low Risk	Facility not maintained in a clean condition. [<i>OGCR</i> 8.150(4)]
3.2.5.10	High Risk	Waste sent to facility not authorized to accept it. [<i>OGCR</i> 8.150(2); <i>Directive 058</i> (2.1(1))]
3.2.5.15	High Risk	Oilfield wastes are mixed/diluted to avoid regulatory requirements. [<i>Directive 058</i> (5.5); <i>Interim Directive (ID) 99-04</i> (2)]
3.2.5.20	High Risk	Conditions not met for on-site land treatment. [<i>Directive 058</i> (16.2(1) - (3)); <i>Informational Letter (IL) 98-02</i> (4.2)]
3.2.5.25	High Risk	Oilfield waste was not treated according to one-time, on-site biopile/biocell treatment requirements. [<i>Directive 058</i> (16.3(1), (4)(c))]
3.2.5.30	High Risk	One-time, on-site biopile or biocell containment device or leachate collection system is not appropriately designed or operated. [<i>Directive 055</i> (8.1); <i>Directive 058</i> (11.6), (16.3)]
3.2.5.35	High Risk	Small batch feed incinerator or mobile thermal treatment facility not operating according to requirements. [<i>Directive 058</i> (11.6), (17.4), (17.5); <i>Interim Directive (ID) 2000-03</i> (3.1(a), (b))]
3.2.5.40	High Risk	Conditions not met for spreading of oily by-products to roads. [<i>Directive 058</i> (29.3), (29.8); <i>Informational Letter (IL) 99-02</i>]
3.2.5.45	High Risk	Banned oilfield wastes injected into pipeline system. [<i>Directive 058</i> (6), (6.1)]
3.2.10.5	High Risk	Oilfield waste generator not tracking oilfield waste from cradle to grave. [<i>OGCR</i> 8.150(2); <i>Directive 058</i> (7.1), (9.1), (9.2)]
3.2.10.10	Low Risk	Waste tracking system data or manifest copies and supporting documentation not retained for two years. [<i>Directive 058</i> (8.9), (9.2)]
3.2.10.15	Low Risk	ERCB manifests not completed or completed improperly for DOWs transported on public roads. [<i>Directive 058</i> (7.1), (8); <i>Interim Directive (ID) 2000-03</i> (3.4)]
3.2.10.20	Low Risk	Discrepancy on the waste manifest is not reconciled. [<i>Directive 058</i> (8.8)]
3.2.10.25	Low Risk	Biopile or biocell records not kept for two years. [<i>Directive 058</i> (16.3(5)), (11.8)]
3.2.10.30	Low Risk	Small batch feed incinerator or mobile thermal treatment facility does not notify ERCB as required. [<i>Directive 058</i> (17.4), (17.5(3))]

3.3 Spills

Manual #	Result	Description
3.3.5.5	High Risk	Facility closer than 100 metres to the normal high water mark of a body of water or permanent stream without appropriate protective measures. [OGCR 8.060]
3.3.5.10	High Risk	Spill or release not contained/cleaned up. [OGCR 8.050(1), 8.051(b)]
3.3.10.5	High Risk	No notification of a reportable spill or release to ERCB. [OGCR 8.050(2), 8.051(a), 12.140; <i>Informational Letter (IL) 98-01</i> (4.1)]
3.3.10.10	Low Risk	Late notification of a reportable spill or release to ERCB. [OGCR 8.050(2), 8.051(a), 12.140; <i>Informational Letter (IL) 98-01</i> (4.1)]

3.4 Surface Water

Manual #	Result	Description
3.4.5.5	High Risk	Release criteria of collected surface water not met prior to release to adjacent lands. [<i>Directive 055</i> (11)]
3.4.5.10	Low Risk	Surface water that meets the surface discharge criteria disposed to injection/disposal well. [<i>Directive 051</i> (2.3)]

4 Liability Management

4.1 Abandonment

Manual #	Result	Description
4.2.10.5	Low Risk	No notification of facility abandonment. [<i>Directive 006</i> Appendix 3(1), (2)]

99 Other

Manual #	Result	Description
99.5.5	Low Risk	Noncompliant with other low risk ERCB requirement(s) (see comments for details). [Refer to the applicable ERCB requirement (must be a risk-assessed noncompliance).]
99.10.10	High Risk	Noncompliant with other high risk ERCB requirement(s) (see comments for details). [Refer to the applicable ERCB requirement (must be a risk-assessed noncompliance).]

D Well Site Inspections

1 Equipment

1.1 Gas Measurement

Manual #	Result	Description
1.1.5.10	High Risk	No produced gas measurement. [OGCR 14.040; <i>Directive 017</i> (4.1), (4.2.1), (4.2.2), (4.2.3), (4.3.5), (5.5), (7)]
1.1.5.15	High Risk	Flared/vented gas not measured. [OGCR 14.040; <i>Directive 017</i> (4.1), (4.3.5.1), (4.3.5.2), (4.3.5.3), (12.3.2); <i>Directive 060</i> (10.1), (10.2)]
1.1.5.20	Low Risk	Fuel gas not measured. [<i>Directive 017</i> (4.1), (4.2.2), (4.3.5.2), (4.3.5.3), (12.3.2)]
1.1.5.22	High Risk	Acid gas not metered. [OGCR 14.200; <i>Directive 060</i> (10.1(1)(b))]
1.1.5.25	Low Risk	Design, installation, and operation of measurement system is not in accordance with requirements. [OGCR 14.070, 14.080; <i>Directive 017</i> (4.3.1), (4.3.4), (4.3.5)]
1.1.5.28	Low Risk	Gas well effluent measurement test taps installed upstream of the well effluent meter. [<i>Directive 004</i> (4.2); <i>Directive 017</i> (7.4)]
1.1.5.30	Low Risk	Meter not calibrated/proved since installation, following repairs, or calibration/proving expired. [OGCR 14.040; <i>Directive 017</i> (2.5.1), (2.5.2.1)]
1.1.5.35	Low Risk	Calibration procedures not in accordance with requirements. [<i>Directive 017</i> (2.5)]
1.1.5.40	Low Risk	Gas meter internal components are unsatisfactory. [OGCR 14.070; <i>Directive 017</i> (2.5.2), (4.3.1)]
1.1.5.45	Low Risk	Gas meter internal components not checked in accordance with requirements. [<i>Directive 017</i> (2.5.2), (2.5.2.1)]
1.1.5.50	Low Risk	Flowing gas temperature not determined in accordance with the requirements. [OGCR 14.060(2), 14.080; <i>Directive 017</i> (4.3.1)]
1.1.5.55	Low Risk	Sensing lines between orifice meter and recording device not designed in accordance with requirements. [OGCR 14.060; <i>Directive 017</i> (4.3.4.1), (4.3.4.1(a))]
1.1.5.60	Low Risk	Chart recorder not suitably winterized to prevent sensing lines and other piping from freezing and disrupting measurement. [<i>Directive 017</i> (4.3.4.1)]
1.1.5.65	Low Risk	Improper chart drive speed/inappropriate use of multiday charts. [OGCR 14.070(1), (2); <i>Directive 017</i> (4.3.1), (5.4.1), (6.5), (7.3.1), (7.4.1)]
1.1.10.10	High Risk	Gas production not reported to the Petroleum Registry. [OGCR 12.030(1); <i>Directive 007</i> (3.2); <i>Directive 017</i> (13.2.2)]

Manual #	Result	Description
1.1.10.15	Low Risk	Gas production determined using measurement by difference practices that are not in accordance with requirements. [<i>Directive 017</i> (5.5)]
1.1.10.20	High Risk	Flared/vented gas not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.2(5)); <i>Directive 017</i> (4.3.3.1(5), (6)), (12.3.2); <i>Directive 060</i> (10(1))]
1.1.10.25	Low Risk	Fuel gas not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.2(5)); <i>Directive 017</i> (4.3.3.1(8), (10))]
1.1.10.28	Low Risk	Acid gas not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.2(2))]
1.1.10.30	Low Risk	Measurement not in accordance with approval. [<i>Directive 017</i> (5), (5.1), (5.2); see specific approval]
1.1.10.35	Low Risk	Meter calibration/proving tag or detailed report does not meet requirements. [<i>Directive 017</i> (2.3(Exceptions 1)), (2.5.2), (2.5.2.1 (2), (3), (4), (8)), (2.5.3), (2.5.4)]
1.1.10.40	Low Risk	Incorrect or insufficient information recorded on chart. [<i>OGCR</i> 14.070(4); <i>Directive 017</i> (4.3.3.1(2)), (4.3.4.2)]

1.2 Hydrocarbon Liquids Measurement

Manual #	Result	Description
1.2.5.10	Low Risk	Metering system not designed, installed, or operated as required. [<i>OGCR</i> 14.180(2); <i>Directive 017</i> (2.6(1)), (2.8.1), (2.8.2), (6.3.1), (12.2), (12.3), (12.3.4), (13.2.1)]
1.2.5.15	Low Risk	Meter installed downstream of snap-acting dump valve. [<i>Directive 017</i> (2.6(1)), (2.8.1), (2.8.2), (2.9), (12.2), (13.2.1)]
1.2.5.20	Low Risk	Measurement device not calibrated/proved since installation, following repairs, or calibration/proving expired. [<i>OGCR</i> 14.090(2)(a), (b), 14.110(1), (3), 14.120(1), (4); <i>Directive 017</i> (2.6), (2.8.1), (2.8.2), (2.9), (2.12), (2.13), (2.14), (12.2), (13.2.1)]
1.2.5.25	Low Risk	Prover tap size or location not in accordance with requirements. [<i>Directive 017</i> (2.6(2)), (12.2), (13.2.1)]
1.2.5.30	Low Risk	Procedures for the proving/calibration of measurement device/system are not in accordance with requirements. [<i>Directive 017</i> (2.6), (2.7), (2.8), (2.9), (2.11), (2.12), (2.13), (12.2), (13.2.1)]
1.2.5.35	Low Risk	Tank gauging procedures not in accordance with requirements. [<i>Directive 017</i> (6.3.1.2), (6.3.1.2(b) - (d)), (12.2), (12.3), (12.3.4), (13.2.1)]
1.2.10.5	High Risk	Hydrocarbon liquid production not reported to the Petroleum Registry. [<i>OGCR</i> 12.030(1); <i>Directive 007</i> (3.2)]
1.2.10.10	Low Risk	Measurement device calibration/proving tag or detailed report does not meet requirements. [<i>OGCR</i> 14.090(2)(c), 14.110(5), 14.120(5); <i>Directive 017</i> (2.6(10), (11), (Exceptions 1 - 3)), (2.7.1(2)), (2.12), (2.13.2), (2.14), (12.2), (13.2.1)]

1.3 Water/Other Measurement

Manual #	Result	Description
1.3.5.5	Low Risk	No water production measurement. [OGCR 14.140 - 14.170; Directive 004; Directive 017 (6.1), (6.2.2.1), (7.1.1), (7.2.1), (7.3), (7.3.1), (7.3.3), (7.4), (7.4.1), (7.4.3)]
1.3.5.10	Low Risk	No measurement of injected/disposed water or other substance(s). [OGCR 14.200; Directive 017 (1.7.3(ii), (iv))]
1.3.5.15	Low Risk	Meter or product analyzer not installed in accordance with the requirements. [OGCR 14.180(3); Directive 017 (2.6), (6.4.2)]
1.3.5.20	Low Risk	Water meter not proved since installation, following repairs, or meter proving has expired. [OGCR 14.140(3); Directive 017 (2.6), (2.10)]
1.3.5.25	Low Risk	Product analyzer calibration expired. [Directive 017 (2.11)]
1.3.10.5	Low Risk	Water production not reported to the Petroleum Registry. [OGCR 12.030(1); Directive 007 (3.2)]
1.3.10.10	Low Risk	Injection or disposition of water/other substance not reported to the Petroleum Registry. [OGCR 12.030(1); Directive 007 (3.2)]
1.3.10.15	Low Risk	Measurement device calibration/proving tag/detailed report not attached or does not meet requirements. [OGCR 14.140(3)(c); Directive 017 (2.6(10), (11), (Exceptions 1)), (2.10)]
1.3.10.20	Low Risk	Product analyzer tag/detailed report does not meet requirements. [Directive 017 (2.11)]

1.4 Spacing

Manual #	Result	Description
1.4.5.5	High Risk	Flare stack or incinerator less than 100 metres from an occupied residence. [OGCR 8.080(3); Directive 060 (7.8(2)(b))]
1.4.5.10	High Risk	Flare pit, flare stack, or incinerator less than 25 metres from oil or gas processing equipment. [OGCR 8.080(5); Directive 060 (7.8(1)(c))]
1.4.5.15	Low Risk	Flare pit, flare stack, or incinerator less than 50 metres from a well or oil storage tank. [OGCR 8.080(5); Directive 060 (7.8(1)(a), (b))]
1.4.5.20	Low Risk	Flare pit, flare stack, or incinerator less than 100 metres from a surface improvement, except surveyed roadway or road allowance. [OGCR 1.020(2)(28), 8.080(3); Directive 056 Appendix 3; Directive 060 (7.8(2)(a))]
1.4.5.25	Low Risk	Flare or incinerator less than 40 metres to a public roadway. [OGCR 8.080(3); Directive 056 Appendix 3; Directive 060 (7.8(2)(a)), footnote 15]
1.4.5.30	High Risk	Flame type equipment placed or operated within 25 metres of a process vessel without adequate flame arrester. [OGCR 8.090(5), (8)]

Manual #	Result	Description
1.4.5.35	High Risk	Flame type equipment within 25 metres of a well, oil storage tank, or other source of ignitable vapour. [OGCR 8.090(4); <i>Interim Directive (ID) 91-03</i> (3.3 (3))]
1.4.5.40	High Risk	Ventilation requirements not met for flame type equipment within the same building as a process vessel or source of ignitable vapour. [OGCR 8.090(6)]
1.4.5.45	Low Risk	Fire within 50 metres of a well, oil storage tank, or other source of ignitable vapour (25 metres for heavy oil/crude bitumen production). [OGCR 8.090(2); <i>Interim Directive (ID) 91-03</i> (3.3)]
1.4.5.50	High Risk	Smoking within 25 metres of a well, separator, oil storage tank, or other source of ignitable vapour. [OGCR 8.120(1)]
1.4.5.55	Low Risk	Outer perimeter of tank dike to surface improvement (other than public roadway) less than 60 metres. [OGCR 8.030(4)]
1.4.5.60	Low Risk	Oil storage tank(s) to well less than 50 metres (25 metres for heavy oil/crude bitumen production). [OGCR 8.090(3); <i>Directive 055</i> (3.7); <i>Interim Directive (ID) 91-03</i> (3.3 (2))]
1.4.5.65	Low Risk	Internal combustion engine exhaust within 25 metres of a well, process vessel, oil storage tank, or source of ignitable vapours, not constructed to prevent flame emergence. [OGCR 8.090(9)(a)]
1.4.5.70	Low Risk	End of exhaust pipe from internal combustion engine is located within 6 metres of the well and/or is not directed away from the well (1 metre for heavy oil production). [OGCR 8.090(9)(b); <i>Interim Directive (ID) 91-03</i> (3.3(4)(a))]

1.5 Flaring, Incinerating, and Venting

Manual #	Result	Description
1.5.5.5	High Risk	No flare or incinerator stack where one is required. [OGCR 7.060(1) - (3), 7.070(1), (3), (5), (6); <i>Directive 060</i> (8.1(5)(b)); <i>Interim Directive (ID) 91-03</i> (3.2(3))]
1.5.5.10	High Risk	Operating procedures and/or automatic shutdowns not in place where needed to control sour/acid gas flaring events. [<i>Directive 060</i> (7.5(3))]
1.5.5.13	Low Risk	Failure to meet solution gas reduction requirements during planned shutdowns and emergency events. [<i>Directive 060</i> (2.11.1(1), (2), Table 1), (5.2(4))]
1.5.5.15	Low Risk	Stack height or design does not meet requirements. [OGCR 7.060(4)(a), (7), 7.070(5), (6); <i>Directive 060</i> (7.4); <i>Interim Directive (ID) 91-03</i> (3.2(3))]
1.5.5.20	High Risk	Pilot/ignition device(s) not available/operable where required. [OGCR 7.060(4)(c), (10), 7.070(1), 7.070(5); <i>Directive 060</i> (7.3), (7.3.1(1)), Appendix 13]
1.5.5.25	High Risk	Insufficient heating value available to flare. [<i>Directive 060</i> (7.1.1(1))]
1.5.5.30	Low Risk	No wind guard on gas sour/acid flare when exit velocity is not sufficient. [OGCR 7.060(4)(b), 7.070(5)]

1.5.5.35	High Risk	No flame arrester, equivalent safety device, or appropriate engineering and operating practices to prevent backflash where required. [OGCR 8.090(7); <i>Directive 060</i> (7.7(1) - (3)), (8.1(9))]
1.5.5.40	High Risk	No knockout drum or flare separator where required. [OGCR 7.060(4)(d), 7.070(5); <i>Directive 060</i> (7.6(2)), (7.6.1), (8.1(5)(b))]
1.5.5.45	High Risk	Knockout drum or flare separator controls, equipment or design, does not meet requirements. [<i>Directive 060</i> (7.6)]
1.5.5.50	High Risk	Exposed flame from an incinerator. [<i>Directive 060</i> (7.1.2(1)(a))]
1.5.5.55	High Risk	Insufficient exit temperature, no automatic temperature shutdown, or no process temperature control and recording where required for incinerators. [<i>Directive 060</i> (7.1.2(1) - (3))]
1.5.5.60	High Risk	Gas is being vented, not burned, where it could support stable combustion. [OGCR 8.080(1); <i>Directive 060</i> (8.1(2),(5))]
1.5.5.65	High Risk	Venting practices not conducted in accordance with the requirements. [OGCR 8.080(1); <i>Directive 060</i> (8.1(4) - (7))]
1.5.5.68	High Risk	Exceeding well test flaring/incineration and venting duration limits. [<i>Directive 060</i> (2.4(1)), (3.2(1), (2))]
1.5.5.70	High Risk	Flare pit containing produced fluids. [OGCR 8.080(4); <i>Informational Letter (IL) 96-04</i>]
1.5.5.75	High Risk	Flare pit used at facility/well site constructed after July 1, 1996. [OGCR 8.080(2); <i>Directive 060</i> (7.11); <i>Informational Letter (IL) 96-04</i>]
1.5.5.80	Low Risk	Inadequate construction, design, equipment, and/or use of a flare pit at a facility/well site. [OGCR 8.080(3), (4); <i>Directive 060</i> (7.11); <i>Informational Letter (IL) 96-04</i> ; <i>Informational Letter (IL) 94-06</i>]
1.5.5.83	High Risk	Routine flaring, incinerating, or venting solution gas from an oil/bitumen well with a GOR greater than 3000 m ³ /m ³ [<i>Directive 060</i> (2.5(1)(b))]
1.5.10.5	High Risk	Failure to conduct dispersion modelling for flaring or incinerating gas with greater than 10 mol/kmol H ₂ S or 1 tonne per day of sulphur. [<i>Directive 060</i> (3.6(1), (2)), (7.12(1), (2))]
1.5.10.10	High Risk	Decision tree or economic evaluation not completed or results not implemented for new, existing, and temporary flares, incinerators, and vents as required. [<i>Directive 060</i> (2.3, Figure 2), (2.4(1)(a)(i)(ii)), (2.5(1)(a)), (2.8(1)), (3.1(1), (2), Figure 3), (4.1(5), Figure 5), (5.1, Figure 6), (6.1, Figure 7), (7.11(4)), (8.1(1)), (9.1)]
1.5.10.15	Low Risk	Failure to keep flaring, incinerating, and venting logs as required. [<i>Directive 060</i> (10.4(1)(b) - (e)), (2))]
1.5.10.20	High Risk	Flaring or incinerating sour gas containing more than 50 mol/kmol H ₂ S without a permit where required. [OGCR 7.055; <i>Directive 060</i> (3.3.1(1)), (3.3.2(2) - (4)), (3.7(3))]
1.5.10.25	High Risk	Failure to comply with any condition of flaring permit or approval (temporary permits, volume allowance threshold exceedance permits, and blanket permits). [OGCR 7.055; <i>Directive 060</i> (3.3(1)), (3.5)]

1.5.10.30	High Risk	Failure to comply with conditions for flaring or incinerating small volumes of sour gas containing more than 50 mol/kmol H ₂ S when a permit is not required. [<i>Directive 060</i> (3.3.2(2) - (4))]
1.5.10.35	Low Risk	Failure to notify the appropriate ERCB Field Centre of flaring, incinerating, or venting events as required. [<i>OGCR</i> 7.060(9.5)(a); <i>Directive 060</i> (2.9(6)), (2.11.1(3)), (3.9), (4.2), (5.4), (6.4(1) - (3)), Table 1, Table 2]
1.5.10.40	High Risk	No resident notification and/or consultation. [<i>OGCR</i> 7.060(9.5)(b), (c); <i>Directive 060</i> (2.5(1)(c)(i), (6)(c), (6)(d)), (2.9(3), (5), (6)), (2.11.1(3)), (3.9(1), (4) - (7)), (4.2(1)), (5.4(1)), (6.4(1)), Table 1, Table 2]
1.5.10.45	Low Risk	Public information packages or resident notification information do not meet the requirements. [<i>Directive 060</i> (2.9.1), (3.9(4), (5))]
1.5.10.48	Low Risk	Licensee does not notify the appropriate ERCB Field Centre of any unresolved concerns/objections to temporary flaring event or well test. [<i>Directive 060</i> (3.9.1(2))]

