Canada Energy Regulator

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Final Audit Report

PKM Cochin ULC

Topic: Control Room Management

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Canada

Executive Summary

The Canada Energy Regulator (**CER**) expects pipelines and associated facilities within the Government of Canada's jurisdiction to be constructed, operated, and abandoned in a safe and secure manner that protects people, property, and the environment. To this end, the CER conducts a variety of compliance oversight activities, such as audits.

Section 103 of the *Canadian Energy Regulator Act* (S.C. 2019, c.28, s.10) (**CER Act**) authorizes inspection officers to conduct audits of regulated companies. The purpose of these audits is to assess compliance with the CER Act and its associated Regulations.

The purpose of operational audits is to ensure that regulated companies have established and implemented both a management system and its associated programs, as specified in the *Canadian Energy Regulator Onshore Pipeline Regulations* (SOR/99-294) (**OPR**).

The CER conducted an audit of PKM Cochin ULC (**the company**) between 24 August 2023 and 13 December 2023. The topic of the audit was Control Room Management**.**

The objectives of this audit were to:

- verify that the company has developed and implemented a pipeline control system and leak detection system in accordance with the requirements of the OPR and the Canadian Standards Association Standard Z662: 2019, Oil and gas pipeline systems (**CSA Z662:23**) and verify that the control room operation and maintenance processes are effectively integrated within the company's management system.

The scope of the audit included the personnel, processes and activities used to operate and control the liquid pipeline control system and leak detection system. The scope applied to normal and abnormal operating conditions, including emergency shut down in place at the time of the audit and looking back for up to six months to verify that they were compliant with relevant sections of the OPR and CSA Z662:23.

The CER conducted the audit using the 21 audit protocols attached in Appendix 1 of this report, which are focused on control room management. The CER assessed whether the company's documentation, processes, and activities complied with legal and other requirements under the CER's authority.

Of 21 audit protocols; 20 were deemed no issues identified. One was deemed non-compliant.

Within 30 calendar days of receiving the Final Audit Report, the company shall file with the CER a Corrective and Preventive Action (**CAPA**) Plan that outlines how the non-compliant findings will be resolved. The CER will monitor and assess the implementation of this CAPA Plan to confirm that it is completed in a timely manner.

Note that all findings are specific to the information assessed at the time of the audit as related to the audit scope.

While one non-compliant finding exists, the CER finds that the company can still construct, operate, and abandon pipelines in a manner that will preserve the safety of persons, the environment, and property.

The Final Audit Report will be made public on the CER website.

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1.0   Background

1.1   Introduction

The CER expects pipelines and associated facilities within the Government of Canada's jurisdiction to be constructed, operated, and abandoned in a safe and secure manner that protects people, property, and the environment.

Section 103 of the CER Act authorizes inspection officers to conduct audits of regulated companies. The purpose of these audits is to assess compliance with the CER Act and its associated Regulations.

The purpose of operational audits is to ensure that regulated companies have established and implemented both a management system and its associated programs, as specified in the OPR.

The CER conducted an audit of the company between 24 August 2023 and 13 December 2023. The topic of the audit was Control Room Management**.**

1.2   Description of Audit Topic

For CER-regulated entities that operate pipeline control rooms, the OPR requires them to develop and implement a pipeline control system and a leak detection system as part of their management system. A carefully designed and well-implemented management system reflects a company's commitment to continual improvement in safety and environmental protection throughout the full lifecycle of its facilities. It also supports a culture of safety and is fundamental to keeping people safe and protecting the environment. The control systems and leak detection systems must also meet the requirements of the CSA Z662:23 and reflect the level of complexity of the pipeline, the pipeline operation, and the products transported.

