



Compliance Assurance Protocol Integrity Management Program for Pipelines

VERSION 2.3: November 2023

About the Regulator

The BC Energy Regulator (Regulator or BCER) is the single-window regulatory agency with responsibilities for regulating oil and gas activities in British Columbia, including exploration, development, pipeline transportation and reclamation.



The Regulator's core roles include reviewing and assessing applications for industry activity, consulting with First Nations, ensuring industry complies with provincial legislation and cooperating with partner agencies. The public interest is protected by ensuring public safety, protecting the environment, conserving petroleum resources and ensuring equitable participation in production.

Vision, Mission and Values

Vision

A resilient energy future where B.C.'s energy resource activities are safe, environmentally leading and socially responsible.

Mission

We regulate the life cycle of energy resource activities in B.C., from site planning to restoration, ensuring activities are undertaken in a manner that:



Protects public safety and the environment



Supports reconciliation with Indigenous peoples and the transition to low-carbon energy



Conserves energy resources



Fosters a sound economy and social well-being



Values

Respect is our commitment to listen, accept and value diverse perspectives.

Integrity is our commitment to the principles of fairness, trust and accountability.

Transparency is our commitment to be open and provide clear information on decisions, operations and actions.

Innovation is our commitment to learn, adapt, act and grow.

Responsiveness is our commitment to listening and timely and meaningful action.

Additional Guidance

As with all Regulator documents, this document does not take the place of applicable legislation. Readers are encouraged to become familiar with the acts and regulations and seek direction from Regulator staff for clarification.

The Regulator publishes both application and operations manuals and guides. The application manual provides guidance to applicants in preparing and applying for permits and the regulatory requirements in the planning and application stages. The operation manual details the reporting, compliance and regulatory obligations of the permit holder. Regulator manuals focus on requirements and processes associated with the Regulator's legislative authorities. Some activities may require additional requirements and approvals from other regulators or create obligations under other statutes. It is the applicant and permit holder's responsibility to know and uphold all legal obligations and responsibilities. For example, Federal Fisheries Act, Transportation Act, Highway Act, Workers Compensation Act and Wildlife Act.

Throughout the document there are references to guides, forms, tables and definitions to assist in creating and submitting all required information. Additional resources include:

- [Glossary and acronym listing](#) on the Regulator's website.
- [Documentation and guidelines](#) on the Regulator's website.
- [Frequently asked questions](#) on the Regulator's website.'s
- [Advisories, bulletins, reports and directives](#) on the Regulator website.
- [Regulations and Acts](#) listed on the Regulator's website.

In addition, this document may reference some application types and forms to be submitted outside of the Application Management System but made available on the Regulator's website. Application types and forms include:

- Heritage Conservation Act, Section 12
- Road use permits
- Water licences
- Master licence to cut
- Certificate of restoration
- Waste discharge permit
- Experimental scheme application
- Permit extension application

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Document Revisions

The Regulator is committed to the continuous improvement of its documentation. Revisions to the documentation are highlighted in this section and are posted to the [Documentation Section](#) of the Regulator's website.

Stakeholders are invited to provide input or feedback on Regulator documentation to ServiceDesk@bc-er.ca or submit feedback using the [feedback form](#).

Version Number	Posted Date	Effective Date	Chapter Section	Summary of Revision(s)
2.2	May 19, 2022	May 19, 2022	Expectations and Requirements	Updates regarding the Professional Governance Act.
2.3	Nov.30, 2023	Nov.30, 2023	Various	Replace BCOGC with BCER; OGAA with ERAA; new logos, references and associations

Background

Integrity Management Programs (IMPs) for pipelines is an integral component of the safety and loss management system (SLMS) as per CSA Z662¹, Clause 3.1. IMPs provide a systematic approach for assuring pipeline integrity throughout the entire pipeline life cycle including planning, design, construction, operation, maintenance and abandonment. IMPs have been a regulatory requirement in British Columbia since they were introduced in the 1999 edition of CSA Z662 – Oil and Gas Pipeline Systems.

As required by the BC Energy Regulator (Regulator) under Section 3 of the Pipeline Regulation (PR), every permit holder planning, designing, constructing, operating, maintaining or abandoning or reactivating pipeline infrastructure within the province of British Columbia must comply with CSA Z662, Annex A of CSA Z662 and must have a fully developed and implemented IMP (Pipeline Regulation Section 7). To facilitate compliance assurance, all permit holders must act in accordance with the most current version of the CSA Z662 standard.

Safety Culture

Safety culture is the shared values, attitudes, beliefs, and behaviors that leaders and individual personnel of an organization holds in regards to safety and risk, which may positively and negatively influence safety and environmental protection outcomes (as per NARWGSC 2016²). As per CSA Z662 Annex A Clause A.1, awareness and understanding of safety culture enables better anticipation and management of system hazards and risks. Safety culture and implementation of management systems such as integrity or safety and loss management are positively correlated with each other.