1.6 Signs and Security

Manual #	Result	Description
1.6.5.5	Low Risk	Conspicuous identification sign not posted at the primary entrance to the well or facility. [<i>OGCR</i> 6.020(3); <i>Directive 055</i> (3.8)]
1.6.5.10	Low Risk	Improper identification sign. [<i>OGCR</i> 6.020(3), (5), (7)]
1.6.5.15	Low Risk	No or improper warning symbol posted adjacent to all entrances to the developed area of wells and facilities. [<i>OGCR</i> 6.020(8), (9), (10), (11), (12), (13), Schedule 12]
1.6.5.20	High Risk	No or inadequate fence around well as required. [<i>OGCR</i> 8.180(1), (2)]
1.6.5.23	Low Risk	Licensee not ensuring vehicles do not operate within 3 metre radius of the wellhead. [<i>OGCR</i> 7.050(7.2); <i>Interim Directive (ID) 98-02</i> (Wellhead Protection)]
1.6.5.28	Low Risk	The wellhead is not conspicuously marked or fenced so that it is visible in all seasons. [<i>OGCR</i> 7.050(7.1); <i>Directive 013</i> Table 1; <i>Interim Directive (ID) 90-01</i> (7.3.5(8)); <i>Interim Directive (ID) 98-02</i> (Wellhead Protection)]
1.6.5.33	High Risk	Physical barrier that is clearly visible not constructed around critical sour well. [<i>Interim Directive (ID) 90-01</i> (7.3.5(9))]

1.7 Emergency Controls and Relief Systems

Manual #	Result	Description
1.7.5.3	High Risk	Sour pressure relief valves at a well site > 10 mol/kmol H ₂ S not tied into flare system. [<i>OGCR</i> 7.060(1), (3)]
1.7.5.5	Low Risk	Operating gas catalytic heater with inoperable safety shut off. [<i>OGCR</i> 8.090(8); <i>Alberta Regulation 62/2003 Occupational Health and Safety Regulation</i> , Part 1, 12(1)]

Manual #	Result	Description
1.7.5.8	Low Risk	No high level and high pressure shutdown device installed on a separator, treater, or other pressure vessel which receives production from an oil well containing more than 10 mol/kmol H ₂ S. [OGCR 7.060(3.1)]
1.7.5.13	Low Risk	No or inadequate/inappropriate pop tank or alternate conditions not adhered to. [OGCR 8.031]
1.7.5.18	High Risk	Well does not have a master valve as required. [OGCR 7.050(7.3), 7.050(7.4); <i>Interim Directive (ID) 98-02</i>]
1.7.5.23	High Risk	A flowing well at which the H ₂ S concentration exceeds 50 mol/kmol or critical sour well does not have two master valves. [OGCR 7.050(3)(a); <i>Interim Directive (ID) 90-01</i> (7.3.5(5))]
1.7.5.28	High Risk	Wellhead working pressure rating less than the bottom hole pressure for a well with greater than 50 mol/kmol H ₂ S or critical sour well. [OGCR 7.050(3)(c); <i>Interim Directive (ID) 90-01</i> (7.3.5(3))]
1.7.5.33	High Risk	Sour pumping well capable of flow to atmosphere with a H ₂ S content of 10 mol/kmol or greater not equipped with hydraulic rod blowout preventer (BOP) and environmental BOP. [OGCR 7.050(7.3), (7.4)]
1.7.5.38	High Risk	Well which produces gas containing more than 10 mol/kmol H ₂ S with a flow line gauge pressure exceeding 1400 kPa and does not have a mechanism installed on the wellhead that halts the flow of oil or gas in the event of an uncontrolled drop in pressure or an equipment failure. [OGCR 7.060(8)]
1.7.5.43	High Risk	Critical sour well capable of flow to atmosphere does not have a surface safety valve. [<i>Interim Directive (ID) 90-01</i> (7.3.5(6))]
1.7.5.48	High Risk	Critical sour well on rod pump does not have an environmental BOP on top of the stuffing box. [<i>Interim Directive (ID) 90-01</i> (7.3.5(7))]
1.7.5.53	Low Risk	Hot oil circulating string does not have a check valve in the injection line and an automatic shut-off valve on the return line (> 50 mol/kmol H ₂ S). [OGCR 7.050(4)]
1.7.5.58	High Risk	No subsurface safety valve in accordance with requirements where required. [OGCR 7.050(7), 8.060(b); <i>Interim Directive (ID) 90-01</i> (7.3.5(6))]
1.7.5.63	High Risk	Well not on pump is located closer than 100 metres to normal high-water mark of a body of water or permanent stream does not have an automatically closing wellhead valve. [OGCR 8.060(a)]
1.7.5.68	Low Risk	No or inadequate surface casing vent. [OGCR 6.100, 7.050(3)]

1.8 Storage

Manual #	Result	Description
1.8.5.5	High Risk	Contaminated materials or materials possessing the potential to leach stored directly on the ground. [OGCR 8.030(1); <i>Directive 055</i> (3.5)]

Manual #	Result	Description
2.1.5.35	High Risk	Failure to ensure that the equipment identified in the ERP is available and located where specified in the ERP for any operation. [<i>Directive 071</i> (14.4(16)); <i>Bulletin 2008-15</i> (2.2)]
2.1.5.38	High Risk	Failure to meet the air quality monitoring requirements for critical sour wells. [<i>Directive 071</i> (14.3.8.1(13), (14)); <i>Bulletin 2008-15</i> (2.2)]
2.1.5.40	High Risk	Failure to ensure that company equipment is operational and the appropriate documentation is available to verify testing and calibration requirements. [<i>Directive 071</i> (14.4(17)); <i>Bulletin 2008-15</i> (2.2)]
2.1.10.5	High Risk	Failure to provide a copy of the public information package to all identified residences in the EPZ every two years and/or conduct a public awareness program with members of the public through personal consultative process. [<i>Directive 071</i> (14.6(23)); <i>Bulletin 2008-15</i> (2.2)]
2.1.10.10	Low Risk	Failure to carry out public and local authority notification and consultation. [<i>Directive 071</i> (13.1(1)), Table 8; <i>Bulletin 2008-15</i> (2.2)]
2.1.10.15	Low Risk	Failure to distribute copies of the sour operations, HVP pipeline, cavern storage facility, sour well site specific drilling and/or completion ERP, or approved supplement to government departments and agencies within 10 business days after approval, unless the government agency requests otherwise in writing. [<i>Directive 071</i> (5.7(15)), (7.3.3(11)), (9.3.2(7)), Appendix 5; <i>Bulletin 2008-15</i> (2.2)]
2.1.10.20	Low Risk	Failure to provide a copy of the public information package to the local ERCB Field Centre. [<i>Directive 071</i> (4.3.1(13)); <i>Bulletin 2008-15</i> (2.2)]
2.1.10.25	High Risk	Failure to immediately contact the ERCB after activating internal response resources to confirm the level of emergency and convey the specifics of the incident. [<i>Directive 071</i> (11.1.1(4)), (14.2(4)); <i>Bulletin 2008-15</i> (2.2)]

3 Environment

3.1 Emissions

Manual #	Result	Description
3.1.5.5	High Risk	H ₂ S emissions at well that produces gas containing more than 10 mol/kmol of H ₂ S. [<i>OGCR</i> 7.070(1), (3); <i>Directive 060</i> (7.1), (8.2); <i>Interim Directive (ID) 91-03</i> (3.2(3))]
3.1.5.10	High Risk	Exceeding Alberta Ambient Air Quality Objectives. [<i>Directive 060</i> (3.3.2(2)(c)), (3.6(6)), (7.12(1)), Appendix 8(5)(b)]
3.1.5.25	Low Risk	Routine combustion of gases results in continuous or repeat black smoke emissions. [<i>OGCR</i> 7.040(1), 9.050(6)(d); <i>Directive 060</i> (7.1(2)), (7.2(1)(a))]
3.1.5.30	High Risk	Individual dehydrator(s) or site dehydrator benzene emissions over the limits. [<i>Directive 039</i> (2); <i>Directive 060</i> (8.3(1), (3))]

Manual #	Result	Description
3.1.10.10	Low Risk	Failure to notify resident(s) within 750 metres of a dehydrator (for new, relocated, or existing glycol dehydrators). [<i>Directive 039</i> (1); CAPP <i>BMP Control of Benzene Emissions from Glycol Dehydrators</i> (Executive Summary, Chapter 11)]
3.1.10.15	Low Risk	Dehydrator Engineering and Operations Sheet (DEOS) not done, incomplete/inaccurate, and/or not posted. [<i>Directive 039</i> (3); <i>Directive 060</i> (8.3(2)(b))]
3.1.10.20	Low Risk	Failure to correctly complete the Decision Tree Analysis (for new or relocated glycol dehydrators as of January 1, 2007). [<i>Directive 039</i> (1); <i>Directive 060</i> (8.3(2)(a)); CAPP <i>BMP Control of Benzene Emissions from Glycol Dehydrators</i> (Executive Summary, Appendix A)]

3.2 Waste Management

Manual #	Result	Description
3.2.5.5	Low Risk	Well not maintained in a clean condition. [<i>OGCR</i> 8.150(4)]
3.2.5.10	High Risk	Waste sent to facility not authorized to accept it. [<i>OGCR</i> 8.150(2); <i>Directive 058</i> (2.1(1))]
3.2.5.15	High Risk	Oilfield wastes are mixed/diluted to avoid regulatory requirements. [<i>Directive 058</i> (5.5); <i>Interim Directive (ID) 99-04</i> (2)]
3.2.5.20	High Risk	Conditions not met for on-site land treatment. [<i>Directive 058</i> (16.2(1) - (3)); <i>Informational Letter (IL) 98-02</i> (4.2)]
3.2.5.25	High Risk	Oilfield waste was not treated according to one-time, on-site biopile/biocell treatment requirements. [<i>Directive 058</i> (16.3(1), (4)(c))]
3.2.5.30	High Risk	One-time, on-site biopile or biocell containment device or leachate collection system is not appropriately designed or operated. [<i>Directive 055</i> (8.1); <i>Directive 058</i> (11.6), (16.3)]
3.2.5.35	High Risk	Small batch feed incinerator or mobile thermal treatment facility not operating according to requirements. [<i>Directive 058</i> (11.6), (17.4), (17.5); <i>Interim Directive (ID) 2000-03</i> (3.1(a), (b))]
3.2.5.40	High Risk	Conditions not met for spreading of oily by-products to roads. [<i>Directive 058</i> (29.3), (29.8); <i>Informational Letter (IL) 99-02</i>]
3.2.5.45	High Risk	Banned oilfield wastes injected into pipeline system. [<i>Directive 058</i> (6), (6.1)]
3.2.10.5	High Risk	Oilfield waste generator not tracking oilfield waste from cradle to grave. [<i>OGCR</i> 8.150(2); <i>Directive 058</i> (7.1), (9.1), (9.2)]
3.2.10.10	Low Risk	Waste tracking system data or manifest copies and supporting documentation not retained for two years. [<i>Directive 058</i> (8.9), (9.2)]
3.2.10.15	Low Risk	ERCB manifests not completed or completed improperly for DOWs transported on public roads. [<i>Directive 058</i> (7.1), (8); <i>Interim Directive (ID) 2000-03</i> (3.4)]
3.2.10.20	Low Risk	Discrepancy on the waste manifest is not reconciled. [<i>Directive 058</i> (8.8)]

Manual #	Result	Description
3.2.10.25	Low Risk	Biopile or biocell records not kept for two years. [<i>Directive 058</i> (16.3(5)), (11.8)]
3.2.10.30	Low Risk	Small batch feed incinerator or mobile thermal treatment facility does not notify ERCB as required. [<i>Directive 058</i> (17.4), (17.5(3))]

3.3 Spills

Manual #	Result	Description
3.3.5.5	High Risk	Well closer than 100 metres to the normal high water mark of a body of water or permanent stream without appropriate protective measures. [<i>OGCR</i> 8.060]
3.3.5.10	High Risk	Spill or release not contained/cleaned up. [<i>OGCR</i> 8.050(1), 8.051(b)]
3.3.10.5	High Risk	No notification of a reportable spill or release to ERCB. [<i>OGCR</i> 8.050(2), 8.051(a), 12.140; <i>Informational Letter (IL) 98-01</i> (4.1)]
3.3.10.10	Low Risk	Late notification of a reportable spill or release to ERCB. [<i>OGCR</i> 8.050(2), 8.051(a), 12.140; <i>Informational Letter (IL) 98-01</i> (4.1)]

3.4 Surface Water

Manual #	Result	Description
3.4.5.5	High Risk	Release criteria of collected surface water not met prior to release to adjacent lands. [<i>Directive 055</i> (11)]
3.4.5.10	Low Risk	Surface water that meets the surface discharge criteria disposed to injection/disposal well. [<i>Directive 051</i> (2.3)]

4 Liability Management

4.1 Suspension

Manual #	Result	Description
4.1.5.3	High Risk	Improper suspension for given well type (if suspended to lower risk level). [<i>Directive 013</i> (3), Table 1]
4.1.5.8	Low Risk	All wellhead valves are not chained and locked or valve handles not removed. [<i>Directive 013</i> Table 1]
4.1.5.13	Low Risk	All outlets (except surface casing vents) not bull plugged or blind flanged with needle valves. [<i>Directive 013</i> Table 1]
4.1.5.23	Low Risk	Inactive well not suspended within 60 days after the one year anniversary of no production or injection. [<i>Directive 013</i> (8)]
4.1.10.3	Low Risk	Failure to report to the ERCB DDS system as required. [<i>Directive 013</i> (8), (9), Table 1]



Pipelines Legislative Requirements

Alberta

Directive 66:

The pipeline check sheet used by an ERCB inspector has the following major categories

- Pipeline Specifications
- Construction
- Ground Disturbance
- Pressure Testing
- Discontinued Pipeline
- Abandoned Pipeline
- Operations Review
- Incident Case
- Other

Within each category there are numerous items that will be deemed satisfactory, low risk unsatisfactory, high risk unsatisfactory.

The following items will be deemed high risk unsatisfactory and are in direct control of Pengrowth site supervisors

Construction

- There is no approval to construct
- Conditions stated on license are not met
- Roads crossings are unsatisfactory
- Railway crossings are unsatisfactory
- Depth of cover is unsatisfactory
- Ditch preparation is unsatisfactory
- Joining/radiograph is unsatisfactory
- Bored crossings are unsatisfactory
- Pipe Coating/handling conditions are unsatisfactory
- Backfill procedures are unsatisfactory
- Lease piping is unsatisfactory
- Safety precautions are unsatisfactory

Ground Disturbance

- Marking of existing pipelines inside a controlled area is unsatisfactory
- Total disregard for the requirements for marking of pipelines

- Hand excavation: Mechanical excavation takes place within 5 m of existing pipeline prior to hand exposure
- Total disregard for the hand excavation requirements
- Machine working with 60 cm without authorization from the owner of the existing crossing
- Notification to the owner of the existing pipeline prior to ground disturbance was unsatisfactory
- Notification to the owner of the existing pipeline prior to backfill was unsatisfactory

Pressure Testing

- Test medium/disposal unsatisfactory
- Safety precautions unsatisfactory
- Test pressure not between 25 and 90 per cent of the pressure recorder range

Discontinued Pipeline

- Not left in safe condition

Abandoned Pipeline

- Not physically isolated /disconnected
- Not cleaned/purged and left in safe condition

The following items will be deemed high risk unsatisfactory and are not in direct control of Pengrowth site supervisors. If any of the following items are discovered the project lead should be contacted.

Pipeline Specifications

- Substance is different from that stated on the license and the line is operating
- H₂S content is higher than that stated on the license and the line is operating
- Pressure design does not meet CSA Standard Z662, Clause 4.3.3, or pipeline regulation section 13
- Materials used: Pipe material is not stated on the licenses
- Joint type is different from that stated on license and is not allowed by CSA standard Z662
- Threaded steel is used and buried below ground
- Environment code is different from that stated on license
- MOP is greater than that stated in license and exceeds the manufacturer's rating of the pipe, valves, flanges, or fittings and connecting pipelines

Construction

- Valves, fittings, or flanges do not meet the requirements of the license for the pipeline

Ground Disturbance

- The status of crossing agreements is unsatisfactory

Pressure Testing

- Test piping unsatisfactory
- Not tested under operating conditions

- Test pressure/duration does not conform to requirements

There are numerous low risk unsatisfactory items that are identified in Appendix 1 of Directive 66. Further clarifications of non compliance items can be found in Section 2 of Directive 66.

Saskatchewan and British Columbia

Under construction

If in doubt default to the guidelines for Alberta to be safe.



Requirements and Procedures for Pipelines

December 2005

Effective January 1, 2008, the Alberta Energy and Utilities Board (EUB) has been realigned into two separate regulatory bodies, the Energy Resources Conservation Board (ERCB), which regulates the energy industry, and the Alberta Utilities Commission (AUC), which regulates the utilities industry.

As part of this realignment, the title pages of all existing EUB directives now carry the new ERCB logo. However, no other changes have been made to the directives, and they continue to have references to "EUB." As new editions of the directives are issued, these references will be changed.

ENERGY RESOURCES CONSERVATION BOARD
Directive 066: Requirements and Procedures for Pipelines

December 2005

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Requirements and Procedures for Pipelines

December 2005

GUIDE RENAMED AS A DIRECTIVE

As announced in *Bulletin 2004-02: Streamlining EUB Documents on Regulatory Requirements*, the Alberta Energy and Utilities Board (EUB) will issue only “directives,” discontinuing interim directives, informational letters, and guides. Directives set out new or amended EUB requirements or processes to be implemented and followed by licensees, permittees, and other approval holders under the jurisdiction of the EUB.

As part of this initiative, this document has been renamed as a directive. As well, changes have been incorporated reflecting the compliance assurance process introduced with *Directive 019: Compliance Assurance—Enforcement*. However, no other changes have been made. Therefore, the document text continues to have references to “guides.” These references should be read as referring to the directive of the same number. When this directive is further amended, these references will be changed to reflect their renaming as directives.

ALBERTA ENERGY AND UTILITIES BOARD **Directive 066: Requirements and Procedures for Pipelines**

December 2005

Replaces Guide 66: Pipeline Inspection Manual (November 2001)

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1 Overview

1.1 Purpose of the Directive

Directive 066: Requirements and Procedures for Pipelines is designed to ensure that EUB Field Centre staff carry out pipeline project inspections in a consistent manner throughout Alberta. The directive and check sheet are also intended to inform industry personnel about what is required to achieve a satisfactory EUB inspection.

The directive is primarily addressed to Field Centre inspectors. It is also intended for use by industry as a guide to what they can expect during a pipeline inspection.

1.2 What This Directive Contains

This directive describes the role of the EUB Field Centre inspectors and includes the EUB check sheet that inspectors complete for each pipeline project inspected, accompanied by a step-by-step description of how to complete each part of the form.

There are two appendices:

- 1) Operational Deficiencies, detailing criteria for determining the level of noncompliance
- 2) The EUB Pipeline Inspectors' Guide to Corrosion Failure Procedures

1.3 The EUB Inspector's Conduct

The purpose of pipeline project inspections is to achieve compliance with EUB regulations and ensure safe and efficient practices at all pipeline projects.

EUB Field Centre inspectors represent the EUB and must display a positive attitude and fairness to all operators, which requires job knowledge and the willingness to "find out" when uncertainty occurs.

Inspectors must offer the operator the opportunity to be present prior to and during a hands-on or active inspection that includes opening and closing valves.

For safety reasons inspectors must contact the operator prior to entering sour facilities.

Inspectors must comply where possible with company policies whenever the company requires notification prior to inspection or lease entry or if the inspection involves the use of specific safety equipment.

Inspectors must always use a cooperative approach as the first method attempted to achieve company compliance with EUB regulations. Where practical, they should have a brief discussion with the company's senior personnel on site after the inspection. This opportunity should be used to establish

contacts, exchange information, discuss deficiencies, enforcement, and follow-up, and enhance relations.

Each inspector must have a copy of this inspection manual on site when conducting an inspection.

1.4 Safety

Inspectors must refer to the EUB *Internal Guide 8: Safety Manual* prior to inspection of any facility and be sure to follow all requirements.

They should point out any unsafe operating conditions and practices to the operator. If necessary, the inspectors must also advise Alberta Human Resources and Employment, Workplace Health and Safety (formerly OH&S), and/or Alberta Municipal Affairs, Safety Services (formerly Electrical Protection).

1.5 Industry Compliance

The EUB believes that compliance in meeting or exceeding regulations and standards is the responsibility of the energy industry. The EUB expects all industry participants to understand its requirements and have an infrastructure in place to ensure compliance. However, the EUB also recognizes that on occasion enforcement of regulations will be required to ensure compliance.

The EUB has implemented a three-level enforcement policy to address the business issue of noncompliance with provincial requirements. *Directive 019: EUB Compliance Assurance—Enforcement* defines the enforcement consequences when operators fail to meet requirements and/or regulations. These consequences only escalate to a higher severity when the operator fails to address EUB requirements and requests.

The criteria for determining the level of noncompliance are given in Appendix 1: Operational Deficiencies. EUB Field Centre inspectors follow these criteria when completing the Pipeline Check Sheet and determining the resulting enforcement action.