For the purposes of this audit, the CER's expectations include, but are not limited to the company having established and implemented:
- an effective organizational structure, competency and training requirements, and training programs and processes to identify and communicate roles, responsibilities, and authorities, and to verify the competency of workers;
- control room operation and maintenance manuals designed to ensure that the pipeline is operated safely, efficiently, and in a manner that protects people and the environment;
- a process for the internal reporting, analysis, and investigation of hazards, potential hazards, incidents, and near-misses reported through the control centre, and for taking corrective and preventive measures, including measures to manage imminent threats; and
- quality assurance measures, including audits and inspections, to ensure that the pipeline control system is being effectively operated and maintained and that personnel are carrying out their duties in accordance with company requirements in a competent manner.

1.3   Company Overview

PKM Cochin ULC's pipeline system consists of approximately 1,000 km of pipeline and 10 pump stations. The Canadian portion of the pipeline currently moves approximately 100,000 barrels per day of condensate from Elmore, Saskatchewan to Fort Saskatchewan, Alberta (Figure 1).

The Cochin pipeline has been operating since 1979 under various owners. Originally, the pipeline moved propane eastward from Fort Saskatchewan to Windsor, Ontario. In July 2014, the direction of flow was reversed to transport condensate westbound. Pembina Pipeline Corporation acquired the Cochin pipeline in

December 2019. Pembina Pipeline Corporation now operates the pipeline as a subsidiary named PKM Cochin ULC, under the Certificate of Public Convenience and Necessity OC-29.

The map below depicts the company's CER-regulated assets.
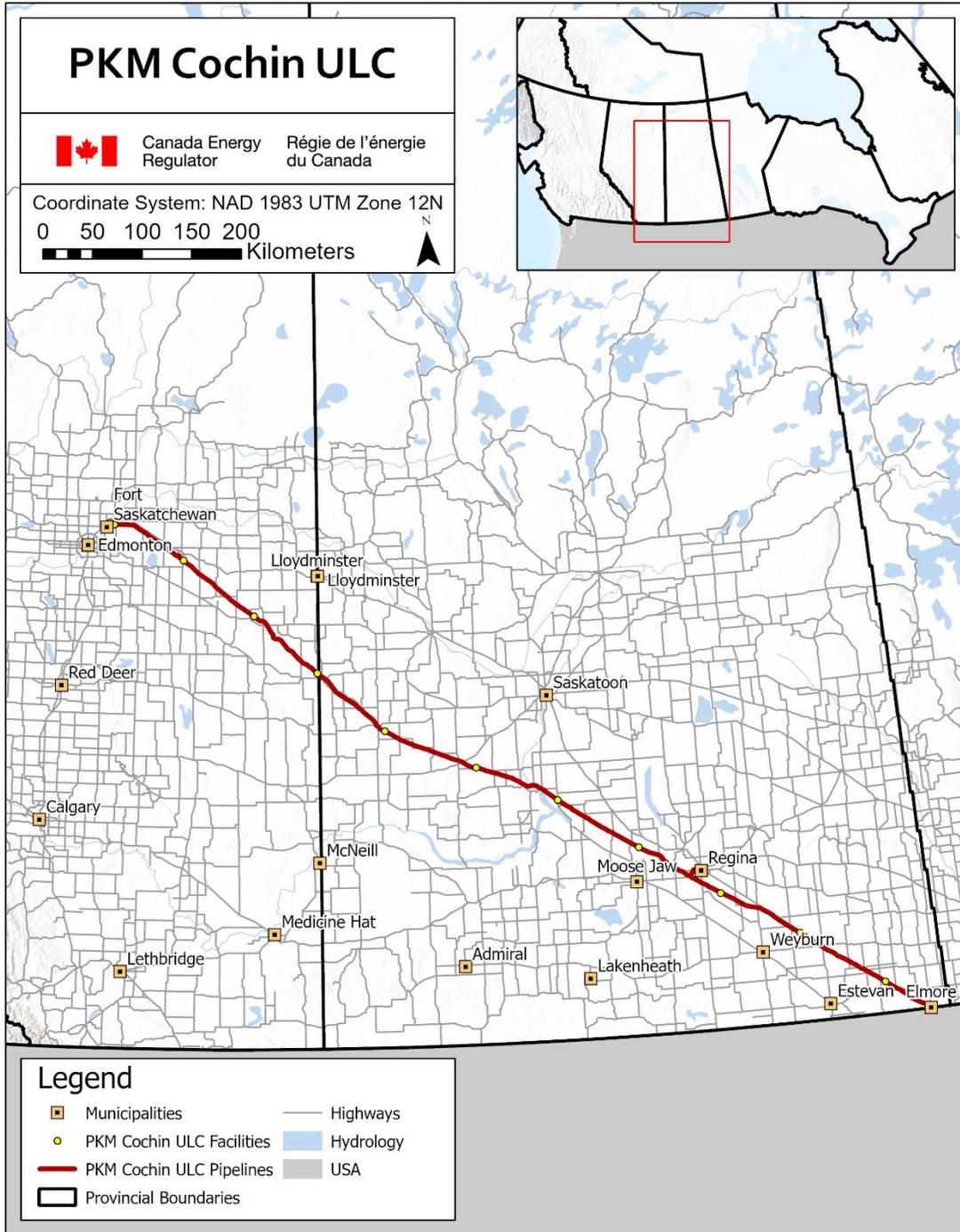
Figure 1. Map of PKM Cochin ULC regulated assets