The Regulator has been working closely with the North American Regulators Working Group on Safety Culture (NARWGSC) since 2014 to explore ways of improving safety performance. A more efficient method to conduct a safety culture assessment is in combination with a safety management or integrity management audit. Therefore, the attributes of a strong safety culture have been incorporated within the compliance assurance process for IMPs.

A positive safety culture is indicated when an organization embraces the following twelve attributes (indicators):

1. Safety as a core value;
2. Leadership and management commitment to safety;
3. Goals and key performance indicators (KPIs) measurement;
4. Positive attitude towards legal and systems compliance (meeting and exceeding minimum standards);
5. Employees' training and competency;
6. Employees' empowerment and accountability;
7. Open and honest communication at all levels;
8. Systemic consideration of risk;

¹ CSA Z662, Oil & Gas Pipeline Systems, 2019

² NARWGSC, North American Regulators Working Group on Safety Culture: Safety Culture Indicators Research Project: A Regulatory Perspective, 2016.

9. Management changes when necessary;
10. Non-punitive reporting;
11. Learning from events; and
12. Continual improvement.

Compliance Assurance Process

The Regulator's compliance assurance protocol is based on CSA Z662 and the guidelines outlined in Annex N.1 and Annex A. The terminology used within this protocol is consistent with CSA Z662 and the Energy Resource Activities Act (ERAA) and subordinate regulations. Where there is a difference between definitions, the definitions in the ERAA and the subordinate regulations apply. The compliance assurance process for IMPs mandates that all pipeline permit holders regulated by the Regulator are required to participate in the IMP compliance assurance process. The Regulator can request pipeline permit holders to participate in an IMP compliance assurance process, in part or fully, at any time based on its risk-based selection criteria.

The Regulator's compliance assurance process for pipeline IMP is standardized and documented within this compliance assurance protocol. The process contains three phases as illustrated in Figure 1.

Permit Holder Self-Assessment

On a biannual basis, the Regulator requests that all permit holders complete and submit an IMP self-assessment. The self-assessment provides the Regulator with a snapshot of the permit holder's IMP that can be used to help inform audit scope, permit holder selection and industry trends. In addition, the self-assessment provides information to permit holders about the Regulator's expectations for IMP content and scope.