1.6 Exemptions

Exemptions to the Pipeline Act and Regulation and CSA standards must be approved by the EUB.

2 Inspection Guide and Check Sheet

A. PIPELINE IDENTIFICATION

LICENSEE NAME	LICENSEE CODE	LICENCE NUMBER	FILE/ENV NUMBER	LINE NUMBERS
LICENSEE REPRESENTATIVE	PHONE NUMBER	CONSTRUCTION CONTRACTOR	STARTING (FROM) LOCATION	INSTALLATION NUMBERS

B. INSPECTION DETAILS

INSPECTION DATE	INSPECTOR NAME	FIELD CENTRE	TYPE OF INSPECTION
			<input type="checkbox"/> Construction <input type="checkbox"/> Test <input type="checkbox"/> Operations <input type="checkbox"/> Failure/Hit
	FAILURE/HIT CAUSE CODE	<input type="checkbox"/> INITIAL INSPECTION <input type="checkbox"/> REINSPECTION	SUBSTANCE
	INVESTIGATION COMPLETION DATE		

C. INSPECTION RESULTS (Code: Satisfactory "X"; Low Risk Unsatisfactory "L"; High Risk Unsatisfactory "H")

PIPELINE SPECIFICATIONS 1 <input type="checkbox"/> Substance 2 <input type="checkbox"/> H ₂ S Content 3 <input type="checkbox"/> Outside Diameter 4 <input type="checkbox"/> Wall Thickness 5 <input type="checkbox"/> Materials Used 6 <input type="checkbox"/> Type and Grade 7 <input type="checkbox"/> Joint Type 8 <input type="checkbox"/> Internal Coating 9 <input type="checkbox"/> From and To Locations 10 <input type="checkbox"/> From and To Facilities 11 <input type="checkbox"/> Length of Pipeline/Route 12 <input type="checkbox"/> Environment 13 <input type="checkbox"/> MOP	GROUND DISTURBANCE 28 <input type="checkbox"/> Crossing Agreements 29 <input type="checkbox"/> Existing Pipelines Marked 30 <input type="checkbox"/> Hand Excavation 31 <input type="checkbox"/> Machine Within 60 cm 32 <input type="checkbox"/> Notification Prior to Ground Disturbance 33 <input type="checkbox"/> Notification Prior to Backfill PRESSURE TESTING 34 <input type="checkbox"/> Test Notice Received 35 <input type="checkbox"/> Test Medium/Disposal 36 <input type="checkbox"/> Test Piping 37 <input type="checkbox"/> Test Under Operating Conditions 38 <input type="checkbox"/> Safety Precautions 39 <input type="checkbox"/> Pressure Test 40 <input type="checkbox"/> Pressure Reading Between 25 and 90% 41 <input type="checkbox"/> Test Pressure/Duration DISCONTINUED PIPELINE 42 <input type="checkbox"/> Physically Isolated/Disconnected 43 <input type="checkbox"/> Left in Safe Condition 44 <input type="checkbox"/> Corrosion Control ABANDONED PIPELINE 45 <input type="checkbox"/> Physically Isolated/Disconnected 46 <input type="checkbox"/> Cleaned/Purged 47 <input type="checkbox"/> Plugged/Capped	OPERATIONS REVIEW 48 <input type="checkbox"/> Operations and Maintenance Procedures 49 <input type="checkbox"/> Emergency Procedures Manual 50 <input type="checkbox"/> Pressure Test Data Records 51 <input type="checkbox"/> Internal Corrosion Control 52 <input type="checkbox"/> External Corrosion Control/Cathodic Surveys 53 <input type="checkbox"/> Failure/Repair Records 54 <input type="checkbox"/> Failure Notification 55 <input type="checkbox"/> Crossing Agreements 56 <input type="checkbox"/> Crossing Inspection Record 57 <input type="checkbox"/> Leak Detection 58 <input type="checkbox"/> Licence Status 59 <input type="checkbox"/> Pipeline Crossing Signs 60 <input type="checkbox"/> Aboveground Facility Identification 61 <input type="checkbox"/> Compressor/Oil Pump Station Identification 62 <input type="checkbox"/> Noise Control 63 <input type="checkbox"/> Right-of-Way 64 <input type="checkbox"/> Pressure Control Devices or Pressure Relief Devices 65 <input type="checkbox"/> Surface Pipeline 66 <input type="checkbox"/> Guide 55 Storage Requirements INCIDENT CAUSE 67 <input type="checkbox"/> Failure/Hit 68 <input type="checkbox"/> Spill OTHER (Y/N) 69 <input type="checkbox"/> Guide 58 Waste Management Requirements Met? 70 <input type="checkbox"/> Facility Suspended? 71 <input type="checkbox"/> Letter to Licensee Required? 72 <input type="checkbox"/> Records Review of Licensee Compliance?
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CONSTRUCTION
 14 ☐ Construction Approval
 15 ☐ Construction Notice Received
 16 ☐ Conditions
 17 ☐ Valves/Fittings/Flanges
 18 ☐ Road Crossing Pipe Specs
 19 ☐ Railway Crossing Pipe Specs
 20 ☐ Depth of Cover
 21 ☐ Ditch Preparation
 22 ☐ Joining/Inspection and Testing
 23 ☐ Bored Crossings
 24 ☐ Pipe Coating/Condition
 25 ☐ Backfill Procedures
 26 ☐ Lease Piping
 27 ☐ Safety Precautions

OVERALL INSPECTION RESULT ☐ Satisfactory ☐ Unsatisfactory

ENFORCEMENT ACTION	
Satisfactory Inspection (no action required)	<input type="checkbox"/>
Unsatisfactory Inspection	<input type="checkbox"/>
Noncompliance Level: _____	
Consequences of Noncompliance: _____	

D. COMMENTS

Licensee's Signature _____

Inspector's Signature _____

Deadline Date _____

2 Inspection Guide and Check Sheet

- 2.1 When to Use the Check Sheet** The EUB inspector must complete a Pipeline Check Sheet when conducting a construction, test, operations, or failure/hit inspection.
- The inspector must also complete a check sheet if a pipeline is inspected due to a complaint, notification, or incident.
- 2.2 How to Complete the Check Sheet** Note that the check sheet is in abbreviated format: each item on the form may require several items to be inspected.
- Record unsatisfactory item(s) in the appropriate box. Not all items on the check sheet must be inspected during every inspection. Mark only those items that are physically inspected.
- This check sheet is used as a written record of every inspection and for input into the EUB's computer database. Complete a separate check sheet for each licence and file number that is inspected during construction inspections and for every licence during operations or failure/hit inspections.
- Leave a copy of the inspection form with the operator after each inspection. If no operator is on site, send the inspection form to the licensee.

A Pipeline Identification

- | | |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Licensee Name | Enter the complete name of the licensee. |
| Licensee Code | Enter the licensee's code. |
| Licence Number | Enter the applicable licence number. |
| File/ENV Number | Enter the file number assigned to the licence or the ENV Event Key number for failures/hits. (See Field Surveillance ENV Completions internal guide.) |
| Line Numbers | Enter only the specific line numbers inspected. |
| Installation Numbers | Enter the installation numbers (from the EUB database) of installations inspected that are associated with the licence. |
| Licensee Representative | Enter the name of the licensee's representative. |
| Phone Number | Enter the telephone number, including area code, of the licensee's representative. |

B Inspection Details

Inspection Date	Enter the date of inspection.
Inspector Name	Enter the name of the EUB inspector.
Field Centre	Enter the name of the inspector's EUB Field Centre.
Type of Inspection	Check the appropriate box(es) that indicates the type(s) of inspection being conducted.
Failure / Hit Cause Code	Enter the applicable incident cause code. For corrosion failures, see Appendix 2 for the necessary procedures to follow.
Initial Inspection or Reinspection	Check the appropriate box that indicates if the inspection is an initial one or a reinspection.
Substance	Enter the applicable code from the licence for the substance that the pipeline transports.

C Inspection Results

All items inspected, except those in the “Other” category, must be marked “X” for satisfactory, “L” for low risk unsatisfactory, or “H” for high risk unsatisfactory. Items under “Other” must be marked “Y” for yes or “N” for no. See *Directive 019* for details on consequences for low and high risk noncompliances. See Appendix 1 for operational deficiencies.

Pipeline Specifications

- Substance**

The substance code on the licence is that of the substance being transported in the pipeline. See *Guide 56*, Unit 3, Table 3.1. By definition, each licence is substance specific. For example, there cannot be a saltwater line and an oil effluent line on the same licence.
- H₂S Content**

The hydrogen sulphide (H₂S) content is equal to or less than that stated on the licence.

If any (H₂S) is being transported in the gas, calculate the partial pressure to see if the pipeline must be built to conform to sour specification.

The partial pressure is determined by multiplying the mole (mol) fraction of H₂S in the gas phase by the maximum operation pressure (MOP) in kilopascals (kPa). The partial pressure of H₂S in the gas phase determines if sour service materials are required.

For gas pipelines, sour service materials are required if the partial pressure of H₂S in the gas phase exceeds 0.35 kPa.

For multiphase pipelines (oil-well effluent), sour service materials are required if the combination of H₂S in the gas phase is in accordance with either of the following:

- the system pressure is < 1400 kPa and the H₂S content in the gas phase is > 50 mol/kmol, or
- the system pressure is >1400 kPa and the partial pressure of the H₂S in the gas phase is >70 kPa.

If the pipeline is transporting more than 10 moles of H₂S per kilomole of natural gas, certain other requirements must be looked at, adhering to *Interim Directive (ID) 81-3* setback requirements. General design and material requirements are found in *CSA Standard Z662*, Clauses 4 and 5; Pipeline Regulation, Section 13; and *Guide 56*, Schedule 3.

3. Outside Diameter

The outside diameter of the pipe is that stated on the licence.

The outside diameter can be found stencilled on the outside of the pipe coating, as required by *CSA Standard Z245.1*.

4. Wall Thickness

The wall thickness of the pipe is that stated on the licence.

The wall thickness can be found stencilled on the outside of the pipe coating, as required by *CSA Standard Z245.1*.

Wall thickness for repairs and crossings may vary, provided that the minimum requirements in CSA and the regulations are met.

5. Materials Used

Materials used are those stated on the licence (*Guide 56*, Table 3.2; Pipeline Regulation, Section 2(1)).

6. Type and Grade

The pipe type and grade are those stated on the licence (*Guide 56*, Tables 3.3, 3.4, 3.5, and 3.6).

“Type” is the standard to which the pipe was manufactured (API, ASTM, or CSA).

“Grade” is the specification of the material used in the pipe. Mill certificates certifying pipe as meeting a specified grade for the pipe supersede stencilling on pipe.

Type and grade for repairs and crossings may vary, provided that the minimum requirements in CSA and the regulations are met.

7. Joint Type

The joint type is that stated on the licence (*Guide 56*, Table 3.7).

8.	Internal Coating	The internal coating is as approved on the licence (<i>Guide 56</i> , Table 3.8).
9.	From and To Locations	The “from” and “to” locations of the pipeline being built are those stated on the licence (Pipeline Regulation, Section 3(1)).
10.	From and To Facilities	The facilities the pipeline is going from and to are those stated on the licence (<i>Guide 56</i> , Table 3.9).
11.	Length of Pipeline/Route	<p>The length of the pipeline and its route correspond to what is stated on the licence (Pipeline Regulation, Section 3(1)).</p> <p>The actual route of the pipeline being built corresponds to that stated on the licence (Pipeline Regulation, Section 3(1)).</p>
12.	Environment	<p>The actual environmental crossing of the pipeline corresponds to that represented by the environment code stated on the licence (<i>Guide 56</i>, Table 3.11).</p> <p>Confirm that all necessary approvals have been obtained from Alberta Environment (<i>Guide 56</i>, Unit 3, Step 10).</p>
13.	MOP	<p>Specifications for valves, flanges, fittings, and pipe are compatible with the licensed MOP (Pipeline Regulation, Sections 9, 10 and 19(1)).</p> <p>If two or more pipelines are connected, see Pipeline Regulation, Sections 9 and 10.</p>

Construction

14.	Construction Approval	<p>The operator holds the necessary EUB approval, in accordance with the Pipeline Act, Part 4, Section 7, which states that no person shall construct a pipeline or undertake any operations preparatory or incidental to the construction of a pipeline unless he is the holder of an approval. (Also see <i>Guide 56</i>.)</p> <p>All rights-of-way must be surveyed according to the Survey Act and all notification requirements must be met, as described in <i>Guide 56</i>, Table 1.3, Schedule 1, and Appendix 1.</p> <p>An application is not required if</p> <ul style="list-style-type: none"> the pipeline is used for a utility cooperative pipeline and is operated at a maximum pressure of 700 kPa or less; the pipeline replacement is less than 100 metres (m) long, the replaced pipeline is removed, and the work is carried out within the existing right-of-way; the total pipeline is less than 50 m long and does not convey natural gas > 10 mol/km H₂S;
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		<ul style="list-style-type: none"> • a pipeline or tie-in is wholly within a single surface lease boundary, except when <ul style="list-style-type: none"> - the pipeline route is within the access road to a well site or - the pipeline conveys high vapour pressure (HVP) or natural gas containing > 10 mol/km H₂S.
15.	Construction Notice Received	The required 24-hour construction notice has been given to the appropriate Field Centre prior to the start of construction of any pipeline (Pipeline Regulation, Section 17).
16.	Conditions	The company has complied with all conditions stated on the licence (Pipeline Act, Section 11).
17.	Valves/Fittings/Flanges	<p>All valves, fittings, and flanges have a manufacturer's rating equal to or greater than the proposed MOP of the pipeline (Pipeline Regulation, Section 10).</p> <p>If used in sour service, the valves, fittings, and flanges must meet the requirements set out in the respective <i>CSA Standards Z245.15, Z245.11, and Z245.12</i> respectively.</p> <p>All bolt studs extend completely through the nuts on flange installations (<i>CSA Standard Z662</i>, Clauses 5.2 and 5.3).</p> <p>Sectionalizing valves are installed on both sides of major water crossings and other locations appropriate for the terrain (HVP and low vapour pressure [LVP] only) (<i>CSA Standard Z662</i>, Clause 4.4.8).</p> <p>Sectionalizing block valves are installed at spacings commensurate with class locations (<i>CSA Standard Z662</i>, Clause 4.4.4 and Table 4.6; Pipeline Regulation, Section 10; <i>IL 91-8</i>):</p> <ul style="list-style-type: none"> • 25 km for Class 2 Gas • 13 km for Class 3 Gas • 8 km for Class 4 Gas • 15 km for Class 2 HVP or carbon dioxide (CO₂) • 15 km for Class 3 HVP or CO₂ • 15 km for Class 4 HVP or CO₂ <p>Valve spacing variance should not normally exceed 25 per cent of the applicable distances listed above.</p>
18.	Road Crossing Pipe Specifications	<p>Road and highway crossing pipe specifications are at least to minimum standards and extend to the full width of the right-of-way of the highway or road (<i>CSA Standard Z662</i>, Clause 4 and Tables 4.8 and 4.9, and Clause 6.2.10; Pipeline Act, Sections 39(1,2,3,4) and 40; Pipeline Regulation, Section 16(1,2)).</p> <p>A "highway" is a primary roadway within the meaning of the Public Highways Development Act or a secondary road within</p>

the meaning of the Public Highways Development Act numbered between 900 and 999, Pipeline Act 11F (Pipeline Regulation, Section 18(1a,1b,1c,2)).

19. **Railway Crossing Pipe Specifications** Railway crossing pipe specifications are at least to minimum standards (*CSA Standard Z662*, Clauses 4.8.3 and 6.2.10).
20. **Depth of Cover** Depth of cover meets the minimum requirements of *CSA Standard Z662*, Clause 4 and Table 4.8; and Pipeline Regulation, Sections 18 and 19.
21. **Ditch Preparation** The pipeline ditch is free of any projections or materials that may damage the pipe or coating during lowering in or back filling (*CSA Standard Z662*, Clauses 6.2.6, 13.3.4.6, and 13.1.4.4).
22. **Joining/Inspection and Testing** Methods of joining pipe are in accordance with applicable standards and regulations (*CSA Standard Z662*, Clauses 6.2, 7.2, and 7.2.8 [steel], 13.1.5 [fibreglass], 12.7 [polyethylene gas distribution], 13.3.5 [polyethylene oilfield], 7.4.2 [mechanical interference fit joints], 4.5.2 [threaded]).

For joint codes, see *Guide 56*, Table 3.7.

Thermoplastic pipe joints have CSA certification (*CSA Standard B 137.4*).

Inspection and testing in accordance with *CSA Standard Z662*, Clauses 7.2.8, 7.2.9, 7.2.11, and 7.2.12 where applicable.
23. **Bored Crossings** Bored road, railway, and water crossings have a hole diameter as close as practical to the outside diameter of the carrier pipe (*CSA Standard Z662*, Clause 6.2.10.3).
24. **Pipe Coating/ Condition** Stockpiling, transporting, handling, and placing of the pipe are being done in such a manner as to prevent any damage to the pipe or the coating (*CSA Standard Z662*, Clauses 6.2.5 and 9.2.7).
25. **Backfill Procedures** Precautions are being taken while back filling to prevent any damage to the pipe from rocks or frozen dirt (*CSA Standard Z662*, Clause 6.2.7).

Sizing plate runs should be considered if field bends or possible dents from backfilling procedures are suspected. Consideration for wall thickness changes must be addressed (*CSA Standard Z662*, Clauses 6.2.3 and 6.2.7.2).

If spoil pile is rocky or in frozen lumps, then rock shield padding or shading the pipe with non-rocky or frozen material is being used (*CSA Standard Z662*, Clause 6.2.7.2).

26. **Lease Piping**
- All on-lease piping is suitable to withstand the MOP of the pipeline it is connected to (*CSA Standard Z662*, Clause 4).
- The use of threaded pipe-to-pipe or pipe-to-component connections for buried pipe is **not** permitted (*CSA Standard Z662*, Clause 4.5.2).
- Supports are designed to support the pipe without causing excessive local stresses and without imposing excessive axial or lateral friction forces that might prevent the desired freedom of movement (*CSA Standard Z662*, Clause 4.6.4).
- Supports must not be welded to the pipeline if the specified minimum yield strength (SMYS) is greater than 50 per cent (*CSA Standard Z662*, Clause 4.6.5).
- A pipeline or tie-in is wholly within a single surface lease boundary, **except when**
- the pipeline route is within the access road to a well site, or
 - the pipeline conveys HVP or sour natural gas.
27. **Safety Precautions**
- All pipeline construction is being done in a safe and efficient manner to ensure the safety of workers and the public (*CSA Standard Z662*, Clause 10.4; Pipeline Act, Part 5, Section 29(1); *IL 92-3*).

Ground Disturbance

28. **Crossing Agreements**
- The operator has obtained approval in writing from the licensee of an existing pipeline prior to a ground disturbance taking place within the right-of-way of the existing pipeline or within 5 m of an existing pipeline if a right-of-way does not exist (Pipeline Regulation, Sections 20.1 and 22(1)).
29. **Existing Pipelines Marked**
- The position and alignment of an existing pipeline are marked with clearly distinguishable warning signs at adequate intervals before a ground disturbance takes place in controlled areas (Pipeline Regulation, Section 21(2)).
- A controlled area extends 30 m on each side of an existing pipeline (Pipeline Regulation, Section 20).
30. **Hand Excavation**
- Pipelines are hand exposed before any mechanical excavation takes place within 5 m of an existing pipeline (Pipeline Regulation, Section 22(7)).
31. **Machine Within 60 cm**
- Mechanical excavation equipment is not being used within 60 cm of a pipeline without direct on-site supervision by a representative of the licensee of the existing pipeline (Pipeline Regulation, Section 22(10)).

The pipeline must first be hand exposed or exposed by a method approved by the EUB (e.g., hydrovac, water jet, or other nonmechanical methods).

32. Notification Prior to Ground Disturbance

Any operator proposing to undertake a ground disturbance in a controlled area has notified the owner of the existing line at least two days and not more than seven days prior to commencing the ground disturbance (Pipeline Regulation, Section 21(1)).

33. Notification Prior to Backfill

Any operator undertaking a ground disturbance that exposes any part of an existing pipeline has notified the owner of the existing pipeline 24 hours prior to backfilling (Pipeline Regulation, Section 22(5)).

Pressure Testing

34. Test Notice Received

The appropriate Field Centre must be notified at least 48 hours prior to the commencement of any test (Pipeline Regulation, Section 32(1,2)).

Prior to pressure testing, the completed pipe sections have been cleaned of construction debris and foreign matter (*CSA Standard Z662*, Clause 6.2.8).

35. Test Medium/Disposal

EUB approval is required if

- water is the test medium in aluminum pipelines or any liquid other than fresh water is used as a test medium in any pipeline and the volume of the test section exceeds 500 m³ (Pipeline Regulation, Sections 43 and 44), or
- the hoop stress level during the test exceeds 100 per cent SMYS, or the volume of the test section will exceed 3 m³ and the pipeline crosses or is within 100 m of flowing water and the hoop stress during the test will exceed 30 per cent SMYS (Pipeline Regulation, Sections 43 and 44).

36. Test Piping

All test piping that is not a permanent part of the pipeline is limited to a test pressure that will result in a hoop stress level not greater than 75 per cent SMYS (*CSA Standard Z662*, Clause 8.9.1).