2.0   Objectives and Scope

The objectives of this audit are to:

- verify that the company has developed and implemented a pipeline control system and leak detection system in accordance with the requirements of the OPR and CSA Z662:23 and verify that the control room operation and maintenance processes are effectively integrated within the company's management system.

The table below outlines the scope selected for this audit which included the personnel, processes and activities used to operate and control the liquid pipeline control system and leak detection system. The scope applied to normal and abnormal operating conditions, including emergency shut down, as in place at the time of the audit and looking back for up to six months to verify that they were compliant with the relevant sections of the OPR and CSA Z662:23.

Table 1. Audit Scope

Audit Scope	Details
Audit Topic	Control Room Management
Lifecycle Phases	☐ Construction ☒ Operations ☐ Abandonment
Section 55 Programs	☐ Emergency Management ☒ Integrity Management ☐ Safety Management ☐ Security Management ☐ Environmental Protection ☐ Damage Prevention
Time Frame	Up to six (6) months prior to the start of the audit.

3.0   Methodology

The auditors assessed compliance through:
- document reviews;
- record sampling;
- interviews; and
- a control room tour.

The list of documents reviewed, records sampled, and the list of interviewees are retained on file with the CER.

An audit notification letter was sent to the company on 24 August 2023 advising the company of the CER's plans to conduct an operational audit. The lead auditor provided the audit protocol and initial information request to the company on 28 August 2023 and met with the company staff to discuss the plans and schedule for the audit. Document review began on 5 October 2023 and interviews were conducted between 6 November 2023 and 14 November 2023.

In accordance with the established CER audit process, the lead auditor shared a pre-closeout summary of the audit results on 1 December 2023. At that time, the company was given five business days to provide any additional documents or records to help resolve the identified gaps in information or compliance. Subsequent to the pre-closeout meeting, the company provided additional information to assist the lead auditor in making their final assessment of compliance. The lead auditor conducted a final close-out meeting with the company on 13 December 2023.

4.0   Summary of Findings

The lead auditor has assigned a finding to each audit protocol. A finding can be either:
- No issues identified – No non-compliances were identified during the audit, based on the information provided by the company, and reviewed by the auditor within the context of the audit scope; or
- Non-compliant – The company has not demonstrated that it has met the legal requirements. A corrective and preventive action plan shall be developed and implemented to resolve the deficiency.

All findings are specific to the information assessed at the time of the audit, as related to the audit scope.