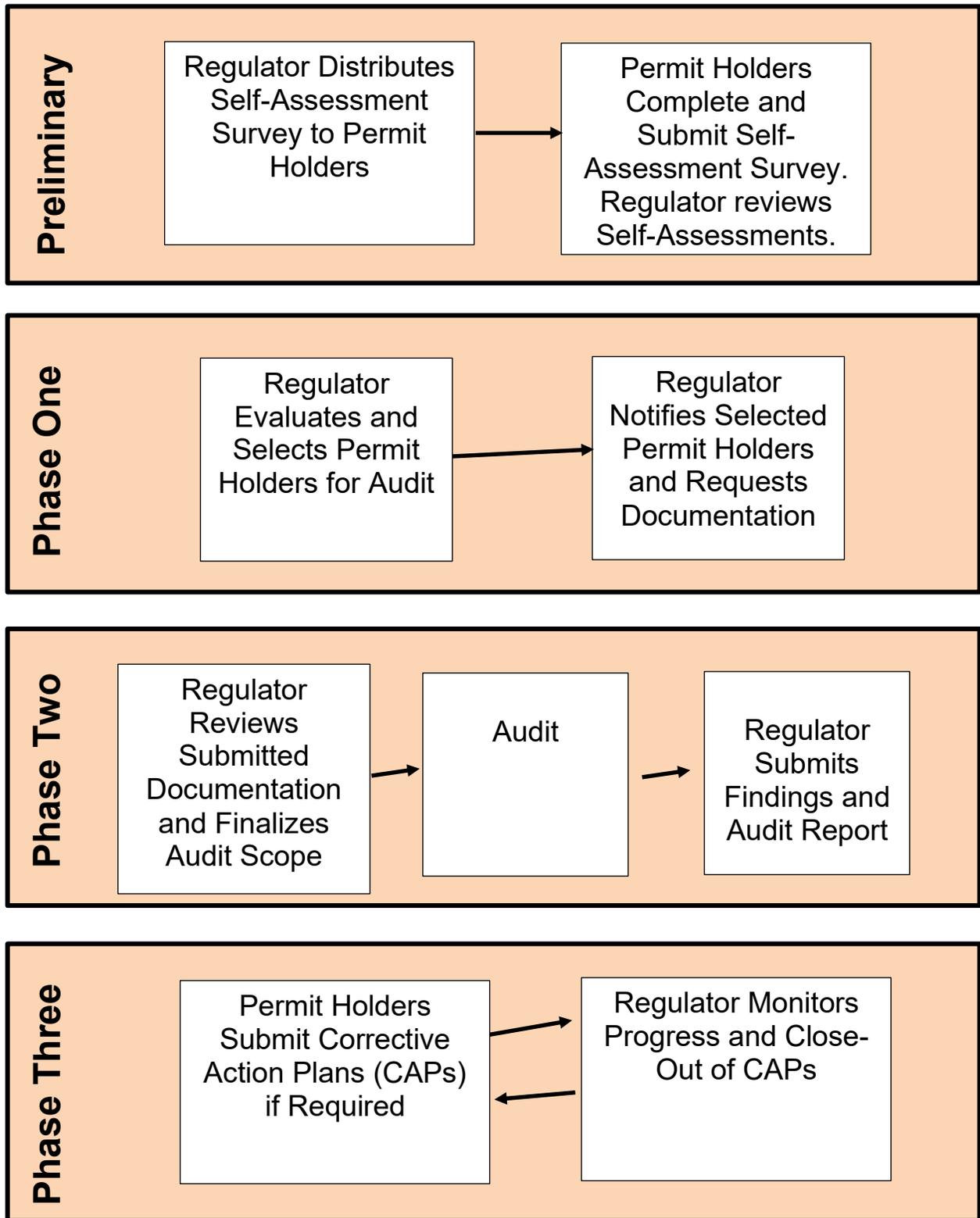
Phase One

Each year a number of pipeline permit holders are selected for audit based on the Regulator's criteria for permit holder selection. Permit holder selection is based on consideration of the following factors:

- Permit holders with active pipelines are eligible for selection.
- Permit holders with more than 700 km of active pipelines are audited every 5 years at a minimum.
- Permit holders with less than 700 km of active pipelines are audited every 7 years at a minimum.
- Additional audits may be scheduled based on changes in operations such as acquisitions of a significant number of new pipelines, incidents and permit holder compliance performance.
- Where possible, corporate entities that are managed under the same overarching IMP program will be audited together for efficiency.
- Where possible, pipeline and facility IMPs for the same permit holder will be audited together for efficiency.

The Regulator will notify all permit holders in Q1 of the calendar year that they have been selected for IMP audit and requests any records that are required to prepare for the audit. Permit holders are usually given 30 days to provide the requested records.

Figure 1 Compliance Assurance Process – Pipeline Integrity Management Program



Phase Two

The second phase of the assurance process involves an audit that the Regulator organizes with each of the selected permit holders. The scope and duration of the audit are selected based on previous audits, permit holder compliance history, the scale and risks associated with the permit holder's pipeline system and a review of submitted documentation. The audit scope will normally be as follows:

Baseline Audit: The baseline audit is the first IMP audit and will cover all required components of an IMP. The goal of this audit is to conduct a baseline assessment of the permit holder's IMP and to identify and address any significant gaps.

Primary Audit: The primary audit follows the baseline audit. The primary audit includes an in-depth review of the core components of an IMP:

- General IMP (scope)
- Risk Assessment
- Competency and Training
- Management of Change
- Operational Control
- Inspection, Maintenance and Monitoring (IMM)
- Evaluation of IMM Results
- Modification and Repair
- Incident Reporting

Secondary Audit: The secondary audit includes an in-depth review of the management system components of the IMP:

- Leadership Commitment
- Goals, Objectives and Targets
- Planning
- Organizational Roles and Responsibilities
- Communication
- Information Management
- Internal Audit
- Performance Measurement and Analysis of Data
- Management Review

The audit entails confirmation of audit scope, systematic review of processes, records, documents to verify compliance, and generation of audit findings. The findings include compliance and good practices along with their supporting evidence, areas where additional information may be required, opportunities for improvement, and observed non-compliances.

Findings for observed non-compliance are outlined and confirmed at the end of the audit. After the Audit, the Regulator issues the audit report that includes summary of findings relating to identified non-compliances to the permit holders.

Compliance and non-compliance are defined below:

Compliance (C)

A particular component fulfills the requirements outlined under the compliance assurance protocol. The permit holder has demonstrated that its IMP program, process or procedures meet the regulatory requirements.

Non-Compliance (NC)

A particular component does not fulfill the requirements outlined under the compliance assurance protocol. The permit holder has not demonstrated that its IMP program, process or procedures meet the regulatory requirements.

Depending on the criticality of the findings from the second phase of the process or independent of the annual IMP process, the Regulator may evaluate certain elements of a permit holder's pipeline IMP in further depth.

Phase Three

The third phase of the compliance assurance process requires permit holders to develop and implement corrective actions (any changes needed to programs, processes, procedures, or instructions) to address identified non-compliance findings and submit a corrective action plan (CAP) to the Regulator. A corrective action plan (CAP) must also outline a schedule for implementation. The Regulator will continue to monitor and assess corrective actions until they are fully resolved. The Regulator may arrange compliance verification activities to ensure that corrective actions defined within CAP have been proactively implemented.

The permit holders that do not provide the required documentation/records for any of the phases will be subject to the Regulator's compliance and enforcement actions, which can include orders or administrative penalties, as applicable.

The Regulator's compliance assurance protocol is maintained by the Integrity Division. For further information please contact integrityengineering@bc-er.ca.