All piping within 20 m from the connection of the test piping is limited to a test pressure that will result in a hoop stress level not greater than 90 per cent of SMYS (Pipeline Regulation, Section 40).

All road and railway crossings that will be at 80 per cent SMYS or more during gaseous medium testing must be pretested or the road or the railway must be closed to traffic during the pressure test (*CSA Standard Z662*, Clause 8.2.8).

All valves and fittings on test piping are limited to a test pressure not greater than the manufacturer's working rating during the test (*CSA Standard Z662*, Clause 8.9.1).

37. Test Under Operating Conditions

Pipelines are tested in place under the same conditions as those that will prevail when the pipelines will be in operation (Pipeline Regulation, Section 29). (The line should be backfilled prior to testing unless conditions apply as outlined in *CSA Standard Z662*, Clauses 8.1.2 and 8.1.3).

Tie-in welds between tested sections for pipelines operating at stresses of 30 per cent SMYS or greater are to be radiographically or ultrasonically inspected until found to be satisfactory, unless the tie-in welds will be subjected to a pressure test (*CSA Standard Z662*, Clause 7.2.8.2.1).

In the case of a sour service pipeline (refer to Section 2 of this directive), the tie-in welds are radiographically inspected irrespective of stress levels (*CSA Standard Z662*, Clause 7.2.8.2.2).

38. Safety Precautions

Testing is done in a manner that ensures the protection of persons and property in the vicinity of the pipeline (Pipeline Regulation, Section 30).

39. Pressure Test

All pressure tests are recorded on a chart unless otherwise allowed by the EUB (*CSA Standard Z662*, Clause 8.6; Pipeline Regulation, Section 35(1)).

Upon completion of any pressure test, results are recorded.

The location and specifications of the tested pipeline or part of the pipeline are identified by reference to an existing plan, as well as an elevation profile where necessary, as outlined in the Pipeline Regulation, Section 37.

The final documentation contains the following information:

- Company name
- Approval number
- Line number and/or section number
- Legal description
- Date
- Time on and off
- Test medium
- Gauge pressure
- Recorder range on chart face
- Significant pressure deviations reconciled by documentation

40. Pressure Reading Between 25 and 90 per cent

The instrument used to record the pressure during the test is selected so that the pressure reading occurs between 25 and 90 per cent of the full range of the instrument (Pipeline Regulation, Section 35(3)).

Each pressure-recording instrument is periodically calibrated to maintain accuracy within 2 per cent of its range. The EUB may require verification of such calibration (Pipeline Regulation, Section 35(4,5); *CSA Standard Z662*, Clauses 8.6.1, 8.6.2, and 8.6.2.4).

41. Test Pressure/Duration

Test pressure is adequate for the MOP of the pipeline; permissible stress levels during the test are not exceeded (Pipeline Regulation, Section 39(1)).

Testing with non-toxic gas is permitted in Class 1 areas up to 95 per cent SMYS (Pipeline Regulation, Section 45). For additional requirements for gaseous air testing, see *CSA Standard Z662*, Clauses 8.2.2, 8.2.4.3, 8.2.6.3, and 8.2.8.

Maximum strength test pressure for liquid medium is 110 per cent SMYS (*CSA Standard Z662*, Clause 8.2.4.2) or limit reached by a pressure volume plot.

Sour natural gas pipelines (greater than 10 moles of H₂S per kilomole of natural gas) for all class locations are tested to minimum 1.40 x MOP (Pipeline Regulation, Section 41(3)).

A testing procedure is approved and a pressure/volume plot is conducted whenever the pipeline is pressure tested above 100 per cent SMYS (Pipeline Regulation, Section 39(1)).

The test pressure of any pipeline must not be less than 700 kPa unless the EUB approves a lower test pressure (Pipeline Regulation, Section 41(2)).

The MOP is in accordance with *CSA Standard Z662*, Table 8.1.

- Note that Pipeline Regulation, Section 41(3), supersedes Table 8.1 for sour natural gas.

Pressure tests of lease piping are adequate for the MOP of the connecting pipeline.

- Note that testing against a closed valve is not recommended.

Pressure test can be conducted up to 1.5 times the rating of the valve or flange.

See *CSA Standard Z662*, Clause 8 and Table 8.1, and Pipeline Regulation, Sections 6, 39, 40, 41, 45, and 46.

Discontinued Pipeline

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|-----|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 42. | Physically Isolated/
Disconnected | The discontinued line or part of a pipeline is physically isolated or disconnected from any operating facility (<i>CSA Standard Z662</i> , Clause 10.13; Pipeline Regulation, Section 61(a,b,c,d); <i>ID 2000-9</i> ; <i>Guide 56</i>). Pipelines that have not been in normal operation within the previous 12 months must have EUB consent to resume operation (Pipeline Regulation 64). These pipelines should be scrutinized to ensure that proper corrosion mitigation procedures have been in place. |
| 43. | Left in Safe Condition | <p>The discontinued pipeline is left in a safe condition (Pipeline Regulation, Section 61(a,b,c,d)).</p> <p>“Safe condition” means that there is no opportunity for explosive, flammable, poisonous, or environmentally damaging gases, liquids, or vapours to be emitted if the pipeline is damaged by any means.</p> |
| 44. | Corrosion Control | Corrosion control measures are maintained on discontinued pipelines (<i>CSA Standard Z662</i> , Clauses 9 and 10.13.1.2; Pipeline Regulation, Section 62). |

Abandoned Pipeline

- | | | |
|-----|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 45. | Physically Isolated/
Disconnected | The abandoned pipeline is physically isolated or disconnected from any operating facility (<i>CSA Standard Z662</i> , Clauses 10.14.1 and 10.14.2; Pipeline Regulation, Section 67(1a,1b,1c,1d); <i>ID 2000-9</i> ; <i>Guide 56</i>). |
| 46. | Cleaned/Purged | <p>The abandoned pipeline is cleaned if necessary and purged with fresh water, air, or inert gas and left in a safe condition (<i>CSA Standard Z662</i>, Clause 10.14.2; Pipeline Regulation, Section 67).</p> <p>“Safe condition” means that there is no opportunity for explosive, flammable, poisonous, or environmentally damaging gases, liquids, or vapours to be emitted if the pipeline is damaged by any means.</p> |
| 47. | Plugged/Capped | The abandoned pipeline is plugged or capped at all open ends (<i>CSA Standard Z662</i> , Clause 10.14.2; Pipeline Regulation, Section 67). |

Operations Review

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|-----|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 48. | Operations and Maintenance
Procedures | The company has documented an operations and maintenance procedure for its pipeline system (<i>CSA Standard Z662</i> , Clause 10.2.1.1; Pipeline Regulation, Section 49). |
|-----|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The company must

- document operating and maintenance procedures;
- operate and maintain its pipeline system in conformance with such procedures; and
- modify such procedures from time to time as experience dictates and as changes in operating conditions require.

49. **Emergency Procedures Manual**

A licensee of a pipeline transporting gas containing 10 or more moles of H₂S per kilomole of natural gas or a liquid-filled pipeline transporting an HVP liquid must maintain an emergency procedures manual (*CSA Standard Z662*, Clause 10.4.10; Pipeline Regulation, Sections 50(1a,1b,1c,1d, 1e) and 50(2)).

The licensee of a pipeline transporting HVP liquids must periodically conduct emergency exercises structured to test the licensee's internal capabilities for initial response to the emergency procedures described in the manual and to test any leak detection and supervisory control and data acquisition systems associated with the pipeline (*CSA Standard Z662*, Appendix E; Pipeline Regulation, Section 50(3)).

The company must retain a record describing the results of the emergency exercise for a period of two years from the time of the exercise (Pipeline Regulation, Section 5(1)(d)).

The emergency procedures manual must be updated at least once each year (Pipeline Regulation, Section 50(2)).

50. **Pressure Test Data Records**

All original and follow-up test data results, including any pressure, temperature, or pressure-volume plots, and other documentation must be retained by the licensee for the operating life of the pipeline (*CSA Standard Z662*, Clause 8.6.2).

51. **Internal Corrosion Control**

Appropriate methods to detect and mitigate internal corrosion are employed to protect pipelines transporting any liquid or gas or combination thereof that may cause the interior to corrode (*CSA Standard Z662*, Clause 9; Pipeline Regulation, Section 53(a,b,c).

Each licensee must monitor to determine the effectiveness of mitigation procedures (*CSA Standard Z662*, Clauses 9.4.3 and 9.5).

The results of the inspection or tests must be recorded and retained for a minimum of six years (Pipeline Regulation, Section 53).

52. **External Corrosion Control/
Cathodic Surveys**

Each buried steel or aluminum pipeline must have an external protective coating and be cathodically protected in its entirety

within one year following completion of construction (*CSA Standard Z662*, Clauses 9.2.1.2 and 9.2.2; Pipeline Regulation, Section 52(1,2a,2b,2c)).

For existing bare piping, refer to *CSA Standard Z662*, Clause 9.2.3.

Each licensee must conduct an annual inspection or test to determine the effectiveness of external corrosion mitigation procedures on all steel and aluminum lines in its pipeline system (Pipeline Regulation, Section 52(1)).

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|-----|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 53. | Failure/Repair Records | A licensee must retain a record of all leaks for the life of the pipeline system (<i>CSA Standard Z662</i> , Clause 10.3.4; Pipeline Regulation, Section 55(1,2)). |
| 54. | Failure Notification | When a leak, break, or contact damage occurs in a pipeline, the licensee must immediately inform the EUB of the location of the leak, break, or contact damage (Pipeline Act, Section 36 (1) and 36 (1.1)). |
| 55. | Crossing Agreements | If a ground disturbance is to take place in the right-of-way of a pipeline or within 5 m of a pipeline where there is no right-of-way, the licensee has an approval in writing (Pipeline Regulation, Section 22(1)). |
| 56. | Crossing Inspection Record | <p>A licensee of an existing pipeline who has been notified of a proposed ground disturbance must</p> <ul style="list-style-type: none">• inspect its pipeline before the start of the ground disturbance to ensure that the locating and marking have been properly carried out; and• carry out such inspections of the ground disturbance necessary to ensure the continued safety of the pipeline (Pipeline Regulation, Section 22(3)(a)(b)). <p>The licensee must inspect the exposed part of the pipeline before backfilling to ensure that no damage has occurred (Pipeline Regulation, Section 22(5)).</p> <p>When a licensee inspects a pipeline, a written record of the inspection must be made and retained by the licensee for a minimum of two years (Pipeline Regulation, Section 22(6)).</p> |
| 57. | Leak Detection | Leak detection systems must be tested annually to demonstrate continued effectiveness (<i>CSA Standard Z662</i> , Clause E4.3). The licensee of a pipeline transporting HVP liquids must periodically conduct emergency exercises (simulation leaks) structured to test the licensee's internal capabilities for initial response to the emergency procedures described in its |

		emergency procedures manual (see item 50) and to test any leak detection and supervisory control and data acquisition systems associated with the pipeline (<i>CSA Standard Z662</i> , Clause 10.2.6 and Appendix E; Pipeline Regulation, Sections 6(3) and 50(3)).
58.	Licence Status	The pipeline's operational status is the same as reflected in EUB records: "O" (operational), "D" (discontinued), "A" (abandoned), "R" (removed). The operational status for discontinued/abandoned must be reported to the EUB within 90 days of completion of the work.
59.	Pipeline Crossing Signs	<p>The licensee has erected pipeline warning signs meeting the requirements of the Pipeline Regulation at each side of a crossing where a pipeline crosses a highway, road, railway, or watercourse (Pipeline Regulation, Section 23).</p> <p>Surface lines are buried at all road and trail crossings, and pipeline warning signs are placed at the point of pipeline entry and exit of each crossing (<i>CSA Standard Z662</i>, Clause 10.2.9; Pipeline Regulation, Section 19(2,3)).</p>
60.	Aboveground Facility Identification	Warning signs identify all aboveground pipeline facilities and are erected adjacent to the facility in each case (<i>CSA Standard Z662</i> , Clause 10.2.8.6; Pipeline Regulation, Sections 24(1,2) and 25). All pertinent data on signs must be accurate.
61.	Compressor/ Oil Pump Station Identification	A large sign showing the name of the facility, the name of the licensee, an emergency telephone number, and a warning symbol is erected at the entrance to gas compressor stations and oil pumping stations (<i>CSA Standard Z662</i> , Clause 10.2.9; Pipeline Regulation, Section 25(1); Oil and Gas Conservation Regulations).
62.	Noise Control	Compressor stations and pump stations are operated so that the maximum noise levels are in accordance with EUB <i>ID 99-8</i> (Pipeline Regulation, Section 14; <i>ID 99-8</i> ; <i>Guide 38</i>).
63.	Right-of-Way	<p>Operating companies must patrol their pipelines in order to observe surface conditions on and adjacent to their rights-of-way, indications of leaks, construction activity performed by others, and other conditions affecting the safety and operation of the pipelines. Particular attention must be given to the following:</p> <ul style="list-style-type: none"> a) construction activity b) dredging operations c) erosion d) ice effects e) scour f) seismic activity g) soil slides h) subsidence i) water crossings

	Frequency of patrols are in accordance with Pipeline Regulation, Section 14.1 (<i>CSA Standard Z662</i> , Clause 10.5).
64. Pressure Control Devices or Pressure Relief Devices	<p>During the steady-state operation of a pipeline, the operating pressure of the pipeline must not exceed the MOP as per the requirements described in <i>CSA Standard Z662</i>, Clause 4.14.1.</p> <p>If two or more pipelines are connected such that one operates at a pressure higher than the other, they are designed so that the pipeline system operating at the lower pressure is not subjected to a pressure greater than its MOP (<i>CSA Standard Z662</i>, Clauses 4.14.2, 4.14.3, and 4.14.4; Pipeline Regulation, Sections 9 and 58).</p> <p>Pressure control, pressure limiting, and pressure-relieving systems (or devices) must be inspected at least once per calendar year, as detailed in <i>CSA Standard Z662</i>, Clause 10.6.5. Records of such tests and inspections and the records of any corrective action taken must be retained by the operating company.</p> <p>Pipeline valves that might be required during an emergency must be inspected and partially operated at least once per calendar year, as detailed in <i>CSA Standard Z662</i>, Clause 10.6.6.2.</p>
65. Surface Pipeline	<p>All surface pipelines have</p> <ul style="list-style-type: none"> • a pressure-relieving device if there is any possibility of a pressure increase to above the allowable MOP due to a rise in ambient air temperature; • a system to allow for adequate expansion or contraction due to temperature change; and • suitable restraints to adequately control lateral or vertical movement. <p>Surface lines are buried at all road and trail crossings, and pipeline warning signs are placed at the point of pipeline entry and exit of each crossing.</p> <p>Additional precautions, such as extra pipeline warning signs, are taken to indicate the presence of a surface line when equipment might be working in the vicinity of the pipeline or conditions might obscure or endanger the pipeline (Pipeline Regulation, Section 19).</p>
66. Guide 55 Storage Requirements	<p>Record noncompliance on check sheet and specify details in D: Comments section using Appendix 1.</p> <ul style="list-style-type: none"> • Appropriate material and waste storage must be conducted

in accordance with *ID 95-3* and *Guide 55*. This includes aboveground tanks, underground tanks, containers, storage facilities, bulk pad storage, and inspection, monitoring, and record keeping requirements for those materials produced, generated, or used by the upstream petroleum industry under EUB jurisdiction.

- All facilities constructed after January 1, 1996, must meet the requirements of *Guide 55*.
- Operators of facilities constructed and operated prior to January 1, 1996, are required to demonstrate that their storage practices, facilities, and containment devices meet the requirements of *Guide 55*.

Incident Cause

67. Failure/Hit

If a noncompliance is noted during the failure investigation and records review, record that noncompliance on the check sheet and specify details in D: Comments section using Appendix 1.

All failures/hits must be reported to the EUB in accordance with the Pipeline Act, Sections 36(1) and 36(1.1). Note that Appendix 2 must be followed when dealing with all corrosion-related failures.

Select/failure mechanism from the following list:

CD Construction damage
MD Mechanical damage
JF Mechanical joint failure
CW Corrosion at girth or fillet weld
CX Corrosion external
CI Corrosion internal
DO Damage by others
EM Earth movement
GW Girth weld failure
IF Installation failure
MJ Miscellaneous joint failure
MS Miscellaneous
OE Operator error
WF Other weld failure
OP Overpressure failure
PF Pipe failure
SR Seam rupture
VF Valve or fitting failure
UN Unknown

68. Spills

Spill and line failure details are to be recorded on the EUB's ENV form (see Field Surveillance ENV Completions internal guide). This section (69) applies to noncompliance and enforcement of containment and cleanup. Record non-compliance on check sheet and specify details in D: Comments section using Appendix 1.

- Immediate steps must be taken to contain and clean up spills of any size or type. The EUB's authority to require and direct cleanup activities where necessary is detailed in the Pipeline Act, Section 37(1).
- Spills of refined products on or off lease must be contained and cleaned up in accordance with the guidelines of the Pollution Control Division of Alberta Environment. (See EUB IL 98-1: *Memorandum of Understanding Between Alberta Environmental Protection and the Alberta Energy and Utilities Board Regarding Coordination of Release Notification Requirements and Subsequent Regulatory Response*.)
- The landowner must be advised of any spills off lease or significant spills on lease, and the company must adequately address all concerns.

Other (Enter "Y" for yes, or "N" for no for items 70-73)

69.	<i>Guide 58</i> Waste Management Requirements Met?	Enter "N" if the licensee is not in compliance with the requirements of <i>Guide 58</i> . See <i>Guide 64</i> for enforcement action.
70.	Facility Suspended?	Enter "Y" if the licensee is requested to suspend operations for any length of time (Pipeline Act, Sections 29(1), 30, and 31).
71.	Letter to Licensee Required?	Enter "Y" if a letter is being sent to the licensee. If the overall inspection result is "H" (high risk unsatisfactory), the inspector must send a letter to the licensee stating escalating consequences for noncompliance.
72.	Records Review of Licensee Compliance?	Enter "Y" if a records review of the pipeline inspection system for licensee compliance has been completed. Escalate or remove the licensee from the enforcement ladder based on the inspection history.
Overall Inspection Result		Indicate if the overall inspection is Satisfactory or Unsatisfactory by entering an "X" in the appropriate box. The overall result is Unsatisfactory if any item on the Pipeline Check Sheet is marked Low or High Risk.

D **Comments**

Clearly define the necessary work that must be completed by the operator in the Comments section.

Enforcement Action

Enter “X” if the inspection is satisfactory.

Enter the appropriate code (**U, M, or S**) if the inspection is unsatisfactory.

Indicate the appropriate noncompliance level and consequences for noncompliance (see back of check sheet form).

Licensee’s Signature

Be sure that the licensee of the inspected facility signs the completed inspection sheet.

Inspector’s Signature

As EUB inspector, sign the completed inspection sheet.

Deadline Date

Enter the date by which the necessary work detailed under Comments must be completed.

2.3 Submission of Check Sheet

Give the licensee a copy of the completed check sheet.

File the completed Pipeline Check Sheet with the local Field Centre.

Follow-Up/Reinspections

A reinspection Check Sheet must be completed and entered to clear unsatisfactory inspections from the database.

Appendix 1 Operational Deficiencies

The **level** of each deficiency is based on the criteria set out in *Directive 019: EUB Compliance—Assurance-Enforcement*.

Inspection Results

- **Low Risk unsatisfactory event/inspection (L)** — a contravention of regulation(s) or requirement(s) that represents an acceptable level of risk that requires mitigative measures within an acceptable time frame.
- **High Risk unsatisfactory event/inspection (H)** — a contravention of regulation(s) or requirement(s) that represents an unacceptable level of risk requiring the inclusion of mitigative measures, provided the benefits outweigh the risks.

The EUB may escalate noncompliance issue(s) to any level should conditions warrant.

Compliance and Noncompliance Results

Inspection results are rated “X” - satisfactory, “L” – low risk unsatisfactory, and “H” – high risk unsatisfactory. Items below are numbered in accordance with the Pipeline Check Sheet.

Pipeline Specifications

- H 1. Substance is different from that stated on licence and the line is operating.
- H 2. H₂S content is higher than that stated on licence and the line is operating.
- H 3. a. Pressure design does not meet *CSA Standard Z662*, Clause 4.3.3, or Pipeline Regulation, Section 13.
- L b. Outside diameter differs from that stated on the licence but meets the pressure design of *CSA Standard Z662*, Clause 4.3.3, or Pipeline Regulation, Section 13.
- H 4. a. Pressure design does not meet *CSA Standard Z662*, Clause 4.3.3, or Pipeline Regulation, Section 13.
- L b. Wall thickness differs from that stated on the license but meets the pressure design of *CSA Standard Z662*, Clause 4.3.3, or Pipeline Regulation, Section 13.
- H 5. Materials used: Pipe material is not as stated on the licences.
- H 6. a. Pressure design does not meet *CSA Standard Z662*, Clause 4.3.3, or Pipeline Regulation, Section 13.

- L b. Type and grade differ from that stated on the licence but meet the pressure design of *CSA Standard Z662*, Clause 4.3.3, or Pipeline Regulation, Section 13.

7. Joint type

- L a. Joint type is different from that stated on licence but allowed by *CSA Standard Z662* and *Guide 56*, Table 3.7.
- H b. Joint type is different from that stated on licence and is not allowed by *CSA Standard Z662*.