The table below summarizes the findings. See Appendix 1: Audit Assessment for more information. Of the 21 protocol items that were assessed in Appendix 1, the CER auditors found that 20 met the expected outcomes.

Table 2. Summary of Findings

Audit Protocol (AP) Number	Regulation	Regulatory Reference	Topic	Finding Status	Finding Summary
AP-01	OPR	6.3(1)	Policy and Commitment Statements	No issues identified	The *Health, Safety & Environmental Policy* includes content related to the prevention of ruptures, releases, fatalities, injuries, and for the response to incidents and emergency situations.
AP-02	OPR	6.5(1)(d)	Hazard Identification	No issues identified	The *OMS Risk Register* lists hazard and potential hazards relevant to the control room.

Audit Protocol (AP) Number	Regulation	Regulatory Reference	Topic	Finding Status	Finding Summary
AP-03	OPR	6.5(1)(e)	Risk Assessment	No issues identified	The company has demonstrated that it has a process which evaluates the risks associated with the hazards and potential hazards that are relevant to the control room and meets the requirements of paragraph 6.5(1)(e) of the OPR.
AP-04	OPR	6.5(1)(f)	Controls	No issues identified	The company has demonstrated that it has a process for developing and implementing controls to address the risks associated with the hazards and potential hazards that are relevant to the control room and meets the requirements of paragraph 6.5(1)(f) of the OPR.
AP-05	OPR	6.5(1)(a)	Goals, Targets and Objectives	No issues identified	The company has demonstrated that it has a process for setting objectives and targets that are relevant to the control room, reviews them annually, and meets the requirements of paragraph 6.5(1)(a) of the OPR.
AP-06	OPR	6.4	Organizational Structure, Roles, and Responsibilities	No issues identified	The company has demonstrated that it has a documented organizational structure for the control room and that it conducts an annual evaluation of need for the operations of the control room including such things as leak detection. The company meets the requirements of sub-section 6.4 of the OPR.

Audit Protocol (AP) Number	Regulation	Regulatory Reference	Topic	Finding Status	Finding Summary
AP-07	OPR	6.5(1)(q)	Operational Control	No issues identified	The company coordinates and controls operational activities using numerous documents including the *Pipeline Control Management Process*, the *CER Operations and Maintenance Manual*, and various shift handover procedures.
AP-08	OPR	27	Operating & Maintenance Manuals	No issues identified	The *CER Operations and Maintenance Manual*, the *Pipeline Control Management Process*, and the various procedures provide information to promote safety, environmental protection and efficiency in the operation of the pipeline.
AP-09	OPR	37(c)	Pipeline Control System Leak Detection System	No issues identified	The *Leak Detection Program* and *Leak Detection Manual* reflect the complexity of the pipeline operations, the products exported, and align with the requirements of CSA Z662:23.
AP-10	OPR	37(b)	Pipeline Control System Data Recording System	No issues identified	The company produced records of historical pipeline operation data, messages, and alarms from its pipeline control system.
AP-11	OPR	6.5(1)(r)	Investigation of Incidents, Near Misses, and Non-compliances	No issues identified	The *Incident Reporting, Investigation and Analysis Standard*, together with examples of control-room-related reporting demonstrate that the process is established and implemented.