Expectations and Requirements

All submissions made to the Regulator in support of an application or a regulatory requirement that include work relating to the practice of professional engineering or professional geoscience are expected to accord with the Professional Governance Act, [SBC 2018], c. 47 and the Bylaws of Engineers and Geoscientists British Columbia (EGBC). This includes any requirements relating to authentication of documents.

The Regulator's requirements and expectations for pipeline IMPs have been developed based on CSA Z662, particularly Annex N.1. They are aligned with management systems as per Annex A and cover the entire life cycle of pipeline systems. The five main components are further classified into 15 sub-components:

Planning
Leadership Commitment

- Scope
- Policy and Commitment
- Goals and Objectives
- Planning

Risk Assessment Management

- Process Knowledge and Information
- Hazard Identification
- Risk Assessment
- Risk Tolerance
- Risk Reduction and Management
- Risk Assessment Review and Update

Implementing

- Organizational Structure, Roles and Responsibilities
- Communication Process
- Training and Competency
- Information Management – Documents and Records Control
- Managing Change
- Operational Controls

Risk Management

- Inspection, Monitoring and Maintenance
- Evaluation and Fitness for Service Assessment
- Modification and Repair Documented in a Risk Assessment Report

Checking

Program Assessment and Evaluation

- Incident / Near-miss Investigation, and Learning
- Performance Measurement and Analysis of Data
- Audit

Act

Continuous Improvement

- Management Review

PLANNING

1. Leadership Commitment

1.1 General IMP

Pipeline system planning, design (including material procurement and selection) and construction (including installation, testing and commissioning) along with operations and maintenance have an impact on pipeline integrity. Permit holders shall develop, implement and maintain an integrity management program (IMP) that addresses the entire life cycle of the pipelines and associated assets, that is, planning, design, construction, operation, maintenance, and abandonment. The permit holder shall identify and ensure conformance with up-to-date regulatory and legal requirements, external standards and codes.

IMPs shall encompass all pipelines under the permit holder's authority that are regulated by the Regulator. IMPs must be documented in a suitable format and outline the scope clearly. The documented IMP shall provide reference to other relevant programs, such as, Facility Integrity Management Program, Emergency Response and Health, Environment and Safety as necessary. IMP documentation must be made available to the Regulator upon request.

Where a permit holder has contracted operation of a pipeline system to a third party, the permit holder's IMP must clarify whose IMP is applicable to those assets. The permit holder remains responsible for the integrity management of the entire pipeline system whether it self-operates or has contracted operation to a third party.

Regulatory References

- CSA Z662 – Clause 3 (3.1.2 f(v), 3.3)
- CSA Z662 – Annex N.1.1
- CSA Z662 – Annex A.2
- Pipeline Regulation

1.2 Policy and Leadership Commitment

The permit holder shall establish, implement and maintain a documented policy to demonstrate senior leadership (a person or a group of people who direct and control the highest level as defined by permit holder) commitment to the IMP program and its continual improvement.

The documented policy statement shall include the scope, commitment and overarching goals of the IMP and its continual improvement. The permit holder's policy shall consider its compliance obligations and their implications. The policy statement shall be communicated within the organization.

Regulatory References

- CSA Z662 – Clause 3 (3.1.2 a, 3.3)
- CSA Z662 – Annex (N.1.2) and Annex A (A.3)
- CSA Z662 – Annex A.2 (A.3)
- Pipeline Regulation

1.3 Goals, Objectives and Targets

The permit holder's senior management shall set goals, such as the prevention and control of incidents, to reflect the direction and desired outcomes of the policy. Additionally, the permit holder shall also define the objectives and targets for its IMP. The objectives and targets shall be measurable and must link to the high-level performance measures (key performance indicators).

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 h(i), 3.3)
- CSA Z662 – N.1.2
- Pipeline Regulation
- CSA Z662 – Annex A.3.1, A.3.2

1.4 Planning

The permit holder's management (a person or group of people, who directs or controls all or part of the department and has assigned responsibility and accountability for compliance with legal and other applicable requirements) shall ensure that:

- Processes and procedures are defined to support the execution of all the key components of the IMP,
- Resources (human and financial) are planned and provided to manage risk and to develop, implement, and continuously improve the IMP,
- A process to identify and ensure conformance with up to date regulatory and legal requirements, standards and code is defined,

- Methods for collection, integration and analysis of information related to the processes and mechanisms appropriate to the pipelines and operation are developed,
- Plans, processes and procedures are integrated to ensure that data and results are shared (internally and externally), across relevant elements, processes, and teams as required.