- H c. Threaded steel is used and buried below ground.

- L 8. Internal coating is not as approved.

- L 9. From or To location is different from that stated on licence.

- L 10. From or To facilities code is different from that stated on licence.

- L 11. Length of pipeline/route: Route is different from that stated on licence.

- H 12. Environment code is different from that stated on licence.

13. MOP

- L a. MOP is greater than that stated on licence but does not exceed the manufacturer's rating of the pipe, valves, flanges, or fittings or the limitations for sour natural gas as applicable.

- H b. MOP is greater than that stated on licence and exceeds the manufacturer's rating of the pipe, valves, flanges, or fittings and connecting pipelines.

Construction

- H 14. There is no approval to construct.

- L 15. No construction notice is given to appropriate EUB Field Centre.

- H 16. Conditions stated on licence are not met.

- H 17. Valves, fittings, or flanges do not meet the requirements of the licence for the pipeline.

- H 18. Road crossings are unsatisfactory.

- H 19. Railway crossings are unsatisfactory.

- H 20. Depth of cover is unsatisfactory.

- H 21. Ditch preparation is unsatisfactory.
- H 22. Joining/radiograph is unsatisfactory.
- H 23. Bored crossings are unsatisfactory.
- H 24. Pipe coating/handling conditions are unsatisfactory.
- H 25. Backfill procedures are unsatisfactory.
- H 26. Lease piping is unsatisfactory.
- H 27. Safety precautions are unsatisfactory.

Ground Disturbance

- H 28. The status of crossing agreements is unsatisfactory.
- H 29. a. Marking of existing pipelines inside a controlled area is unsatisfactory.
- H b. Total disregard for the requirements for marking of pipelines inside a controlled area.
- H 30. a. Hand excavation: Mechanical excavation takes place within 5 m of existing pipeline prior to hand exposure.
- H b. Total disregard for the hand excavation requirements.
- H 31. Machine working within 60 cm without authorization from the owner of the existing crossing.
- H 32. Notification to the owner of the existing pipeline prior to ground disturbance was unsatisfactory.
- H 33. Notification to the owner of the existing pipeline prior to backfill was unsatisfactory.

Pressure Testing

- L 34. No test notice is given to the appropriate EUB Field Centre.
- H 35. Test medium/disposal unsatisfactory.
- H 36. Test piping unsatisfactory.
- H 37. Not tested under operating conditions.
- H 38. Safety precautions unsatisfactory.
- L 39. Pressure test recorded unsatisfactory.

- L 40. Test pressure not between 25 and 90 per cent of the pressure recorder range.
- H 41. Test pressure/duration does not conform to requirements.

Discontinued Pipeline

- L 42. Not physically isolated/disconnected.
- H 43. Not left in safe condition.
- L 44. Corrosion control unsatisfactory.

Abandoned Pipeline

- H 45. Not physically isolated/disconnected.
- H 46. Not cleaned/purged and left in a safe condition.
- L 47. Not plugged/capped.

Operations Review

- L 48. a. Operations and maintenance procedures manual incomplete.
- H b. No operations and maintenance procedures manual, or not followed.
- H 49. a. Emergency procedures manual unsatisfactory.
- H b. No approved site-specific emergency response plan (ERP) where required.
- H c. Safety equipment specified in ERP not installed.
- H d. Copy of ERP not readily available.
- H e. ERP manual not updated yearly, and exercises not held or details not documented.
- H f. Operator on-site representative not familiar with ERP.
- L g. Operator not communicating with residents in emergency planning zone (EPZ).
- L 50. Pressure test data records unsatisfactory.
- H 51. a. Internal corrosion control—no records in corrosive environment.
- L b. Internal corrosion control—no records in noncorrosive environment.

- H c. Internal corrosion control—no monitoring and mitigation in corrosive environment.
- H 52. a. External corrosion control/cathodic surveys—no records of survey results.
- H b. Cathodic protection system—not operational or not installed.
- L 53. Failure/repair records unsatisfactory.
- H 54. Failure to notify appropriate EUB Field Centre.
- H 55. No crossing approval in place.
- L 56. Crossing inspection record unsatisfactory.
- H 57. Leak detection unsatisfactory.
- L 58. a. Pipe has been discontinued or abandoned but is still shown as operating on EUB records.
- H b. Pipe is operating but is shown as discontinued or abandoned on EUB records.
- L 59. a. Pipeline sign missing or defaced on one side of crossing.
- H b. Pipeline sign missing or defaced on both sides of a crossing.
- L 60. Aboveground facility identification unsatisfactory.
- L 61. Compressor/oil pump station identification unsatisfactory.
- H 62. Facility exceeding permissible sound levels.
- L 63. a. Right-of-way maintenance and patrols not being performed and/or documented.
- H b. Right-of-way maintenance and patrols not being performed and/or documented in Class 2, 3, or 4 area.
- H 64. a. Pressure control devices or pressure relief device installations unsatisfactory (i.e., not installed where required or does not function).
- H b. Required function tests not conducted or recorded.
- L 65. Surface pipeline unsatisfactory.
- 66. *Guide 55* Storage Requirements (references are to *Guide 55* sections)
 - a. General storage practices (Section 3)

- L i) Materials not consumed within two years.
- L ii) Oilfield wastes/empty barrels stored more than one year.
- H iii) All temporary single-walled aboveground tanks not diked (unless operation qualifies for it to be optional).
- L iv) Temporary tank (not diked) not emptied or removed from site within 72 hours of completing the operation (drilling, completions, testing, or servicing operations).
- H v) Contaminated material stored directly on the ground.
- b. Siting of storage areas/facilities (Section 3.6)
 - L i) Not readily accessible for fire fighting and other emergency procedures.
 - L ii) Located on a floodplain.
 - L iii) Located within 100 m of normal high-water mark of a body of water, permanent stream, or water well used for domestic purposes.
- c. Aboveground storage tank(s) with an internal volume less than 5 m³ (Section 5.1)
 - L i) Not externally coated or made from weather and corrosion-resistant material.
- d. Aboveground storage tank(s) with internal volume equal to or greater than 5 m³ (Section 5.3)
 - L i) Steel tank(s) not externally coated.
 - L ii) Spill control device(s) not installed/inadequate.
 - L iii) No measures in place to prevent overfilling of tanks.
 - H iv) No tank dike where required.
 - L v) Liner not installed where required/insufficient liner.
 - L vi) Tank loading/unloading areas not designed to contain spills or leaks.
 - L vii) Tank dike(s) deteriorating, developing leaks, or unable to withstand hydrostatic head.
 - L viii) Insufficient tank dike capacity.

- L ix) Tank dike(s) contain openings (e.g., open dike drains).
- L x) Impervious liner does not cover the dike and the area within the dike not keyed into dike walls.
- L xi) Aboveground tank not tested at the required five-year frequency; operator cannot demonstrate tank integrity.
- L xii) Inadequate leak detection methods.
- L xiii) Indoor aboveground storage tanks not surrounded by containment device and/or drain and collection tank with sufficient capacity.
- e. Double-walled tanks with internal volume $>5 \text{ m}^3$ (Section 5.33)
 - L i) No measures in place to prevent overfilling of tank(s) (alarms/automatic shutoffs).
 - L ii) Spill control device(s) not installed/inadequate.
 - L iii) No system to monitor interstitial space.
 - L iv) No barriers to protect tank from vehicular damage.
 - L v) Automatic shutdown system not checked on a monthly basis.
- f. Underground storage tank(s) including associated piping (Section 6.0)
 - H i) No leak detection and secondary containment where required.
 - H ii) Underground storage tank(s) not double walled (tanks installed after October 31, 2001).
 - H iii) Newly installed tank(s) and associated piping not tested prior to service.
 - L iv) Steel tank(s) not cathodically protected or externally coated.
 - L v) Tank loading/unloading areas not designed to contain spills or leaks.
 - L vi) Spill control devices not installed/inadequate.
 - L vii) Tank breathing vents not designed to prevent fluid overflow.
 - L viii) No measures in place to prevent overfilling of tanks.

- L
 - ix) Underground tank(s) not tested at the required three-year frequency; operator cannot demonstrate tank integrity.
- g. Storage containers with combined volume >1 m³ on site (Section 7)
 - L
 - i) Insufficient or no secondary containment (dikes, curbs, and collection trays).
 - L
 - ii) No weather protection where required.
- h. Bulk pads for the storage of solid materials (Section 9)
 - L
 - i) Using concrete as primary containment where there is potential for stored materials to leach (bulk pads constructed after October 31, 2001).
 - L
 - ii) Not constructed of compacted clay, synthetic liner, concrete, or asphalt.
 - L
 - iii) No continuous curb on three sides and/or curb height not minimum 15 cm.
 - H
 - iv) No leachate collection or leak detection system where required.
- i. Inspection, monitoring, and record keeping (Section 10)
 - L
 - i) Inventory records for last two years not available.
 - L
 - ii) Records of inspection and corrosion monitoring programs not available.
 - L
 - iii) Other records not available where required.
 - L
 - iv) Applicable approvals, licences, or permits not on site or at field/plant offices.
- j. Withdrawal of storage tanks from service (Section 12)
 - L
 - i) Aboveground/underground tanks out of service do not meet the requirements.

Incident Cause

67. Failure/Hit

Consequences for Failure Mechanism

CD CONSTRUCTION DAMAGE

Examples of construction failures include, but are not limited to,

- damage to coating or pipe caused during handling
- bending
- improper installation of river/swamp weights
- improper installation of shrink wraparound sleeves
- poorly taped joint or holiday (jeep)
- damaged/disbonded coating causing shielding of cathodic protection
- improper ditch preparation causing stress failure
- settlement at risers or supports
- improper joint alignment
- poor cleaning and prepping of joints prior to welding or joining

Company representatives are responsible to ensure proper installation during construction to eliminate the above failure mechanisms. Where damage is found, the following will apply:

- L a. Poor construction practices resulting in failure after one year's service/operation.
- H b. Poor construction practices resulting in failure within one year's service/operation.
- H c. Total disregard for CSA requirements and EUB acts and regulations.

MD MECHANICAL DAMAGE

- H Includes dents, scrapes, and gouges to pipe body that were not repaired or replaced at time of contact; the system has been allowed into service and failed due to stress or corrosion.

JF MECHANICAL JOINT FAILURE

- L Includes gasket, screwed couplings, "O" ring leakage, mechanical interference joints, bell, and spigot overinsertion, damaging internal coating.

CW CORROSION AT GIRTH OR FILLET WELD

Record as either corrosion external (CX) or corrosion internal (CI) (see below).

CX CORROSION EXTERNAL

- H a. Cathodic potential is less than nominal -0.85 volts on an operating or discontinued system.
- H b. Cathodic protection not installed within one year of service/operation.
- L c. Failure to follow the investigative procedures detailed in Corrosion Guide, Section 1.3 (Appendix 2).

- H d. Failure to follow the investigative procedures detailed in Corrosion Guide, Sections 2 and 4 (Appendix 2).

CI CORROSION INTERNAL

- H a. There is **no** documented monitoring or mitigation program in place and/or company is not following program.
- H b. There is **no** monitoring or mitigation program in place for pipelines with major potential public and environmental consequences, as referenced in Appendix 2, Section 4.
- H c. Failure to follow the investigative procedures detailed in Corrosion Guide, Sections 2, 3, and 4 (Appendix 2).
- L d. Failure to follow the investigation procedures detailed in Corrosion Guide, Sections 1.1, 1.2, and 3 (Appendix 2).

DO DAMAGE BY OTHERS

- X a. All ground disturbance requirements were complied with and no records, survey plans, or caveats indicated lines existed.
- H b. Proper procedures were not followed.
- H c. Complete disregard for the acts and regulations.

EM EARTH MOVEMENT—includes river changes, frost heaves, and slope movement

- X a. Right-of-way surveillance was conducted and documented and action was taken.
- H b. Right-of-way surveillance was conducted and documented but no action was taken.
- H c. **No** right-of-way surveillance was conducted.

GW GIRTH WELD FAILURE—includes metal failure in the heat-affected zone of weld or weld imperfections; **not corrosion related**

- X a. Mandatory nondestructive inspection requirements were followed.
- H b. Mandatory nondestructive inspections requirements were **not** followed.

IF INSTALLATION FAILURE—failures at a compressor station, pumping station, meter station, etc., that are all part of pipeline surface installation

X a. Compressors and pump units are designed for safe and efficient operation of the units throughout the range of operating conditions with emergency shutdown systems.

H b. Designed for full range of operating conditions, but emergency shutdown and safety protection devices do not meet requirements.

H c. **Not** designed for full range of operating conditions.

MJ MISCELLANEOUS JOINT FAILURE—includes plastic butt fusion, socket fusion, plastic butt and fibreglass threaded or bonded joining, welding or explosion welding of aluminum, mechanical interference fit, or thermal joining

X a. Proper techniques have been used during construction and operation.

H b. Manufacturer's techniques and specifications not followed.

MS MISCELLANEOUS—includes erosion from external jetting action, vandalism, lightning strikes, flooding from rivers

X No enforcement action required—acts outside of operator control.

OE OPERATOR ERROR

H Operating and maintenance procedures manual not followed.

WF OTHER WELD FAILURE—includes weldolet branch connections

L a. Caused by preventable external forces (e.g., wildlife rubbing against riser on line pipe).

H b. Proper installation procedures were not used or followed.

OP OVERPRESSURE FAILURE—includes frozen lines, waxed-off lines, pig stuck in line, hydrate plugs, switch failure, thermal overpressure

H Inappropriate construction or design, or documented operating procedures not followed.

PF PIPE FAILURE—includes pipe body failures, stress corrosion cracking, hydrogen-induced cracking, brittle cracks, running cracks, failure of plastic pipes, failure due to fatigue and lamination separations (metallurgical report must follow)

X a. No enforcement action required if cause is a manufacturing defect and the operator was not aware of potential indicators (as listed above) prior to failure.

- H b. Operator is aware of pipe body issues but has not implemented mitigative measures.

SR SEAM RUPTURE—includes those caused by electric resistance welding (ERW) mill defects, but not failures due to overpressurization or corrosion

- X a. No enforcement action required if cause of failure is a manufacturing defect that the operator was not aware of.
- H b. The operator is aware that the line has integrity issues but has not implemented mitigative measures.

VF VALVE OR FITTING FAILURE—includes gasket blowouts, pig trap failures

- X a. No enforcement action required if manufacturing flaw not detected.
- H b. Pressures do not comply with manufacturer's rating, or maintenance and testing frequency are not followed.

UN UNKNOWN—lines that fail beneath creeks, roads, or traverse slopes that cannot be readily exposed and are abandoned in place

If the line has a history of previous corrosion failures, use the same mechanism code for this failure as the last. All lines must be cleaned and purged if they are to be abandoned in place. This may require installation of a sleeve to prevent further spillage while product is being displaced. Where a sleeve can be installed, the failure cause must be documented with the EUB.

- X No enforcement action required.

68. Spill

- H a. Release reporting (Pipeline Act 36(1); *IL 98-1*)—Operator is aware of a reportable release but neglects to report it. The EUB may discover the spill during an inspection, receive a report from a third party, or receive a complaint.
- b. Release detail accuracy
 - L i) Spill reported as contained on lease when it is off lease.
 - L ii) Actual affected area significantly different from or larger than reported.
 - L iii) Actual volume of release significantly larger than reported.
 - H iv) Operator fails to report that spill has entered water.
 - H v) Operator advises that spill has been cleaned up when it has not. Cleanup refers to all free fluids being removed.

- L vi) The reported location of spill is incorrect.
- c. Control and containment (Pipeline Regulation 54)
- H i) Operator does not take immediate steps to shut off source of liquid release (i.e., continues to produce well with leak while awaiting equipment and/or repairs).
- H ii) Unaddressed spill into water, operator aware, no action is being taken.
- H iii) Operator does not take steps to contain spill as soon as possible and prevent spill from spreading (e.g., berms, dykes, booms if on water).
- H d. Recovery and cleanup—Spill not adequately cleaned up. (Free fluids still remain.)
- e. Waste disposal
- H i) Spill wastes taken to facility not authorized to accept/handle.
- H ii) A one-time treatment site is not limited to a single application of waste, as per *Guide 58*, Section 16.2.
- H iii) Inappropriate material put into land treatment site (i.e., salt contaminated).
- H iv) Spill material moved off site for land treatment without meeting conditions in *IL 98-2*.
- H v) Spill material (waste) not properly stored.
- f. Area security
- H i) Area is unsafe and steps not taken to restrict public access.
- L ii) Steps not taken to restrict animal access.

The above could include fencing, barricades, signage, manning of site, etc.

- H g. Landowner notification—Release has affected off-lease area and landowner/resident not contacted.

Other (Y/N)

69. Are *Guide 58* requirements met?

70. Is the facility being suspended?

71. Is a letter to the licensee required because the overall inspection result is “H”?

72. Has there been a records review of licensee compliance?

Appendix 2

EUB Pipeline Inspectors' Guide to Corrosion Failure Procedures

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Overview

These guidelines were developed by the EUB in consultation with industry and pipeline corrosion specialists to standardize the EUB and industry approach to dealing with corrosion-related failures by expanding upon the existing Pipeline Act and Regulation and CSA standards. The aim is to enhance pipeline integrity and reduce the frequency of pipeline failures in Alberta. The procedures detailed here are presented in a flowchart in Section 7.

The following definitions explain terms as used in this appendix.

Dry sweet gas—for the purposes of **this guide only**, dry sweet gas contains **no** H₂S and its water dew point is at all times below the minimum pipeline system operating temperature (see *CSA Z662-99*, Clause 9.4.1.1, definition).

Engineering assessment—typically includes an analysis of the design parameters, materials, construction techniques, operating history, and maintenance done regarding a pipeline for the purpose of establishing whether the pipeline is fit for intended service. For further clarification, see Clause 10.11.6 of *CSA Z662-99*. Engineering assessments that involve engineering principles must be reviewed by the EUB Pipeline Section of the Operations Group.

Integrity and integrity assessment—Integrity is the expectation that a pipeline is not leaking and that it is safe to resume operation in a defined service for a defined period of time. Long-term integrity is the expectation that the pipeline is not leaking and that it is safe to resume operation for an indefinite period of time in accordance with defined operating and maintenance criteria. An integrity assessment considers the existing condition of the pipeline and the suitability of the corrosion control plan, operating characteristics, and maintenance programs.

Pipeline Section—The EUB Operation's Group Pipeline Section is the EUB pipeline inspectors' contact for EUB pipeline technical support. The Pipeline Section can be reached at (403) 297-8432, 297-8148, 297-3367, or 297-8967.

Pipeline system—any line or lines licensed for the same substance and associated with one facility.

Repeat failure—any failure that results from the same or similar cause as a previous failure on either the same line or on another line within the same pipeline system.

Sour natural gas—as defined and used in *EUB Guide 56*, gas containing more than 10 mol/kmol H₂S.

1 First Failure

1.1 Internal Corrosion Failures—All Products*

1.1.1 Visual examination of failures

Unless an in situ repair will be completed, the failed pipe must be removed for visual examination. For large-diameter pipe, it may not be feasible or necessary to remove the failure if a repair sleeve is used. The minimum length of pipe to be replaced is specified in *CSA Z662-99*, Clause 10.8.5.3. If corrosion is apparent, an entire joint should be removed, if possible, so it may be examined for severe corrosion. In certain locations it may not be possible, feasible, or necessary to remove full joints, such as at water or road crossings or on slopes. If an in situ repair is completed, the repair will be considered as temporary until the requirements set out here in Section 1.1 are met.

1.1.2 Lab analysis

A sample containing the failure must be cut out and sent for lab analysis to determine failure cause and/or mechanism, unless the cause and mechanism are obvious or already known. Any pipe structural failure (e.g., buckling, collapse, rupture, or seam failure) should be sent for metallurgical or mechanical analysis. The failed section should not be disturbed (e.g., cleaned, torch cut, or split) and should be taped off or sealed on the ends.

1.1.3 Visual examination of adjacent pipe

The remainder of the removed section should be split, cleaned, and inspected for further corrosion.

1.1.4 Replacement

Any replaced section must be replaced with pipe having the same grade and wall thickness or, if not available, grade and wall thickness sufficient to ensure that equal or higher pressure and stress capability are maintained.

1.1.5 Localized corrosion

If the corrosion appears to be localized (restricted to a single area), acceptable options for repair would be to either replace the section and follow with a pressure test or replace the section using pretested pipe followed by radiographic, ultrasonic or other nondestructive weld inspection. A documented corrosion plan must be prepared as outlined in 1.1.8 below.

1.1.6 Nonlocalized corrosion

If the corrosion is not localized (restricted to a single area) or there is reason to suspect that the corrosion could be inherent to other parts of the pipeline, then further action is required. A pressure test or internal inspection must be conducted or an engineering

* For additional requirements for sour natural gas and HVP pipelines, see Sections 1.2 and 4; for pipelines having higher failure consequence, see Section 4; for repeat failures, see Section 2.

assessment done. A documented corrosion plan must be prepared as outlined in 1.1.8 below.

1.1.7 Sleeve repairs

If cutout is not feasible, a temporary repair sleeve may be appropriate. For a leaking internal corrosion failure, a repair would be done by using a pressure containment sleeve. The welds on the sleeve must be inspected without causing damage. As the pipeline is being pressured up for return to service, the sleeve must be visually inspected for any leaking defects (e.g., using a soap test). See CSA Z662-99, Clause 10.8.5.4 and Table 10.1, for clarification on sleeve use.