Audit Protocol (AP) Number	Regulation	Regulatory Reference	Topic	Finding Status	Finding Summary
AP-12	OPR	32(1.1)	Emergency Procedures Manual	Non-compliant	While the company has developed an emergency procedures manual, several components within the manual have not been updated for over four years.
AP-13	CSA Z662:23	E.4.2.1	Analysis of Leak Alarms	No issues identified	The company provided records to demonstrate that leak alarms are analyzed. Interviews indicate that all alarms are assessed, and no alarm is declared invalid without an assessment.
AP-14	CSA Z662:23	E.5.2.1	Safe Shut Down of Pipeline in an Emergency	No issues identified	Imbalance response protocols, emergency response plans, and emergency operating guides all work together to allow for the safe control or shutdown of a pipeline system, and safety procedures for personnel at emergency sites.
AP-15	OPR	6.5(1)(j)	Define Competency and Training Requirements	No issues identified	The *Training, Mentorship & Qualifications (TMQ) for Operations Standard*, and the *TMQ Competency Library (SPCC)* outline the training and competency process for the control room staff.
AP-16	OPR	6.5(1)(k)	Verify Competency and Training	No issues identified	The *Training, Mentorship, and Qualification (TMQ) for Operations Standard* outlines the process to verify training and competency of staff. The role of shift lead and technical lead is to supervise and support the control room operators, ensuring safe operations.
AP-17	OPR	56(b)	Annual Training Program Report	No issues identified	The *Team Training Operations Report May2023* compares planned training to the actual training completed.

Audit Protocol (AP) Number	Regulation	Regulatory Reference	Topic	Finding Status	Finding Summary
AP-18	OPR	55	Control Room Audits	No issues identified	The company conducted an operations and maintenance program audit in July 2023 which included the pipeline control system. This audit noted deficiencies and associated corrective actions.
AP-19	CSA Z662:23	E.9	Audits of Leak Detection System	No issues identified	The company conducted an operations and maintenance program audit in July 2023 which included the leak detection system. This audit contained all of the content required by Clause E.9.
AP-20	OPR	6.5(1)(x)	Annual Management Review	No issues identified	The *OMS Management Review Standard* outlines the process for conducting an annual management system performance review. Two annual reports were provided, demonstrating implementation of this process.
AP-21	OPR	37(a)	Pipeline Control System	No issues identified	The Pipeline Control Management Process describes the pipeline control system including the facilities and procedures used to control and monitor the operation of the pipeline. Implementation was verified via a control room tour and interviews with staff.

5.0   Discussion

Effective Control Room Management is an important component of operations that helps regulated companies ensure the safety of people, property, and the environment. Control rooms monitor a variety of parameters across the pipelines, such as flow rates, pressure, and temperature readings, and are often the first line of defence in locating and responding to abnormalities. Auditing Control Room Management practices is a proactive method to identify what is working well and what needs improvement.

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Overall, PKM Cochin ULC performed well in this audit. The control room itself, along with the associated processes are well organized, well designed, and incorporate many principles related to human organizational factors. Multiple redundancies have been built into the system to account for a variety of scenarios while preserving safe operation of the pipeline.

6.0   Next Steps

The company is required to resolve all non-compliant findings through the implementation of a CAPA plan. The next steps of the audit process are as follows:
- Within 30 calendar days of receiving the Final Audit Report, the company shall file with the CER, a CAPA plan that outlines how the non-compliant findings will be resolved.
- The CER will monitor and assess the implementation of the CAPA Plan to confirm that it is completed:
  - on a timely basis; and
  - in a safe and secure manner that protects people, property, and the environment.
- Once implementation is completed, the CER will issue an audit close-out letter.

7.0   Conclusion

In summary, the CER conducted an operational audit of PKM Cochin ULC. The topic of the audit was Control Room Management. Out of a total of 21 audit protocols, 20 were classified as no issues identified, resulting in an audit score of 95 percent.

PKM Cochin ULC is expected to resolve these deficiencies through the implementation of a CAPA Plan. The CER will monitor and assess the implementation of this CAPA Plan and issue an audit close-out letter upon its completion.