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 a, b, c, 3.3)
- CSA Z662 – A.3.2, A.4
- Pipeline Regulation

2. Risk Assessment and Management

The permit holder shall apply an ongoing risk assessment process that identifies hazards and quantifies risk, and analyses and implements appropriate risk reduction measures/controls to prevent, manage and mitigate identified hazards and risks. The permit holder shall ensure that the pipeline inventory data are gathered and integrated to support Risk Assessment. The permit holders must document and maintain an ongoing process for the identification and analysis of all possible hazards throughout the entire life cycle. The permit holder shall establish and implement a process for evaluating the risks associated with identified hazards (that is represented by probability/likelihood of occurrence of hazard and severity of resulting consequence).

The permit holder shall prioritize the pipelines/segments in order of risk level and be able to evaluate and implement risk reduction measures, where the chosen threshold of risk is exceeded.

2.1 Pipeline Description

The permit holder shall perform initial collection, review, integration of relevant data and information from pipeline design, construction, operation, maintenance, patrolling, and failure investigation to support the risk assessment. A plan for collecting historical data shall be established and maintained.

A complete description of the permit holder's pipelines and associated assets, regulated by the Regulator, must be developed for the IMP. The pipeline description to characterize the segments shall consider the inclusion of, but is not limited to:

- A general description of the pipeline including its age, purpose, capacity and class location
- Dimensions and material characteristics of the pipeline, the types of coating and the location and function of any ancillary equipment
- An estimate of the condition of the pipeline, its coatings and any ancillary equipment
- The operating conditions of the pipeline, including service fluids, operating pressure and temperature range
- Physical surroundings along the pipeline route
- Physical boundaries of the pipeline system

2.2 Hazard Identification

The permit holder shall have a documented and maintained process to identify and review potential hazards that can lead to failure or external interference incidents at each life cycle stage (that is planning, design, construction, operation and maintenance and abandonment). The hazards shall be regularly identified.

The hazards to be taken into consideration in the IMP shall include factors in the list below, or other factors as suggested in ASME B31.8S Managing System Integrity of Gas Pipelines and CSA Z662 - Annex H:

- Material loss
- Cracking
- Material degradation
- External interference
- Material, or manufacturing
- Construction
- Geotechnical event (for example, wash-out, freeze-thaw, earthquake, slope movement, soil subsidence, construction or undermining, or other)
- Equipment failure
- Other causes (for example, improper operations, control system malfunction, and overpressure)

2.2.1 Risk Analysis and Evaluation

- The permit holder shall choose the appropriate risk analysis method to estimate probability of occurrence of hazardous events and the severity of resulting consequences.
- The permit holder shall also select the appropriate method for risk estimation and risk evaluation.
- The level of acceptable risk, threshold for risk analysis refinement and risk reduction must be defined.
- The permit holder shall consider how the results of risk assessment will be used for supporting decisions.

2.2.2 Risk Reduction and Control

The permit holder shall prioritize the pipelines/segments in order of risk level and shall implement an effective process for identifying and evaluating the available risk reduction options (CSA Z662 – Clause N.1.10) to prevent, manage, and mitigate risks where the chosen threshold of risk is exceeded.

2.2.3 Reassessment

Risk reassessment shall be carried out on a regular basis or on a specific timeline. Additionally risk reassessment shall be carried out:

- After risk reduction options are selected to ensure the risk is reduced to an acceptable level;
- When design and operation of the system changes;
- When pipeline environment changes;
- In response to incident investigation or mitigation failure; and
- When significant risk is determined in the risk evaluation process, the permit holder shall:
 - Perform a more refined level of risk analysis in an attempt to reduce the possibility of risk level overestimation. Risk analysis refinement should include, but is not limited to the following:
 - Selection of a more rigorous approach for the analyses and estimates
 - Additional observations and analysis of the operating conditions
 - Inspections to provide more accurate and detailed information about the presence, location and severity of identified hazards or imperfections

2.2.4 Risk Reporting

The data, methods, assumptions, limitations, rationale used, conclusions and recommendations, and the personnel responsible for risk assessment shall be documented.

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 f (i), 3.2, 3.3)
- CSA Z662 –Annex N (N.1.4, N.1.8, N.1.9)
- CSA Z662 – A (A.7.3)
- Pipeline Regulation

Guidance

- CSA Z662 – Annex B

IMPLEMENTATION

3. Organizational Roles and Responsibilities

The permit holder shall document and keep current the assignment of roles and responsibilities associated with the development, implementation and maintenance of the IMP.

- The permit holder shall have an organizational structure that identifies the positions responsible for each and all aspects of the IMP.
- The organizational structure shall define and communicate the roles, responsibilities and authorities of positions identified relevant to the IMP.
- The permit holder shall appoint a management representative who is responsible for the overall IMP development, implementation, and maintenance.

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 b, 3.3)
- CSA Z662 – N (N. 1.3)
- CSA Z662 – A (A.3.3, A.4.3, A.4.4)
- Pipeline Regulation

4. Communication Process

A permit holder shall establish and implement an effective process for internal and external communication to coordinate information essential to the IMP. The permit holder shall promote cross-functional and interdepartmental communication for decision, analysis and reviews. The communication process should consider what, when, who and whom to communicate. The permit holder's communication can include public awareness programs, communication with external and internal stakeholders, emergency response plans and reporting on performance of the IMP. Permit holders shall evaluate the effectiveness of their communication process.