1.1.8 Corrosion mitigation plan

If a failure indicates a corrosive condition, the operator must have a documented plan to prevent further corrosion failures. This plan must consider other lines within the same pipeline system and include details of the mitigative measures to be adopted. The Pipeline Regulation, Sections 52 and 53, requires the operator to maintain records of any corrosion maintenance activities for at least six years. Typical mitigative and monitoring measures for internal corrosion could include combinations of the following: lab analysis to determine failure cause, pipeline cleaning by pigging or chemicals, inhibition (continuous and/or batch), maintenance pigging, electronic monitoring devices, corrosion coupons, fluids analysis, and flow modelling. If operator expertise is insufficient, the operator should enlist expert third-party assistance.

1.1.9 Evaluation of corrosion mitigation plan

Details of the plan must be discussed with the operator to ensure that the plan is reasonable for that pipeline or pipeline system and the existing operating conditions.

1.1.10 Coating inspection

The exposed pipeline must be inspected visually for external coating condition. Defects such as disbondment, taped repairs, improperly applied shrink sleeves, or ripples resulting from areas of soil shear may exist. If external corrosion is found, the coating must be removed and the pipe examined. Inspection for stress corrosion cracking (SCC) using wet magnetic particle inspection should also be conducted in areas where external corrosion has been found unless the company has sufficient documentation to show that SCC is unlikely.

1.1.11 Stress corrosion cracking (SCC) inspection

Even though the pipeline may not exhibit external corrosion, if it meets the criteria for high probability of SCC, the operator must conduct an examination for SCC. The exposed pipeline segment must be examined and the operator must consider assessment of other parts of the system as well. If SCC has been confirmed, the EUB Pipeline Section, Operations Group, must be notified for possible further follow-up. Excavation and investigation of exposed pipe is an acceptable method to conduct evaluations for SCC.

1.1.12 Return to service (satisfactory pipeline integrity)

In cases where pipeline integrity has been confirmed, the pipeline can return to service while the documented corrosion plan is being developed.

1.1.13 Temporary service (long-term integrity is uncertain)

If long-term pipeline integrity is uncertain but it is desirable to allow the pipeline to return to temporary operation based on significant need, the following measures must be considered to minimize any risks of failure and to minimize potential spill volume: pressure reduction, line patrol (aerial or using gas leak detection equipment but being aware of sour natural gas hazards), pressure monitoring, and additional metering.

Before allowing any return to service, the following matters must also be considered: the severity of the exhibited corrosion, the potential likelihood of failure, population density, and possible environmental and public risk as a consequence of failure.

The operator must provide within 30 days a written plan of further action for EUB review. Normal pipeline operations may be resumed only after further work is done that confirms or re-establishes long-term integrity. Further work could include an engineering assessment. The need to allow such pipelines to return to temporary service must be discussed with the local EUB Field Centre Team Leader (FCTL) or the EUB Operations Leader prior to approval.

1.1.14 Audit

Selected operators will be audited for corrosion prevention activities, the presence of a documented corrosion monitoring and mitigation plan, and their compliance with the plan within 12 months of the failure.

1.1.15 Discontinuation/abandonment

If a pipeline is discontinued or abandoned, the company must notify the EUB, as required in EUB *Guide 56*, within 90 days of completing discontinuation or abandonment operations.

1.2 Internal Corrosion Failures—Additional Requirements for Level 1 Sour Natural Gas (as per *ID 81-3*) and CSA Class 1 HVP Pipelines*

1.2.1 Temporary service

Temporary operation without proof of long-term integrity will not be allowed.

1.2.2 Confirmation of integrity

Proof of long-term integrity can be achieved through one or more of the following:

- internal electromagnetic or ultrasonic in-line inspection, followed by necessary repairs
- replacement of the line

* For additional requirements for Level 2, 3, or 4 sour natural pipelines and Class 2, 3, or 4 HVP pipelines, see Section 4.

- installation of a liner, as per the procedures of CSA Z662-99
- flow modelling analysis, followed by verification digs, necessary repairs, and implementation of an appropriate corrosion prevention program
- an engineering assessment of the pipeline integrity, followed by any necessary repairs
- additional corrosion control program modifications as necessary; note that at least one of the prior items must also be implemented

A pressure test alone will not be considered as adequate proof of long-term integrity. Note that sour natural gas lines require pressure testing to 1.4 x MOP.

Random cutouts, ultrasonic inspection, and shadow shots are not adequate proof of integrity.

1.3 External Corrosion Failures—All Products*

For additional requirements for Level 2, 3, or 4 sour natural gas pipelines and Class 2, 3, or 4 HVP pipelines, are given in Section 4.

1.3.1 Visual examination of coating and failure

The exposed pipeline section must be examined visually for external coating condition. Defects such as disbondment, taped repairs, improperly applied shrink sleeves, or ripples resulting from areas of soil shear may exist. If external corrosion is found, the coating must be removed and the pipe examined. Inspection for SCC using wet magnetic particle inspection should be conducted in areas where external corrosion has been found unless the company has sufficient documentation to show that SCC is unlikely. If the failure appears to be the result of third-party damage, it may be unnecessary to conduct SCC examination.

1.3.2 Stress corrosion cracking (SCC) inspection

Even though the pipeline may not exhibit external corrosion, if it fits the criteria for high probability of SCC, the operator must conduct an examination for SCC. The exposed pipeline segment must be examined and the operator must consider assessment of other parts of the system as well. If SCC has been confirmed, the Pipeline Section should be notified for possible further follow-up. Excavation and investigation of the exposed pipe is an acceptable method to conduct evaluations for SCC colonies.

1.3.3 Replacement

Any replaced section must be replaced with pipe having the same grade and wall thickness or, if not available, grade and wall thickness sufficient to ensure that equal or higher pressure and stress capability are maintained.

1.3.4 Localized corrosion

If the corrosion appears to be localized (restricted to a single area), acceptable options for repair would be to either replace the section and follow with a pressure test or replace the

* For additional requirements for sour natural gas and HVP pipelines, see Sections 1.2 and 4; for pipelines having higher failure consequence, see Section 4; for repeat failures, see Section 2.

section using pretested pipe followed by radiographic, ultrasonic, or other nondestructive weld inspection. A documented corrosion plan must be prepared as outlined in 1.3.7 below.

1.3.5 Nonlocalized corrosion

If corrosion is not localized (restricted to a single area) or there is reason to suspect that the corrosion could be inherent to other parts of the pipeline, further action is required. A pressure test or internal inspection must be conducted or an engineering assessment done. A documented corrosion plan must be prepared as outlined in 1.3.7 below.

1.3.6 Sleeve repair

If cutout is not feasible, a repair sleeve may be appropriate. For a leaking external corrosion failure area, a repair would be done by using a pressure containment sleeve. If a pressure containment sleeve is used on nonleaking corrosion, the pipe must be tapped to pressurize the annulus between the pipe and the sleeve CSA Z662-99, Clause 10.8.5.4.2(g)). The welds on the sleeve must be inspected without causing damage. As the pipeline is being pressured up for return to service, the sleeve must be visually inspected for any leaking defects. A reinforcement repair sleeve would be used on a nonleaking external corrosion area. See CSA Z662-99, Clause 10.8.5.4 and Table 10.1, for clarification on sleeve use.

1.3.7 Corrosion mitigation plan

If a failure indicates a corrosive condition, the operator must have a documented plan to prevent further corrosion failures. The plan must consider other lines within the same pipeline system and include details of the mitigative measures to be adopted. The Pipeline Regulation, Sections 52 and 53, requires the operator to maintain records of any corrosion maintenance activities for at least six years. Typical mitigative and monitoring measures for external corrosion could include combinations of the following: evaluation of cathodic protection system, close interval survey, C scan, coating evaluation, and SCC evaluation. If operator expertise is insufficient, the operator should enlist expert third-party assistance.

1.3.8 Evaluation of corrosion mitigation plan

Details of the plan must be discussed with the operator to ensure that the plan is reasonable for that pipeline or pipeline system and the existing operating conditions.

1.3.9 Return to service (satisfactory pipeline integrity)

In cases where pipeline integrity has been confirmed, the pipeline can return to service while the documented corrosion plan is being developed.

1.3.10 Temporary service (long-term integrity is uncertain)

If long-term pipeline integrity is uncertain but it is desirable to allow the pipeline to return to temporary operation based on significant need, the following measures must be considered to minimize any risks of failure and to minimize potential spill volume: pressure reduction, line patrol (aerial or using gas leak detection equipment but being aware of sour natural gas hazards), pressure monitoring, and additional metering.

Before allowing any return to service, the following matters must also be considered: the severity of the exhibited corrosion, the potential likelihood of failure, population density, and possible environmental and public risk as a consequence of failure.

The operator must provide within 30 days a written plan of further action for EUB review. Normal pipeline operations may be resumed only after further work is done that confirms or re-establishes long-term integrity. Further work could include an engineering assessment. The need to allow such pipelines to return to temporary service must be discussed with the local EUB Field Centre Team Leader (FCTL) or the EUB Operations Leader prior to approval.

1.3.11 Third-party damage/construction damage

If failure is a result of third-party or construction damage and the operator's assessment indicates that other corrosion is not a problem, then a repair using pretested pipe followed by radiographic, ultrasonic, or other nondestructive testing of the weld is sufficient. If either construction damage or mechanical damage initiated failure, the cause must be recorded as such.

1.3.12 Audit

Selected operators will be audited for corrosion prevention activities, the presence of a documented corrosion monitoring and mitigation plan, and their compliance with the plan within 12 months of the failure.

1.3.13 Discontinuation/abandonment

If a pipeline is discontinued or abandoned, the company must notify the EUB, as required in EUB *Guide 56*, within 90 days of completing discontinuation or abandonment operations.

2 Repeat Failures

A repeat failure could be either on the same line or on another line within the same pipeline system (see definitions in Overview). Note that the requirements below are to be used in conjunction with those found in Sections 1.1 and 1.3.

2.1 Internal or External Corrosion Failures—All Products

2.1.1 Insufficient due diligence

If an operator experiencing a repeat failure is not following its pipeline operations and maintenance manual and a documented corrosion mitigation plan or does not have a suitable manual or plan in place, then the pipeline cannot be returned to service until these issues are resolved to the satisfaction of the EUB.

2.1.2 Failures on dry sweet gas pipelines

For repeat failures on dry sweet gas (see definition in Overview) where there is no significant environmental or public risk and the operator has been following an acceptable operations and maintenance manual and documented corrosion mitigation plan, further written integrity assessments will not routinely be required.

2.1.3 Return to service—dry sweet gas pipelines

If a written integrity assessment and modified corrosion control plan are required, they must be satisfactory to the EUB inspector. Once the integrity assessment is satisfactory or it is determined that no further integrity assessment is required, dry sweet gas pipelines may be returned to service in combination with an acceptable leak monitoring program, such as visual inspections or flame ionization inspections.

2.1.4 Failures other than dry sweet gas pipelines

For repeat failures on other than dry sweet gas (see definition in Overview) pipelines, the failure indicates that the previous corrosion control program may not be adequate. Therefore, the company must provide a complete written integrity assessment of the subject pipeline(s) and a thorough plan to prevent any further failures. This may require an engineering assessment or third-party consultation, which must consider the pipeline condition, extent of corrosion, product carried, population density, environmental and public risk, and proposed mitigative and operational changes necessary to prevent further failures.

2.1.5 Return to service—other than dry sweet gas pipelines

Details of the written integrity assessment and modified corrosion control plan must be satisfactory to the EUB inspector, and the engineering assessments must be satisfactory to the EUB Pipeline Section before the pipeline may be returned to service.

2.1.6 Audit

Selected operators will be audited for corrosion prevention activities, the presence of an acceptable operations and maintenance manual and documented corrosion monitoring and mitigation plan, and for compliance with such documents within 12 months of the failure.

2.1.7 Discontinuation/abandonment

If a pipeline is discontinued or abandoned, the company must notify the EUB, as required in EUB *Guide 56*, within 90 days of completing discontinuation or abandonment operations.

3 Failures on Internally Coated Pipelines

3.1 Internal or External Corrosion Failures—All Products

3.1.1 General requirements

The same procedure as for other failures must be followed, unless failure was initiated at a joint due to improper joining procedures.

3.1.2 Joint failures

If a failure was initiated at a joint, further digs must be conducted to inspect joints using nondestructive testing methods. Failures due to improper joining procedures must be recorded as mechanical joint failure.

3.1.3 Internal coating integrity

Repairs must re-establish continuous internal coating integrity at the repaired location. If coating integrity cannot be restored, an alternative method of corrosion prevention must be implemented, such as inhibition or use of other liners.

4 Failures on Pipelines with Major Potential Public and Environmental Consequences

Pipelines with major potential failure consequences include

- any Level 2, 3, or 4 sour natural gas pipeline (as per *ID 81-3*)
- any pipeline in a *CSA Z662-99* Class 2, 3, or 4 area (except dry sweet gas)
- any pipeline 323.9 mm (12 inch) diameter or larger
- any liquids pipeline crossing water or within 100 m of a water body
- any liquids pipeline crossing parks or wetlands
- any flammable liquids pipeline within 1.5 km of villages, towns or cities

4.1 General Requirements

The same investigative technique and follow-up as used for repeat failures must be used.

4.2 Return to Service

All assessments, evaluations, and corrosion monitoring and mitigation plans must be fully completed and reviewed by EUB staff before considering recommissioning. Long-term integrity must be assured by the use of one or more of the following:

- internal electromagnetic or ultrasonic in-line inspection, followed by necessary repairs
- replacement of the line
- installation of a liner as per the procedures of *CSA Z662-99*
- a suitable alternative course of action (supported by an engineering assessment) that meets with the satisfaction of the EUB field inspectors and EUB Pipeline Section staff

A pressure test alone will not be considered as adequate proof of long-term integrity.

Note that HVP lines in CSA Z662-99 Class 2, 3, or 4 must be tested to 1.5 x MOP and all sour natural gas lines must be tested to 1.4 x MOP.

4.3 Large-Diameter Pipelines

Any failure of a pipeline 323.9 mm (12 inch) or larger must be reported to the EUB Pipeline Section for their possible follow-up.

5 Resumption of Operation of Discontinued or Abandoned Pipelines

5.1 Assessment Procedures

The requirements of CSA Z662-99, Clause 10.13.2, which outline the engineering assessment procedures that are necessary, are to be followed before making application for resumption.

5.2 Application Requirement

An application for resumption (licence amendment) is submitted to the EUB following the normal *Guide 56* process and must include the required assessment information.

5.3 Technical Inquiries

Technical inquiries may be directed to the EUB Pipeline Section.

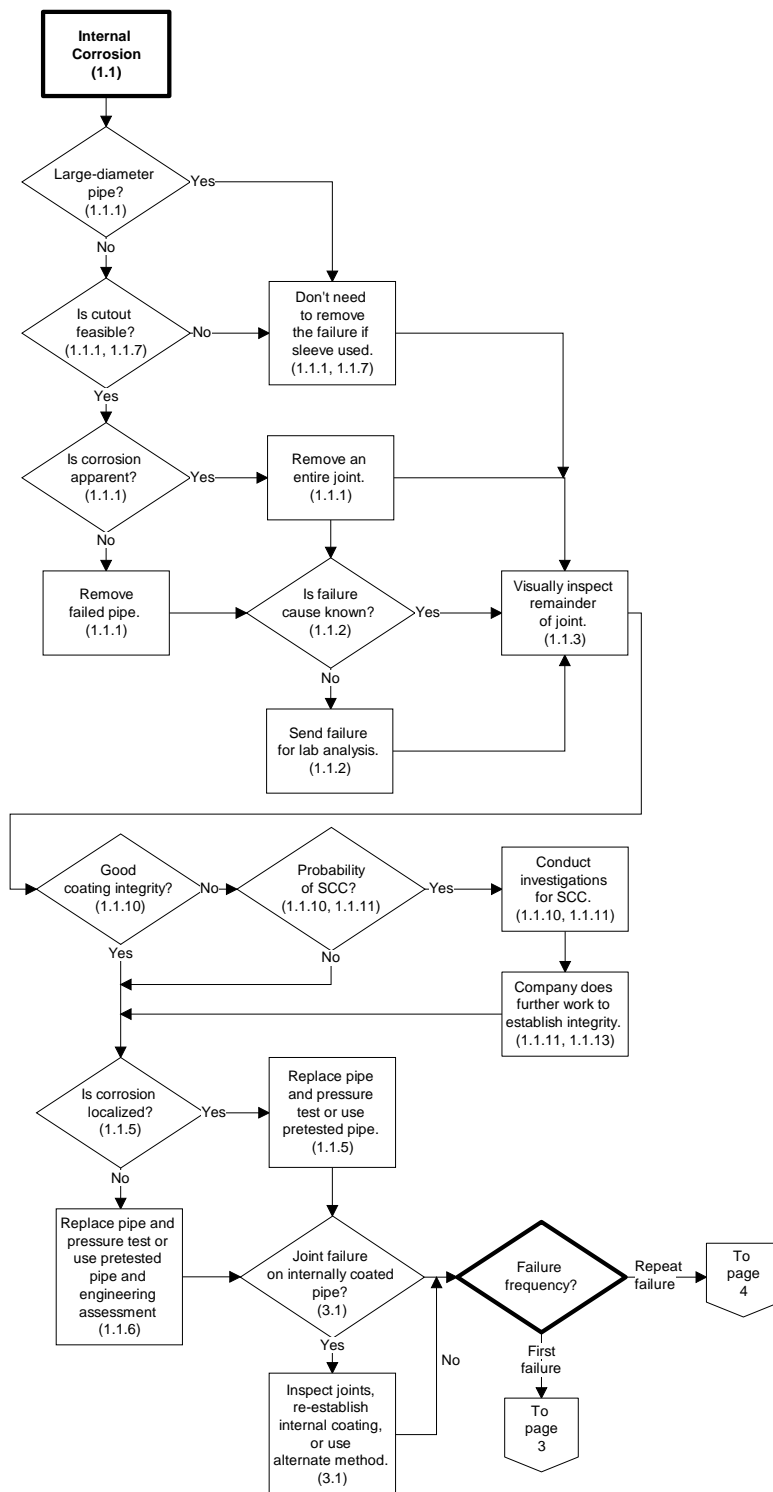
6 Enforcement

The EUB has adopted an enforcement process that includes guidelines for EUB enforcement actions when dealing with regulatory noncompliance. Companies failing to meet requirements or follow EUB direction will be subject to escalating enforcement consequences. Details of the EUB enforcement process are contained in *Directive 019: EUB Compliance Assurance—Enforcement*.

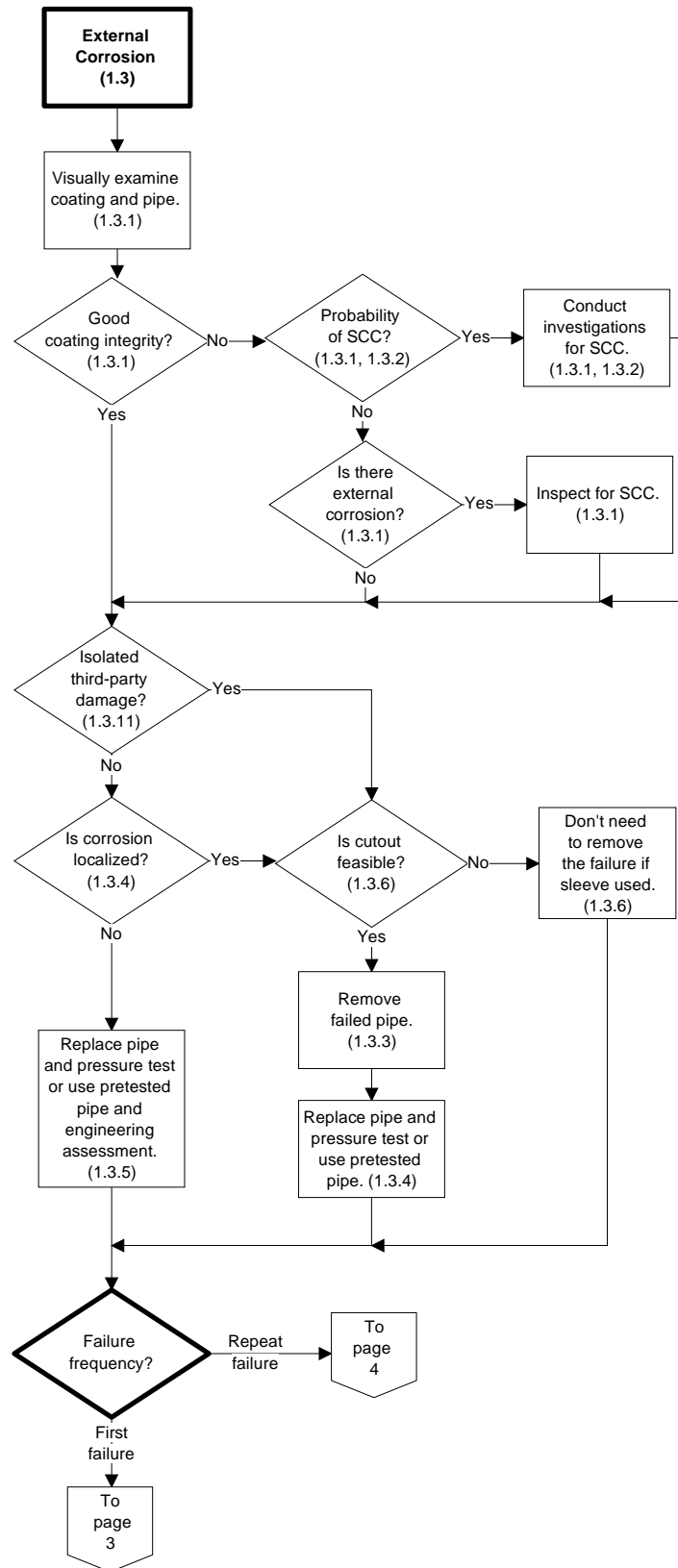
Although the procedures in this corrosion guide are not detailed in the Pipeline Act or Regulation, they are recognized as representing good practice and are written to reduce potential future failures that could result in environmental and public impacts. If a licensee does not conduct failure incident reviews and follow-up according to the general intent of this guide, the licensee will be subject to EUB-applied enforcement processes as outlined in *Directive 019*, based on the potential or actual impact on the public and environment.