Appendix 1: Audit Assessment

AP-01 Policy and Commitment Statements

Finding status	No issues identified
Regulation	OPR
Regulatory reference	6.3(1)
Regulatory requirement	The company shall establish documented policies and goals to ensure that the purposes referred to in paragraphs 6(a) to (c) are achieved and its obligations under these Regulations are met. The policies and goals shall include: (b) goals for the prevention of ruptures, liquid and gas releases, fatalities, and injuries and for the response to incidents and emergency situations.
Expected outcome	The expected outcome is as follows: • The company can demonstrate that it has established documented policies and goals for the prevention of ruptures, liquid and gas releases, fatalities, and injuries and for the response to incidents and emergency situations.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Health Safety & Environmental Policy* The following interviews are related to this finding: • INT 4.3 Policy, Goals, Targets and Objectives
Finding summary	The *Health, Safety & Environmental Policy* includes the content related to the prevention of ruptures, releases, fatalities, injuries and for the response to incidents and emergency situations.

Detailed Assessment

PKM Cochin ULC has satisfied the expected outcomes listed above.

The company's policy on health, safety, and environment states that it is committed to protecting the health and safety of workers, the public, and to safeguarding the environment which may be affected by the company's activities. The policy goes on to indicate that the company will comply with all applicable health, safety and environmental requirements to ensure the prevention of ruptures, liquid and gas releases, fatalities and injuries.

As part of the policy statement, the company also addresses the need for response to incidents and emergency situations through an emergency management program that is designed to support planning and preparedness including the need for response capabilities.

AP-02 Hazard Identification

Finding status	No issues identified
Regulation	OPR
Regulatory reference	6.5(1)(d)
Regulatory requirement	A company shall, as part of its management system and the programs referred to in section 55, establish and maintain an inventory of the identified hazards and potential hazards.
Expected outcome	The expected outcomes are as follows: • The company has a compliant inventory that is established and maintained. • The inventory includes hazards and potential hazards associated within the company scope of operations and activities through the lifecycle of the pipelines. • Hazards and potential hazards are identified for the control room. • The inventory has been maintained, it is current, and is up to date including changes made to company operations and activities. • The inventory is being used as part of the risk evaluation and controls processes.
Relevant information provided by the company	The following key documents and records are related to this finding: • *OMS Risk Register, PCR* • *OMS Risk Register – Hazards* • *OMS Hazard Identification and Risk Assessment* • *OMS Corporate Risk Matrix Guideline* • *OMS Corporate Risk Matrix* • *Meeting Minutes – OMS Steering Committee – Q3 Meeting* • *Accountable Officer Report pg 18-19* • *Accountable Officer Report Ver. 5* • *November 22 SPCC Safety Meeting* The following interviews are related to this finding: • INT 4.2 Hazards, Risk and Controls
Finding summary	The OMS Risk Register lists hazards and potential hazards relevant to the control room.

Detailed Assessment

PKM Cochin ULC has satisfied the expected outcomes listed above.

The company provided a portion of its hazard inventory which highlighted the identified hazards and potential hazards associated with the control room. The company's staff indicated that Subject Matter Experts (**SMEs**) are responsible for identifying the respective hazards and potential hazards for their specific program. The inventory provided additional details such as the inherent and residual risk levels associated with each hazard.

Excerpts from the Accountable Officer (**AO**) Report show that the inventory of hazards is being maintained annually and shared with a larger audience. Through reviews of AP-03 and AP-04, the company demonstrated that the inventory is being used as part of the risk evaluation and controls processes.