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 d, 3.3)
- CSA Z662 – A (A.5)
- Pipeline Regulation

5. Training and Competency

The permit holder shall assess and document the training and competency requirements for its employees to ensure appropriate knowledge and skills for performing the IMP activities for which they are responsible. Training schedules and frequency must be maintained. The permit holder shall establish, implement and evaluate a process for verifying that employees of the permit holder are competent to perform their duties in a safe manner. Methods for collection and maintenance of training records must be clearly documented.

The permit holder shall have a process in place to evaluate and select contractors on the basis of ability and qualifications to perform specified duties. The evaluation process should include review of safety and environmental policies, procedures, past performance, ability and qualification check through audits, work-site inspections, and observations of performance as appropriate.

The permit holder shall also have a process in place to ensure that the performance requirements and expectations are defined and communicated to the contractor.

The permit holder shall have a process in place to monitor and assess the contractor's performance, provide feedback and ensure that identified deficiencies are resolved.

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 c, 3.3, 3.4.2 a,b)
- CSA Z662 – N (N. 1.7)
- CSA Z662 – A (A.4.2)
- Pipeline Regulation

5.1 Managing Change

The permit holder shall develop and implement a systemic process to ensure that prior to implementation, changes that may impact the integrity to the pipeline system at any life cycle phase are evaluated, controlled and documented for their potential risk impacts. This shall include the changes that are initiated and controlled by the operating company and also those that are not initiated and controlled by the permit holders. Changes resulting from actions for mitigation of risk or to correct non-conformance shall be appropriately evaluated and documented by the permit holder.

The changes that are initiated and controlled by the permit holder may relate to:

- Piping and control system
- System operating status
- Operating conditions

- Service fluid characteristics
- Records related to pipeline system integrity management
- Ownership of the pipeline system
- Organization and personnel
- Methods, practices and procedures

Changes that are initiated and controlled by external stakeholders may include

- Technical standards and regulation
- Environmental factors, such as, flood, fire, ground movement, if changes to the pipeline must be made to account for these factors
- Adjacent land use and development
- Legal requirements related to IMP

Not all changes are managed using the same procedure/process and therefore do not necessarily reside in the IMP. Appropriate processes, such as Management of Change (MOC), shall be developed and implemented and the scope of the MOC process shall be clearly defined. The primary focus of MOC shall be to manage risks related to proposed changes.

The MOC process shall address and document:

- Identification process for anticipated and actual changes
- Reasons for change
- Responsibilities and authorities for approving and implementing changes
- Analysis of implications of the changes
- Impact and risk of the changes
- Communication method and associated records and documents
- Timing of changes (approval and implementation)
- Close out

Programs or processes used by the permit holder outside of IMP shall be appropriately referenced. For a change to be “replacement in kind” it should meet the original technical specifications of the pipeline or equipment.

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 g, 3.3, 3.4)
- CSA Z662 – N (N. 1.6)
- CSA Z662 – A (A.8)
- Pipeline Regulation

6. Information Management Documents and Records Control

The permit holder shall establish and implement information and knowledge management process related to its IMP. The permit holder shall prepare and manage documents and records related to pipeline design, construction, commissioning, operation, maintenance and abandonment that are needed for performing the activities included in the IMP.

6.1 Document Control

The permit holder shall document and implement a process for the identification, collection, control, review, revision, distribution, and approval of documents within its IMP. This process must include the responsibilities associated with document control and the location, for both electronic and paper-based copy, of all identified documents. The permit holder must also ensure that its documents within its IMP are legible and retrievable.

6.1.1 Record Control

The permit holder shall establish, implement and maintain a records management program encompassing the creation, security, updating, retention, retrieval and deletion of all information and records necessary for the implementation of IMP. It must apply to electronic and paper-based records. Permit holders are required to maintain all records as required within Annex N and within the broader context of CSA Z662.

The procedure shall consider:

- Responsibilities and procedures for the creation, updating, retention and deletion of records;
- Retrieval of records related to a particular pipeline location or segment;
- Evidence of past activities, events, changes, analyses and decisions; and
- Index describing the types, forms and locations of records.

Where records are incomplete due to asset transfers or other reasons, the permit holder should acknowledge this in their self-assessment and provide information on how the IMP manages in the absence of these records as well as what reasonable actions are taken to recover, reproduce or revalidate the needed records. Retention period of records must be developed and implemented in accordance with operational, legal, and regulatory requirements.