7 Corrosion Failure Procedures Flowchart (page 1)

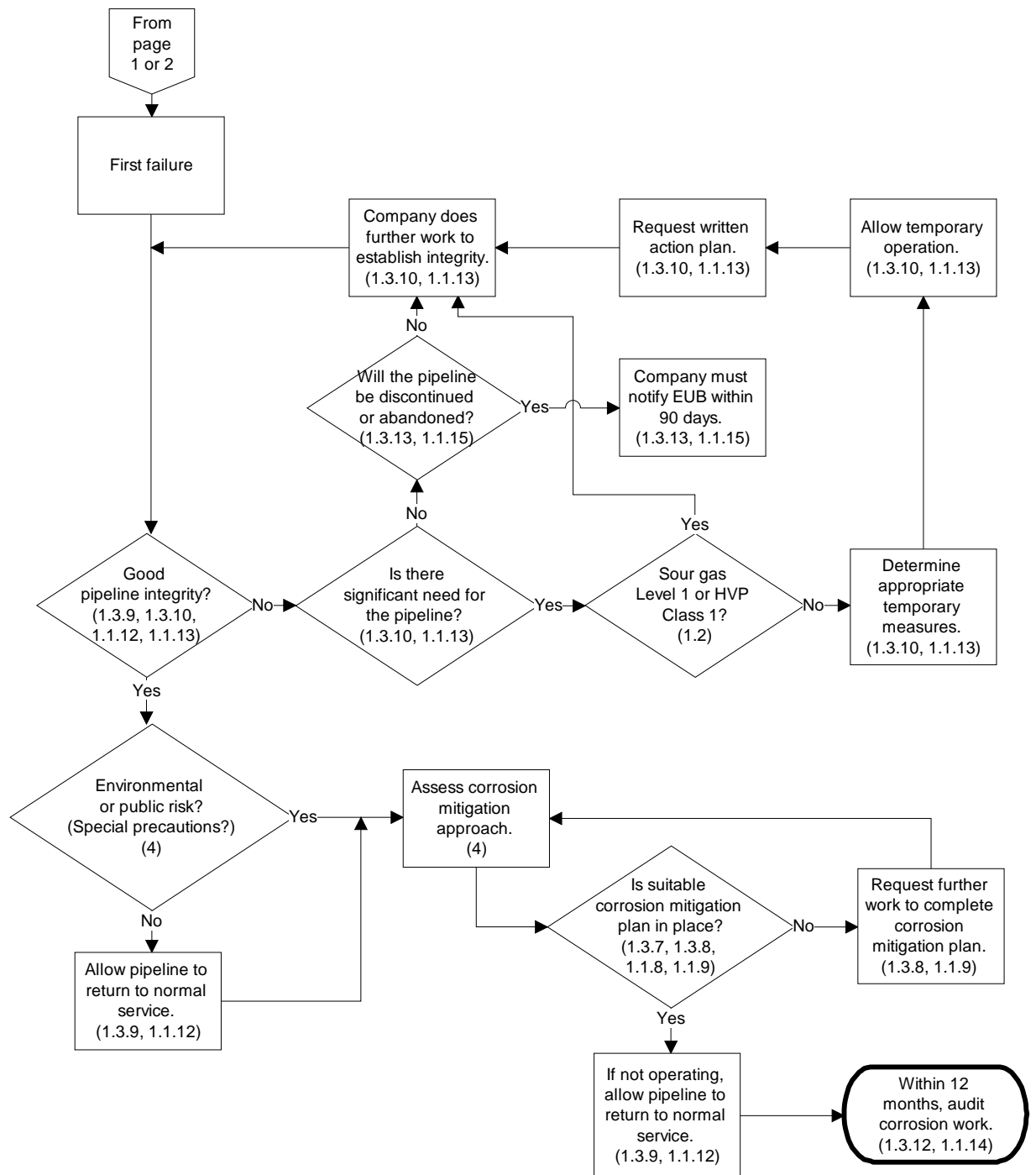
The numbers within parentheses in this four-page flowchart refer to the relevant preceding sections in the corrosion guide (Appendix 2).



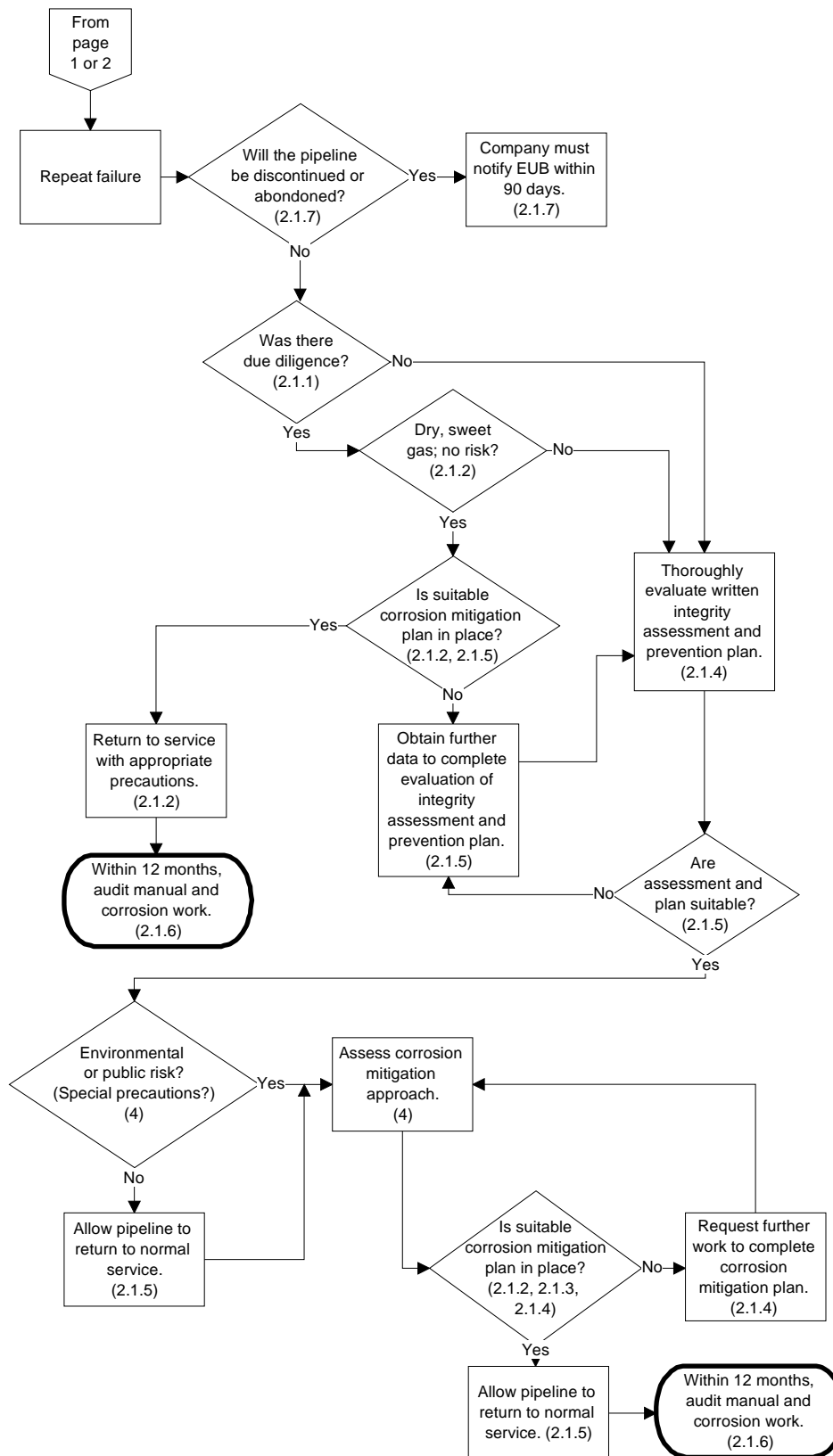
Corrosion Failure Procedures Flowchart (page 2)



Corrosion Failure Procedures Flowchart (page 3)



Corrosion Failure Procedures Flowchart (page 4)





Summary of Watercourse Crossing Requirements

The **Alberta Water Act** governs activities associated with watercourse crossings in the province of Alberta. Further, the **Code of Practice for Pipelines and Telecommunications Lines Crossing a Water Body** specifies the regulatory requirements for buried facilities that cross a watercourse. These documents can be obtained and viewed on the Alberta Environment website.

Water bodies are defined in the Code of Practice as: *A water body with defined bed and banks, whether or not water is continuously present.*

Water bodies are broken into 4 categories by the code of practice and are defined as Class A,B,C or D. In general, Class A water bodies are defined as major watercourses (ex: Bow River) Class D watercourses are typically those that are seasonal drainage or exhibit non-continuous flow.

In all cases Alberta Environment requires notification 14 days in advance of construction works taking place at a watercourse crossing. The watercourse class and complexity of the crossing will dictate the requirements of this notification, but at minimum the notification must include the following:

SCHEDULE 1

Notice to the Director (Section 3)

Information that must be contained in a notice for the purposes of section 3:

- (a) *the name, address and phone number of at least one owner of the pipeline crossing or telecommunication line crossing;*
- (b) *the name and phone number of the contact person;*
- (c) *a map, diagram, or air photo that shows the pipeline crossing or telecommunication line crossing location in relation to the boundaries of the quarter section that the crossing is located in, including the legal description of the land and the name of the water body (if named) that is crossed, and the UTM coordinates, if available, on which the pipeline crossing or telecommunication line crossing is located;*
- (d) *the diameter (in millimetres of the pipe, conduit or cable or arrangement of lines or other conductors) to be constructed at the pipeline crossing or telecommunication line crossing;*
- (e) *where the works are for a pipeline crossing, the substances to be carried by the pipe;*
- (f) *the construction methods and conditions determined in accordance with section 8, 9 and Schedule 3 that will be used in carrying out the works, including, where applicable, the rationale for not using the preferred construction method referred to in sections 8(1)(b)(i) and (ii) and 8(1)(c)(i);*
- (g) *whether the works to be carried out will incorporate the specifications and recommendations prepared by a qualified aquatic environment specialist, and if so, the name of the qualified aquatic environment specialist, and consulting company name, if applicable;*
- (h) *the expected commencement and completion dates of the works, including the estimated duration of time that the works will be carried out in a water body;*
- (i) *whether physical or other measures will be required to meet clause (a) in Part 1 of Schedule 2.*

(Excerpt taken from Code of Practice)

In support of this notification the design requirements that must also be met in accordance with the code of practice are defined as follows:

SCHEDULE 2

Plans (Section 6)

PART 1 DESIGN AND CONSTRUCTION STANDARDS

Design and construction standards that must be met for the purposes of this Code of Practice:

- (a) Upon completion of the works, the quantity and productive capacity of the aquatic environment, including fish habitat, at and adjacent to the pipeline crossing or telecommunication line crossing site must be equivalent to or exceed that which existed prior to commencing the works;
- (b) Upon completion of the works, the hydraulic, hydrologic or hydrogeological characteristics must be restored to a condition that is similar to the condition that existed prior to commencing the works;
- (c) All pipes for pipeline crossings must be installed at an elevation that is below the one in fifty year bed scour depth of the water body except for pipes under clause (d);
- (d) All pipes for pipeline crossings that will carry a substance that causes or may cause an adverse effect on the aquatic environment, including fish habitat, must be installed at an elevation that is below the one in one hundred year bed scour depth of the water body;
- (e) Measures must be implemented to avoid harm to or destruction of fish and fish eggs, and the harmful alteration, disruption or destruction of fish habitat;
- (f) Upstream and downstream fish migrations must not be impeded over the life span of the pipeline crossing or telecommunication line crossing, following completion of the works;
- (g) The flow of the water body must be maintained at the pipeline crossing or telecommunication line crossing site at all times through or around the crossing;
- (h) Measures must be implemented to minimize the duration and amount of disturbance of the bed and banks of the water body;
- (i) Measures must be implemented to prevent the deposition into the water body of deleterious substances and materials that are toxic to fish and other aquatic organisms;
- (j) Measures must be implemented to prevent the transfer of biota that is not indigenous to the environment at the pipeline crossing or telecommunication line crossing site;
- (k) Measures must be implemented to minimize erosion and sedimentation into the water body;
- (l) Measures must be implemented to permanently stabilize all disturbed areas on the pipeline crossing or telecommunication line crossing site sloping to the water body within one full growing season;
- (m) Debris disposal, cleanup and initial stabilization must be carried out as part of the work.

REQUIREMENTS FOR INFORMATION AND WRITTEN SPECIFICATIONS FOR PLANS OF WORKS, FROM OWNER OR PROFESSIONAL ENGINEER

Written specifications that must be provided under section 6(1) must

- (a) meet the design and construction standards specified in Part 1 of this Schedule;
- (b) incorporate any written specifications and recommendations prepared by a qualified aquatic environment specialist for the works; and
- (c) include the design specifications of the works and other information related to the works, as follows:
 - (i) information on a page which is a minimum size of 21 centimetres by 27 centimetres, a minimum scale of 1:15000 and that includes:
 - (A) a map, diagram, or air photo that shows the location of the works in relation to the boundaries of the quarter section that the pipeline crossing or telecommunication line crossing will be located in, the legal description of the land, and the UTM coordinates, if available, on which the pipeline crossing or telecommunication line crossing is located;
 - (B) the name of the water body that is crossed, if named;
 - (C) the substances carried by or to be carried by the pipe for a pipeline crossing;
 - (D) the type of cable, conduit or arrangement of lines or other conductors for a telecommunication line crossing;
 - (E) the diameter of the pipe for a pipeline crossing and the diameter of the cable, conduit or arrangement of lines or other conductors for a telecommunication line crossing;
 - (F) the burial depth of the pipe for a pipeline crossing, and of the cable, conduit or arrangement of lines or other conductors for a telecommunication line crossing, shown through the width of the active floodplain of the water body;
 - (G) the setback distance to the pipe, cable or conduit sag bends on each side of the water body;
 - (H) all surveyed and unsurveyed profile and cross-sectional drawings required for the design;
 - (ii) for a pipeline crossing, an explanation of rationale and the calculations for the design of scour depth at the pipeline crossing;
 - (iii) any hydraulic, hydrologic, or hydrogeologic analysis performed for the design of the works; and
 - (iv) a description of any other specifications for the works that were not provided on the plan or that the owner or professional engineer considers appropriate.

(Excerpt taken from Code of Practice)

During the survey of a pipeline R.O.W. it is important that photos of the crossing location are taken and sent to the project engineer to support the notification and potential crossing design. Photos should be taken of each bank as seen from the opposite bank and a photo looking up and downstream the watercourse at the crossing location (if practicable). In general, if a watercourse contains water year round (including frozen), a watercourse cross section and bed profile up and downstream (50m in each direction from crossing location) should be requested by Pengrowth and provided by the survey company to support notification and design requirements.

In all cases a basic set of records must be kept for the life of the pipeline and are as follows:

Record keeping and information availability

- 12(1) An owner must compile and retain the following records within the time period specified in subsection (2);***
- (a) the names, addresses and phone numbers of the owners of the pipeline crossing or telecommunication line crossing;***
 - (b) a copy of the plan prepared for the pipeline crossing or telecommunication line crossing;***
 - (c) any as built plans or as constructed plans, if such as built or as constructed plans were prepared;***
 - (d) the time period over which the carrying out of the works occurred, including:***
 - (i) the start and completion dates, and***
 - (ii) the duration of time each day that the work occurred in the water body;***
 - (e) all photographs or video-recordings taken of the pipeline crossing or telecommunication line crossing before and after the carrying out of the works;***
 - (f) where written specifications and recommendations of a qualified aquatic environment specialist have been included in the plan, the curriculum vitae and relevant experience of the qualified aquatic environment specialist; and***
 - (g) a copy of all certifications referred to in section 10.***

(Excerpt from Code of Practice)

In addition to Alberta environment notifications, under certain circumstances, a notification to the Federal Department of Fisheries and Oceans may also be required.

Notice under Code of Practice - Water Act



This notification is for the placement, construction, installation, maintenance, replacement, or removal of Pipeline or Telecommunication Line Crossings

Documents or information provided to Alberta Environment pursuant to section 15(1)(a) of the Water (Ministerial) Regulation are public records and are accessible by the public.

Check one or more of the following to indicate type of activity

☐ Pipeline Crossing:

☐ Installation

☐ Removal

☐ Maintenance

File No.: _____

☐ Telecommunication Line Crossing:

☐ Installation

☐ Removal

☐ Maintenance

Brief Description:

Owner of Pipeline or Telecommunication Line Crossing

Print Name or Company Name:		Home/Cell. Telephone: ()	Bus. Telephone: ()	Electronic Mail Address:
Address (Street, PO Box, etc.):	Place, Province:	Postal Code:	Fax: ()	

Person Responsible or Contact Person (if not the same as Owner):

Print Name or Company Name:		Home/Cell. Telephone: ()	Bus. Telephone: ()	Electronic Mail Address:
Address (Street, PO Box, etc.):	Place, Province:	Postal Code:	Fax: ()	

Under Schedule 1 of the Code, a location plan, diagram, or an aerial photograph showing the following criteria must accompany this notice:

- (a) minimum size of 21 cm by 27 cm and is a scale of 1:15,000 or larger,
- (b) where the pipeline crossing or telecommunication line crosses the water body in relation to the boundaries of the quarter section that the crossing is located in, including the legal description of the land and,
- (c) name of each water body to be crossed. (if applicable)

See next page

Please attach a separate page for additional crossings or information

Location of Crossing(s) (if more crossings are proposed, attach a separate list)	Name of Water Body, if known	Diameter of pipeline and/or telecommunication line (cable, pipe, conduit)	Substance to be conveyed by the pipeline	Method of installation, repair, or removal	Expected commencement and completion dates of works	Maximum time the works will occur in the water body	Are specifications and recommendations, prepared by a qualified aquatic environment specialist, incorporated in the plans? Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, enter name of specialist and, if applicable, the company name below	Was a less preferred crossing type chosen? Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, describe reason(s):
1/4 sec twp rge m								

Note: The Director may ask for other information required by the Code of Practice including detailed design plans for the construction, assessments, and reports.

Will physical or other measures be required to meet clause (a) in Part 1 of Schedule 2? Yes ☐ No ☐

Signature of owner of/person responsible for the crossing:

Signature Print Name Title

Dated

Request to change 14-day notification requirement to _____ days (insert number of days or n/a if request is not requested)

Approved by the Director:

Director's Signature

Dated

Return the completed form to the appropriate Alberta Environment regional office:

Northern Region, Peace River Office
Bag 900 - 5, Provincial Building
9621 - 96 Avenue
Peace River, AB T8S 1T4
Telephone (780) 624-6167
Fax: (780) 624-6335

Northern Region, Edmonton Office
Twin Atria
111, 4999 - 98 Avenue
Edmonton, AB T6B 2X3
Telephone: (780) 427-5296
Fax: (780) 427-7824

Central Region, Stony Plain Office
52322 Golf Course Road
Stony Plain, AB T7Z 2K9
Telephone: (780) 963-6131
Fax: (780) 963-4651

Central Region, Red Deer Office
304, Provincial Building
4920 - 51 Street
Red Deer, AB T4N 6K8
Telephone: (403) 340-7052
Fax: (403) 340-5022

Southern Region, Calgary Office
200, 3115 - 12 Street, NE
Calgary, AB T2E 7T2
Telephone: (403) 297-6582
Fax: (403) 297-2749

Southern Region, Lethbridge Office
2nd Floor, Provincial Building
200 - 5 Avenue, South
Lethbridge, AB T1J 4L1
Telephone: (403) 382-4254
Fax: (403) 381-5337

SCHEDULE VI/ANNEXE VI
(Subsection 58(1)/paragraphe 58(1))



Fisheries and Oceans
Pêche et Océans

Page 1

Habitat File No./N° de fichier

APPLICATION FOR AUTHORIZATION FOR WORKS OR UNDERTAKINGS AFFECTING FISH HABITAT
DEMANDE D'AUTORISATION POUR DES OUVRAGES OU ENTREPRISES MODIFIANT L'HABITAT DU POISSON

I, the undersigned, hereby request authorization to carry out the works or undertakings described on this application form. I understand that the approval of this application, if granted, is from the Minister of Fisheries and Oceans standpoint only and does not release me from my obligation to obtain permission from other concerned regulatory agencies.