AP-03 Risk Assessment

Finding status	No issues identified
Regulation	OPR
Regulatory reference	6.5(1)(e)
Regulatory requirement	A company shall, as part of its management system and the programs referred to in section 55, establish and implement a process for evaluating the risks associated with the identified hazards and potential hazards, including the risks related to normal and abnormal operating conditions.
Expected outcome	The expected outcomes are as follows: • The company has a compliant process for evaluating and managing risks that is established and implemented. • The method(s) for risk evaluation confirm that the risks associated with the identified hazards (related to normal and abnormal operating conditions) are based on referenced regulatory standards and are appropriate for the nature, scope, scale, and complexity of the company's operations, activities, and are connected to the purposes and intended outcomes of the section 55 programs. • Risks are evaluated for all hazards and potential hazards and include normal and abnormal conditions. • Risk levels are monitored on a periodic basis and as needed and re-evaluated for changing circumstances. • Risks are managed using defined method(s) appropriate to the section 55 programs. • Risk tolerance/acceptance criteria is determined for all hazards and potential hazards.
Relevant information provided by the company	The following key documents and records are related to this finding: • *OMS Hazard Identification and Risk Assessment* • *Hazard Identification and Risk Assessment Ver 2.1* • *OMS Risk Register, PCR* • *OMS Corporate Risk Matrix* • *OMS Risk Register – Inherent and Residual Controls* The following interviews are related to this finding: • INT 4.2 Hazards, Risk and Controls
Finding summary	The company has demonstrated that it has a process which evaluates the risks associated with the hazards and potential hazards that are relevant to the control room and meets the requirements of paragraph 6.5(1)(e) of the OPR.

Detailed Assessment

PKM Cochin ULC has satisfied the expected outcomes listed above.

The company's *OMS Hazard Identification and Risk Assessment* document states that it outlines the requirements, considerations, and processes to systematically identify and evaluate the collective hazards and potential hazards and risks associated with its Operating Management System (**OMS**). The document goes on to indicate that it supports the development and maintenance of the hazard list and risk registry, and provides the corporate overarching hazard identification, risk assessment and controls process. The document lays out the roles and responsibilities of various staff members to ensure that the necessary steps to evaluate the various hazards and potential hazards for an individual program are identified. Individual Programs are to use the *OMS Hazard Identification and Risk Assessment* document to support their risk assessment work, but the Programs can also implement more detailed methods to assess and manage their detailed Program-specific risks.

The *OMS Hazard Identification and Risk Assessment* document addresses risks associated with abnormal operating conditions in individual Programs by requiring each Program to look at all hazards and potential hazards where abnormal operating conditions may occur. Abnormal operating conditions may be identified through a number of different sources such as:
- Addition/Abandonment of assets;
- Changes to equipment, regulations, documents, technology, personnel, etc;
- Program/System assessment gaps; and
- Inspection findings, to name a few.

In review of the documentation, the company has determined the inherent, or the non-controlled, and residual risks for each of the hazards and potential hazards associated with the control room. Each year, as recorded in the annual AO Report, all Programs are required to review the hazard inventory and re-evaluate the inherent and residual risks and identify any changes or updates that may have occurred.

When reviewing the company's Risk Matrix Guidelines, four categories, or levels of risk, have been established with both low risk and medium risk being considered acceptable as long as controls are verified to be working as intended for the respective hazard(s).

AP-04 Controls

Finding status	No issues identified
Regulation	OPR
Regulatory reference	6.5(1)(f)
Regulatory requirement	A company shall, as part of its management system and the programs referred to in section 55, establish and implement a process for developing and implementing controls to prevent, manage and mitigate the identified hazards, potential hazards and risks and for communicating those controls to anyone who is exposed to the risks.
Expected outcome	The expected outcomes are as follows: • The company has a compliant process for developing and implementing controls. • The method(s) for developing controls are appropriate for the nature, scope, scale, and complexity of the company's operations and activities and section 55 programs. • Controls are developed and implemented. • Controls are adequate to prevent, manage and mitigate the identified hazards and risks. • Controls are monitored on a periodic basis and as needed and re-evaluated for changing circumstances. • Controls are communicated to those exposed to the risks.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Hazard Identification and Risk Assessment Ver. 2.1* • *OMS Risk Register* • *Hazard Identification and Risk Assessment* • *Assurance Standard* • *Fatigue Management Training Module* • *Training Completion Report – Fatigue Management* The following interviews are related to this finding: • INT 4.2 Hazards, Risk and Controls
Finding summary	The company has demonstrated that it has a process for developing and implementing controls to address the risks associated with the hazards and potential hazards that are relevant to the control room and meets the requirements of paragraph 6.5(1)(f) of the OPR.