As a minimum, the following items shall be included:

Design, Construction and Commissioning

- Survey and route, including location of the pipeline system with respect to crossings, land use and structures
- Class locations
- Design basis and calculation of the pipeline system or segments of the pipeline system, including limits on pressure, temperature, loading, and other operating conditions
- Design changes and approvals
- Material specifications and certification for the pipe, components, bolting and coating materials (material test reports)
- Inspection and test certifications and reports (joining and inspection records, coating and inspection records, inspection of terrain, soil type, backfill material, and depth of cover)
- Pressure test records and summary
- Permit to operate
- Changes, events and non-conformance during design, construction and commissioning

Operational and maintenance details

- Historical IMP plans
- Changes (operating conditions, procedures, maps, drawings, plans)
- Cathodic protection system design and performance
- Inspection, testing and monitoring records (pigging, internal corrosion control record, device control, ILIs, leak detection, P/L surveillance, geotechnical and post-seismic inspection)
- Emergency response
- Evaluation of testing and inspection
- Repair and modification

- Incidents and failure records and investigation

Abandonment

- Records of deactivation
- Records of maintenance of deactivated pipelines
- Records of abandonment
- Records of disposal of records for abandoned pipelines

IMP records

- Management review
- Training and competency records,
- Approved suppliers and contractors
- Non-conformance reports
- Internal and external audits
- IMP performance analysis

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 e, 3.3)
- CSA Z662 – N (N.1.1, N.1.3, N.1.4, N. 1.5)
- CSA Z662 – A (A.6)
- Pipeline Regulation

7. Operational Controls

The permit holder shall establish controls to ensure integrity is not compromised during design, procurement, construction, commissioning, operation and abandonment phases.

The permit holder shall establish and maintain procedures for quality control for materials and construction; manufacturing and construction inspections; and operational and maintenance activities of its pipeline system for normal operations. Operational conditions must be monitored to detect and assess any changes (such as pressure cycles, overpressure, and over temperature).

Permit holders shall also develop and implement procedures to record and identify deviations and upset operating conditions and to determine any immediate or long term implications. The permit holder must also develop and implement contingency plans for such situations.

The permit holder shall establish controls to prevent, manage and mitigate risks and develop plans and schedules for pipeline IMP-related activities which must align with risk assessment results. The method and rationale for prioritization of IMP-related activities must be documented. The planning of integrity management activities shall be reviewed and tracked to 1) verify proper completion as per methods and procedures, 2) verify changes in planned activities are reviewed and approved, 3) identify incomplete work and unresolved issues, 4) develop recommendations and plans for future work, and 5) verify that the relevant records were created and revised.

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 f, 3.2, 3.3)
- CSA Z662 – N (N. 1.11)
- CSA Z662 – A (A.7.1, A. 7.2, A.7.4, A.7.6, A.7.7)
- Pipeline Regulation

8. Inspection, Monitoring and Maintenance

The permit holder shall establish and implement the methods and procedures of inspections, maintenance and monitoring (IMM) in accordance with clauses 9 and 10, and as appropriate clause 12.

Planning, scheduling, and frequency of IMM activities should consider parameters such as risk assessment results, effectiveness of inspection method and technology, previous integrity reviews, incident history, and current condition. The permit holder shall document schedules and ensure that the planned activities are carried out using relevant methods and procedures, and that incomplete work and issues are resolved. The Permit Holder's records must provide details of actual IMM activities that have been performed versus planned, and future IMM activities schedules are planned accordingly.

The permit holder shall ensure that results of the IMM activities are integrated to its risk assessment and overall continual improvement process.

Consideration shall be given to:

- Cathodic protection (CP) systems;
- Internal corrosion mitigation, monitoring systems and devices based on susceptibility to internal corrosion;
- Leak detection methods and devices;
- Shutdown devices and systems;
- Pressure-control, pressure-limiting and pressure-relieving systems;
- Size, location and operational position of pipeline system valves;
- Pipeline system patrolling;
- Inspection for geotechnical issues where applicable;
- Inspection for seismic impacts where applicable;
- Inspection of exposed piping for corrosion and other types of imperfections;
- Indirect methods (ILIs to detect internal and external corrosion, dents, cracks, and close interval surveys for CP performance); and
- Direct assessments.

Records of IMM activities must be maintained.

Regulatory References

- CSA Z662 - Clauses 3, (3.1.2 f, 3.2, 3.3), 9, 10, 12
- CSA Z662 – N (N. 1.12)
- CSA Z662 – A (A.7.3, A.7.7)
- Pipeline Regulation

8.1 Evaluation of Inspection, Maintenance, and Monitoring Results

When the IMM activities results indicate the presence of conditions or imperfections that might lead to failure, the permit holder shall:

- Conduct an engineering assessment as per Clause 10.3.2.1, or
- Take corrective actions as per Clause 10.3.2.3.

The permit holder shall use detailed visual inspection, mechanical measurement, and non-destructive inspection (as appropriate) as per CSA Z662 Clause 10.10 of CSA Z662.

The permit holder shall document and implement a process for conducting engineering assessments which appropriately and effectively supports decisions for the evaluation of conditions and imperfections, and for the initiation of mitigations and repair.