Je soussigné, demande par les présentes l'autorisation d'exploiter les ouvrages ou entreprises décrits dans la formule. Je comprends que l'approbation de cette demande, le cas échéant, porte sur ce qui relève du ministre des Pêches et des Océans et ne me dispense pas d'obtenir la permission d'autres organismes réglementaires concernés.

If an authorization is granted as a result of this application, I hereby agree to carry out all activities relating to the project within the designated time frames and conditions specified in the authorization.

Si la demande est approuvée, je consens par les présentes à exécuter tous les travaux relatifs à ce projet selon les modalités et dans le laps de temps prescrits dans l'autorisation.

Applicant's Name (Please Print)

Nom du requérant (lettres moulées)

Applicant's Business Address

Adresse d'affaires du requérant

Applicant's Telephone No./N° de téléphone du requérant

Date

I solemnly declare that the information provided and facts set out in this application are true, complete and correct, and I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath. This declaration applies to all material submitted as part of this application.

Je déclare solennellement que les renseignements fournis et les faits énoncés dans cette demande sont véridiques, complets et exacts, et je fais cette déclaration solennelle, la croyant consciencieusement vraie et sachant qu'elle a la même force et le même effet que si elle était faite sous serment. Cette déclaration s'applique à tout document qui est présenté dans le cadre de cette demande.

Applicant's Signature (and corporate seal)

Signature du requérant (et sceau de la société)

Name of watercourse or waterbody (give coordinates)
Cours d'eau ou plan d'eau (donner les coordonnées)

This watercourse is a tributary of (where applicable)
Cours d'eau tributaire de (le cas échéant)

Nearest Community
Localité la plus proche

County
Comté

Province
Province

SCHEDULE VI---Continued/ANNEXE VI (suite)
(Subsection 58(1)/paragraphe 58(1))



Fisheries and Oceans
Pêche et Océans

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Habitat File No./N° de fichier

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Type of Activity/Genre d'activité

- | | | | |
|------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <input type="checkbox"/> Bridge
Traverse Pont d'eau | <input type="checkbox"/> Stream Realignment
Alignement de cours d'eau | <input type="checkbox"/> Gravel Removal
Enlèvement du gravier | <input type="checkbox"/> Stream
Traversée de cours |
| <input type="checkbox"/> Culvert
Ponceau | <input type="checkbox"/> Channelization
Canalisation | <input type="checkbox"/> Obstruction Removal - Bypass
Enlèvement ou contournement d'obstacle | <input type="checkbox"/> Seismic Survey
Levé sismique |
| <input type="checkbox"/> Dam
Barrage | <input type="checkbox"/> Wharf - Break water
Quai - Brise-lames | <input type="checkbox"/> Stream Utilization - Recreation
Utilisation récréative du cours d'eau | <input type="checkbox"/> Agriculture |
| <input type="checkbox"/> Stream Diversion
Dérivation de cours d'eau | <input type="checkbox"/> Dewatering
Assèchement | <input type="checkbox"/> Erosion Control
Lutte contre l'érosion | <input type="checkbox"/> Other (Specify)
Autres (préciser) |
| <input type="checkbox"/> Mining
Activité minière | <input type="checkbox"/> Aquaculture | <input type="checkbox"/> Flood Protection
Protection contre les inondations | |

**List of Agencies (Federal, Provincial or Municipal) contacted or notified, or who have initiated contact with the applicant.
Liste des organismes (fédéraux, provinciaux ou municipaux) contactés ou qui ont pris contact avec le requérant.**

**PROVIDE DETAILS OF PROPOSED ACTIVITY INCLUDING REASONS FOR THE PROJECT AND TYPES OF EQUIPMENT TO BE USED
DONNER DES PRÉCISIONS SUR LES TRAVAUX PROJETÉS, Y COMPRIS LA JUSTIFICATION DU PROJET ET LE TYPE D'ÉQUIPEMENT À UTILISER**

SCHEDULE VI---Continued /ANNEXE V1 (suite)
(Subsection 58(1)/paragraphe 58(1))



Fisheries and Oceans
Pêche et Océans

Habitat File No./N° de fichier

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SCHEDULE/CALENDRIER

	D/J	M/M	Y/A
Proposed Starting Date Date prévue du début des travaux	_____	_____	_____
Proposed Completion Date Date prévue de l'achèvement des travaux	_____	_____	_____

Approximate Timing of Work in shoreline, foreshore, tidal zone, or underwater areas.
Période approximative des travaux sur le rivage et les estrans ainsi que dans les zones à marées et les zones sous-marines.

	D/J	M/M	Y/A		D/J	M/M	Y/A
From/De	_____	_____	_____	To/À	_____	_____	_____

The following documents will assist in assessing your application and help expedite its approval. Please check which documents you have attached.

Les documents suivants faciliteront l'évaluation de votre demande et permettront d'accélérer son approbation. Veuillez cocher les documents vous avez joints à votre demande.

Map indicating location of project

☐ Carte indiquant l'emplacement du projet

Engineering Specifications

☐ Spécifications techniques

Scale Drawings

☐ Dessins à l'échelle

Dimensional Drawings

☐ Plans cotés

Assessment of Existing Fish Habitat Characteristics

☐ Évaluation des caractéristiques existantes de l'habitat du poisson

Assessment of Potential Effects of Project on Fish Habitat

☐ Évaluation des répercussions possibles sur l'habitat du poisson

Measures Proposed to Offset Potential Damage to Fish Habitat

☐ Mesures proposées pour compenser les éventuels dommages à l'habitat du poisson

Other

☐ Autres

ENVIRONMENTAL ASSESSMENT AND REVIEW PROCESS
CONSIDERATIONS

CONSIDÉRATIONS CONCERNANT LE PROCESSUS
D'ÉVALUATION ET D'EXAMEN EN MATIÈRE D'ENVIRONNEMENT

NOTE: All applications pursuant to section 35 of the Fisheries Act will be assessed in accordance with applicable federal environmental assessment requirements.

REMARQUE: Toute demande en vertu l'article 35 de la Loi sur les pêches sera soumise aux exigences fédérales applicables à l'évaluation environnementale.

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SCHEDULE VI---Concluded/ANNEXE VI (fin)
(Subsection 58(1)/paragraphe 58(1))



Fisheries and Oceans
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COMPLETE ONLY IF USE OF EXPLOSIVES IS INTENDED
À REMPLIR SEULEMENT EN CAS D'UTILISATION D'EXPLOSIFS

EXPLOSIVES CONTRACTOR (IF DIFFERENT FROM APPLICANT)/RESPONSABLE DES EXPLOSIFS (SI AUTRE QUE LE REQUÉRANT)

Name/Nom: _____

Address/Adresse: _____

Telephone No./N° de téléphone: _____

	D/J	M/M	Y/A		D/J	M/M	Y/A
Anticipated Starting Date				Completion Date			
Date prévue du début des travaux				Date d'achèvement			

DETAILS OF EXPLOSIVES/PRÉCISIONS SUR LES EXPLOSIFS

Type (including trade name)
Genre (y compris la marque) _____

Weight and configuration (where applicable)
Poids et forme (le cas échéant) _____

Weight of individual shots and shot pattern where multiple charges are used
Poids des coups individuels et déploiement des coups, en cas de charges multiples

Detonation depth (In the rock; note also the depth of water, if applicable)
Profondeur de détonation (dans le roc; indiquer aussi la profondeur de l'eau, s'il ya lieu)

Method of detonation
Méthode de détonation



NOTIFICATION FORM

Fisheries and Oceans Canada
Alberta Operational Statement

Version 2.5

PROPONENT INFORMATION

NAME:	STREET ADDRESS:	
CITY/TOWN:	PROVINCE/TERRITORY:	POSTAL CODE:
TEL. NO. (RESIDENCE):	TEL. NO. (WORK):	
FAX NO:	EMAIL ADDRESS:	

CONTRACTOR INFORMATION (provide this information if a Contractor is working on behalf of the Proponent)

NAME:	STREET ADDRESS:	
CITY/TOWN:	PROVINCE/TERRITORY:	POSTAL CODE:
TEL. NO. (RESIDENCE):	TEL. NO. (WORK):	
FAX NO:	EMAIL ADDRESS:	

PROJECT INFORMATION

Select Operational Statements that are being used (check all applicable boxes):

- | | | |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Alberta Interim Operational Position
Statement on Pipeline Crossing Methods | <input type="checkbox"/> Culvert Maintenance
<input type="checkbox"/> Ice Bridges and Snow Fills
<input type="checkbox"/> Isolated Pond Construction
<input type="checkbox"/> Maintenance of Riparian Vegetation in Existing Rights-of-Way | <input type="checkbox"/> Moorings
<input type="checkbox"/> Overhead Line Construction
<input type="checkbox"/> Routine Maintenance Dredging
<input type="checkbox"/> Submerged Log Salvage
<input type="checkbox"/> Underwater Cables |
| <input type="checkbox"/> Beaver Dam Removal | | |
| <input type="checkbox"/> Bridge Maintenance | | |
| <input type="checkbox"/> Clear-Span Bridges | | |

Select the type of water body or watercourse at or near your project:

- | | |
|-------------------------------------------------------|-------------------------------------------------------------------------|
| <input type="checkbox"/> River, Stream, Creek | <input type="checkbox"/> Pond or wetland (pond is less than 8 hectares) |
| <input type="checkbox"/> Lake (8 hectares or greater) | |

PROJECT LOCATION (S) (fill out this section if the project location is different from Proponent Information; append multiple project locations on an additional sheet if necessary)

Name of water body or watercourse	Coordinates of the Project (UTM co-ordinate or Degrees, Minutes, Seconds), if available Easting: _____ Northing: _____ Latitude: _____ Longitude: _____
Legal Description (LSD, Quarter, Section, Township, Range, Meridian)	Directions to Access the Project Site (i.e., Route or highway number, etc.)
Proposed Start Date (YYYY/MM/DD):	Proposed Completion Date (YYYY/MM/DD):

We ask that you notify DFO, preferably 14 working days before starting your work, by filling out and sending in, by mail or by fax, this notification form to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to the Operational Statement.

I, _____ (print name) certify that the information given on this form is, to the best of my knowledge, correct and complete.

Signature _____ Date _____

Note: If you cannot meet all of the conditions and cannot incorporate all of the measures in the Operational Statement then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact the DFO office in your area if you wish to obtain DFO's opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the fish habitat protection provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-SCI-605. Under the *Privacy Act*, individuals have a right to, and on request shall be given access to, any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provisions of the *Access to Information Act*.

FISHERIES AND OCEANS CANADA OFFICES IN ALBERTA

Calgary Office

Fisheries and Oceans Canada
7646-8th St. NE
Calgary, Alberta, T2E 8X4
General Inquiries: 403-292-5160
Fax: 403-292-5173
Email: ReferralsCalgary@dfo-mpo.gc.ca

Edmonton Office

Fisheries and Oceans Canada
Whitemud Business Park
4253-97th Street
Edmonton, Alberta, T6E 5Y7
General Inquiries: 780-495-4220
Fax: 780-495-8606
Email: ReferralsEdmonton@dfo-mpo.gc.ca

Lethbridge Office

Fisheries and Oceans Canada
J.D. Higinbotham Building
204, 704-4th Avenue South
Lethbridge, Alberta, T1J 0N8
General Inquiries: 403-394-2920
Fax: 403-394-2917
Email: ReferralsLethbridge@dfo-mpo.gc.ca

Peace River Office

Fisheries and Oceans Canada
9001-94th Street
Peace River, Alberta, T8S 1G9
General Inquiries: 780-618-3220
Fax: 780-618-3235
Email: ReferralsPeaceRiver@dfo-mpo.gc.ca

Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

4.8 Crossings

4.8.1 General

4.8.1.1

The requirements of [Clause 4.8](#) are applicable to pipeline crossings of, and by, utilities, roads, railways, and water. Other crossings shall be designed in accordance with the applicable requirements of [Clauses 4.1](#) to [4.3](#).

4.8.1.2

Unless otherwise specified in [Clause 4.8](#), the stresses due to all normally expected loads shall be in accordance with the applicable requirements of [Clause 4.6](#).

4.8.1.3

Where practicable, crossings other than water crossings shall be made in such a manner that the angle between the centreline of the railway, road, or utility being crossed and the centreline of the pipeline is not less than 45°, and as close to 90° as possible.

4.8.2 Crossings of Utilities

4.8.2.1

Where practicable, the pipeline or utility shall maintain straight alignment and be at a depth suitable to maintain the required depth of cover (see [Table 4.9](#)) for the full width of the right-of-way.

4.8.2.2

Interference with, or from, other systems through the application of cathodic protection shall be dealt with by mutual action of the parties involved (see [Clause 9](#)).

4.8.3 Crossings of Roads and Railways

4.8.3.1 Uncased Road Crossings

It shall be permissible to install uncased steel pipelines with welded joints under roads, provided that the following requirements are met:

- a) The pipe has been designed to sustain the loads at the crossing in accordance with the requirements of [Clause 4.3](#).
- b) The pipe nominal wall thickness is not less than the applicable least nominal wall thickness given in [Table 4.10](#) or the applicable least nominal wall thickness for steel carrier pipe required by [Clause 4.3.3.7.2](#), whichever is the greater.
- c) The design requirements are applied to the pipeline for a minimum distance of 7 m beyond the travelled surface of the road, measured at right angles to the centreline of the travelled surface.
- d) All circumferential joints that are associated with the crossing and are within the road right-of-way are nondestructively inspected in accordance with the applicable requirements of [Clause 7](#).

Table 4.10
Least Nominal Wall Thickness for Steel Casing Pipe in
Cased Crossings and Carrier Pipe in Uncased Crossings

(See **Clauses 4.8.3.1, 4.8.3.2, 4.8.3.3, and 15.4.5** and **Table 4.5.**)

Pipe outside diameter, mm	Least nominal wall thickness, mm	
	Roads	Railways
88.9	3.2	3.2
101.6	3.2	3.2
114.3	3.2	3.2
141.3	4.0	4.0
168.3	4.8	4.8
219.1	4.8	4.8
273.1	4.8	4.8
323.9	4.8	4.8
355.6	4.8	5.6
406.4	4.8	5.6
457	4.8	6.4
508	4.8	7.1
559	5.6	7.9
610	6.4	8.7
660	6.4	9.5
711	6.4	10.3
762	6.4	10.3
813	6.4	11.1
864	6.4	11.9
914	6.4	11.9
965	7.9	12.7
1016	7.9	12.7
1067	7.9	12.7
1118	7.9	14.3
1168	7.9	15.9
1219	8.3	15.9
1270	8.7	15.9
1321	9.5	19.1
1372	9.5	19.1
1422	9.5	19.1
1524	10.3	20.6

Note: For intermediate pipe outside diameters, it shall be permissible to determine the minimum wall thickness by interpolation.

4.8.3.2 Uncased Railway Crossings

It shall be permissible to install uncased steel pipelines under railways, provided that the following requirements are met:

- a) The pipe has been designed to sustain the loads at the crossing in accordance with the requirements of **Clause 4.3.**
- b) For steel pipe with a joint factor of 1.00, the hoop stress in the carrier pipe does not exceed 50% of its specified minimum yield strength.
- c) For steel pipe with a joint factor of less than 1.00, the hoop stress in the carrier pipe does not exceed
 - i) 50% of its specified minimum yield strength, if such pipe crosses secondary or industry tracks; and
 - ii) 30% of its specified minimum yield strength, if such pipe crosses tracks that are other than secondary or industry tracks.

- d) The pipe nominal wall thickness is not less than the applicable least nominal wall thickness specified in **Table 4.10** or the applicable least nominal wall thickness for steel carrier pipe required by **Clause 4.3.3.7.2**, whichever is the greater.
- e) The D/t ratio is not greater than the applicable maximum D/t ratio specified in **Table 4.11**.
- f) The design requirements are applied to the pipeline for a minimum distance of 7 m beyond the centreline of the outside track, measured at right angles to the centreline of the track.
- g) All circumferential joints within the railway rights-of-way are nondestructively inspected in accordance with the applicable requirements of **Clause 7**.

Table 4.11
Maximum Pipe Diameter to Wall Thickness (D/t)
Ratio for Uncased Railway Crossings
 (See **Clause 4.8.3.2**.)

Maximum operating pressure, MPa	Maximum D/t ratio									
	Steel pipe grade									
	172	207	241	290	317	359	386	414	448	483
14.0	—	10	15	20	22	25	27	29	32	34
13.3	—	10	16	21	23	26	29	31	33	36
12.6	—	11	17	22	25	28	30	32	35	38
11.9	—	11	18	24	26	30	32	34	37	40
11.2	—	12	18	25	28	32	34	36	40	43
10.5	—	13	19	27	30	34	36	39	42	45
9.8	—	13	21	29	32	36	39	42	45	49
9.1	—	14	22	31	34	39	42	45	49	53
8.4	—	15	23	34	37	42	45	49	53	57
7.7	—	16	25	37	41	46	50	53	58	62
7.0	—	17	26	40	45	51	55	59	64	68
6.3	—	19	28	43	50	56	61	65	71	76
5.6	—	20	31	46	56	64	68	73	80	85
4.9	10	22	33	50	63	73	78	85	85	85
4.2	12	24	36	55	70	85	85	85	85	85
3.5	13	27	39	61	79	85	85	85	85	85
2.8	15	29	43	67	85	85	85	85	85	85
2.1	17	33	48	80	85	85	85	85	85	85
1.4	20	37	55	85	85	85	85	85	85	85
≤0.7	24	43	71	85	85	85	85	85	85	85

Notes:

- 1) For intermediate operating pressures, it shall be permissible to determine the D/t ratio by interpolation.
- 2) D/t ratio means the OD divided by the nominal wall thickness.
- 3) Design conditions used to develop the table are as following:
 - a) 2.0 m minimum depth of cover;
 - b) 55 °C temperature differential;
 - c) maximum hoop stress of 50% SMYS;
 - d) maximum combined circumferential stress of 72% SMYS;
 - e) maximum combined equivalent tensile stress of 90% SMYS;
 - f) E-80 rail loading criteria with an impact factor of 1.4 at the surface, reducing linearly to 1.0 at 3.0 m;
 - g) fluctuating stress limitation of 69 MPa based upon 2 000 000 cycles; and
 - h) maximum D/t ratio of 85.

4.8.3.3 Cased Crossings

Where cased crossings are installed, the design shall be in accordance with the following requirements:

- a) Carrier pipe shall be designed in accordance with the applicable requirements of [Clause 4.3](#).
- b) For carrier pipe smaller than 168.3 mm OD, the outside diameter of the casing pipe shall be at least 50 mm greater than the outside diameter of the carrier pipe. For carrier pipe 168.3 mm OD or larger, the outside diameter of the casing pipe shall be at least 75 mm greater than the outside diameter of the carrier pipe.
- c) Carrier pipe shall be held clear of the casing pipe by properly designed supports, insulators, or centring devices, so installed as to minimize external loads transmitted to the carrier pipe.
- d) The ends of the casings shall be suitably sealed to the outside of the carrier pipe. Venting of sealed casings is not mandatory; however, where vents are installed, they shall be protected from the weather to prevent water from entering the casing. Where casing seals of a type that will retain more than 35 kPa pressure between the casing and the carrier pipe are installed, and vents are not used, provision shall be made to relieve the internal pressure before carrying out maintenance work.
- e) Casing pipe under roads shall be of sufficient length to absorb all of the external loading from the road bed at the point of crossing.
- f) Casing pipe under railways shall extend to the greatest of the following distances, measured at right angles to the centreline of the track:
 - i) 7 m each side from the centreline of the outside track;
 - ii) 0.6 m beyond the toe of slope; and
 - iii) 1 m beyond the ditch line or area that may be affected by normal ditch cleaning operations.
- g) The nominal wall thickness for steel casing pipe shall be not less than the applicable least nominal wall thickness specified in [Table 4.10](#).

4.8.4 Crossings of Water

Note: Where the designer considers that the design and construction requirements of [Clause 11](#) are more appropriate, such requirements should be used for water crossings.

4.8.4.1

The wall thickness of pipe shall be determined in accordance with the applicable requirements of [Clauses 4.2, 4.3, and 4.6](#). Special attention shall be given to the physical characteristics of crossings, such as composition and stability of the bed and banks, waves, currents, scouring, flooding, type and density of water-borne traffic, and other features that may cause adverse effects. Weight-coatings, river weights, anchors, or other means shall be used to maintain the position of pipelines under anticipated conditions of buoyancy and water motion.

4.8.4.2

Where it has been determined by the designer that aerial crossings are preferable to submarine crossings, it shall be permissible for aerial crossings to be used. Overhead structures used to suspend pipelines shall be designed in accordance with sound engineering practices.

4.9 Requirements for Pipelines in Proximity to Electrical Transmission Lines and Associated Facilities

4.9.1 General

Pipelines in proximity to electrical transmission lines and associated facilities shall comply with the applicable requirements of CAN/CSA-C22.3 No. 6.

Notes:

1) Fault currents resulting from lightning and upset conditions of electrical facilities could result in danger to personnel and damage to coating and pipe. Such adverse effects can occur where a pipeline is close to the grounding facilities of electrical transmission line structures, substations, generating stations, and other facilities that have high fault current-carrying grounding networks.

2) Where buried pipelines are close to high fault current-carrying grounding networks, remedial measures may be necessary to protect the pipeline from resulting potential gradients in the earth near the pipelines.