Regulatory References

- CSA Z662 - Clauses 3 (3.2, 3.3, 3.4), 10
- CSA Z662 – N (N. 1.13)
- CSA Z662 – A (A.7.9)
- Pipeline Regulation

8.2 Evaluation of Inspection, Maintenance, and Monitoring Results

The permit holder shall document and maintain procedures to modify or repair conditions or imperfections that could cause failure or damage with significant consequences. Records for mitigation and repair must be maintained.

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 g, h (vi)), 10
- CSA Z662 – N (N. 1.14)
- CSA Z662 – Annex A (A.7.2, A.8, A.9.6)
- Pipeline Regulation

CHECKING

9. Program Assessment and Evaluation

9.1 Incident Reporting, Investigation and Learning

The permit holder shall document and implement its process to report, collect, investigate and trend any internal hazards, potential hazards, incidents or near misses, and incidents affecting or having the potential to affect the integrity of the pipelines. The process shall also include communication of any findings, actions and follow up on recommendations. The permit holder shall establish, implement and maintain a process for incorporating lessons learned from incidents and near-misses within the organization and from across industry where warranted, into standards, procedures, and processes to mitigate systemic development of similar circumstances and to improve the effectiveness of the IMP. Records of investigations shall be maintained and communicated as necessary.

In addition, any mitigation/repair corrections resulting from near misses and incidents that are applied locally shall be reviewed for applicability to a broader scope (either geographically or by pipeline type).

- Failure incidents shall be addressed in accordance with the requirements specified as per the latest edition of CSA Z662 (Annex H).

Regulatory References

- CSA Z662 - Clause 3, (3.1.2 h (ii, iii, vi))
- CSA Z662 – Annex H
- CSA Z662 – N (N. 16)
- CSA Z662 – A (A.3.3)
- Pipeline Regulation

10. Audit

The permit holder shall develop and implement a process for auditing to determine conformity with the standard and prescribed requirements under the IMP. A permit holder's process must define the responsibilities, scope, objectives, frequency, and schedule for audits. The process shall also ensure auditor competency and independence. An audit may be performed by external professionals or internal personnel not directly involved in the IMP or the operations being audited. The process for completing corrective and preventive actions for non-conformances identified through audits and communication of lessons learnt shall be outlined.

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 h (v))
- CSA Z662 – N (N. 1.15.3, N.1.15.4)
- CSA Z662 – A (A.9.5, A.9.6)
- Pipeline Regulation

11. Performance Measurement and Analysis of Data

The permit holder's management shall develop key performance indicators (KPIs) for implementing its goals and objectives and for evaluating the performance of its integrity management program. The permit holder may follow the guiding principles outlined in API RP 754³ for developing leading and lagging performance metrics (KPIs).

The permit holder shall establish and maintain a process for identification collection and analysis of data generated from operations, maintenance, integrity management, audits, and management review. The permit holder shall periodically review, evaluate, and trend KPIs to measure and analyze performance of pipeline IMP. The permit holder shall take corrective actions when adverse trends are identified and shall update KPIs as required.

The performance review through KPIs should also link to the management review process.

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 h (iv))
- CSA Z662 – N (N. 1.15.2)
- CSA Z662 – A (A.9.1, 9.4, A.9.5)
- Pipeline Regulation

³ API Recommended Practice 754

12 Act – Management Review

The permit holder shall establish and implement a regular management review process to determine the adequacy, implementation and effectiveness of its integrity management program. The management shall, periodically review the performance of the integrity management program to evaluate where the goals and objectives have been met, where Management is a person or group of people who directs or controls all or part of the pipelines and has assigned responsibility and accountability for compliance with legal and other applicable requirements. The management review process must define the inputs, review methods, and responsibilities. Focus shall be on evaluating, adequacy and effectiveness of the IMP to meet its stated goals and targets (through review of performance indicators), implementation of the IMP, compliance to company and regulatory requirements, and identification of corrective actions for continual improvement.

For inputs, consideration shall be given to the following:

- Goals and objectives
- Effects of changes in the operating company, pipelines, and/or external factors
- Results of the risk management process
- Findings, status, and trends of corrective actions identified during internal and external audits
- Status and trends of integrity performance indicators related to the frequency and consequences of external interference incidents and failure incidents, and the completion of integrity-related work
- Status and trends of integrity-related issues and recommendations identified during previous review and evaluations, operation, maintenance, or integrity-related work
- Root causes of recent failure incidents
- Successes and problems experienced in detecting and preventing potential failure incidents

Outputs from the management review shall consider the following:

- Summary of assessment of the effectiveness of IMP and risk management process
- Decisions and actions
- Changes to required resources, and
- Improvements to processes and procedures to meet the requirements

Senior leadership (a person or a group of people who direct and control the highest level as defined by permit holder) shall at least annually review and approve the output of management reviews, which shall be documented.

Regulatory References

- CSA Z662 - Clause 3 (3.1.2 h (vii))
- CSA Z662 – N (N. 1.15.1)
- CSA Z662 – A (A.9.7)
- Pipeline Regulation