Detailed Assessment

PKM Cochin ULC has satisfied the expected outcomes listed above.

The company's process for identifying, developing and implementing controls is provided in the *Hazard Identification and Risk Assessment* document. The document states that by implementing controls to either reduce the likelihood of the occurrence of the hazard or reduce the severity of the hazard or event will reduce the risk to acceptable levels.

The company follows the hierarchy of controls approach to determine the most appropriate method(s) to mitigate the hazard. If a hazard cannot be eliminated or controlled using only a single method of control, then the Program may require the application of multiple controls. The hierarchy of controls is:

- Elimination;
- Substitution;
- Engineering approaches;
- Administrative options; and
- Personal Protective Equipment.

The company provided several examples of controls that have been implemented to deal with specific control room hazards such as fatigue management and ergonomic approaches to assist control room operators.

As initially described in AP-03, on an annual basis, the company conducts a series of workshops with all Programs to assess the existing hazard inventory, to ensure the hazards and potential hazards have been appropriately assessed, followed by ensuring the existing controls are working as intended, and making modifications or additions as required. The result of this process is included in the annual AO Report. Using a different approach, the company will also use its Quality Assurance Program which looks at how effective and adequate the controls are in an operational setting.

Through the annual workshops, the information is shared amongst the different Programs. Programs communicate the respective controls they have implemented amongst the other Program groups that may be exposed to the same hazards to share potential solutions to similar issues. Overall, Programs are expected to manage the implementation of any controls, and the communication of them, as part of their ongoing management and governance activities.

AP-05 Goals, Targets and Objectives

Finding status	No issues identified
Regulation	OPR
Regulatory reference	6.5(1)(a)
Regulatory requirement	A company shall, as part of its management system and the programs referred to in section 55, establish and implement a process for setting the objectives and specific targets that are required to achieve the goals established under subsection 6.3(1) and for ensuring their annual review.
Expected outcome	The expected outcomes are as follows: • The company has a compliant process that is established and implemented. • The company can demonstrate that it has established and implemented a process for setting the objectives and specific targets to achieve the company's goals for the prevention of ruptures, liquid and gas releases, fatalities, and injuries and for the response to incidents and emergency situations applicable to the company's control room operations. • The company has set objectives and targets that are required to achieve the goals established under subsection 6.3(1). • All objectives are relevant to the company's management system when considering the scope of the process and their application to section 55 programs. • An annual review of the objectives and targets is performed by the company. • The review determines if the objectives were achieved or if corrective or preventive actions are needed.
Relevant information provided by the company	The following key documents and records are related to this finding: • *OMS Goals, Objectives and Targets Standard* • *SPCC Safety Meeting and Lessons Learned* • *OMS Performance Tracker* • *OMS Annual Certification Document* • *Accountable Officer Report Presentation* The following interviews are related to this finding: • INT 4.3 Policy, Goals, Targets and Objectives
Finding summary	The company has demonstrated that it has a process for setting objectives and targets that are relevant to the control room, reviews them annually, and meets the requirements of paragraph 6.5(1)(a) of the OPR.

Detailed Assessment

PKM Cochin ULC has satisfied the expected outcomes listed above.

At a corporate level, the *Goals, Objectives and Targets Standard* is where the process for this OPR requirement is found. This document states it identifies how to approve, implement, monitor and effectively deliver goals, objectives and targets.

When considering objectives, the company's documentation states that objectives provide insight into how its programs are performing and providing safe, value-added support to ensure the safety of people, assets and the environment. Each objective will have at least one quantifiable target and performance measure associated with it.

The company defines its targets as measurable outcomes of the changes used to evaluate the achievement of the organization's objectives. Targets are generally considered to be very short term and specific in nature.

For the control room, the company stated that it has one corporate goal associated with it, which breaks down to three Program-specific goals. From these Program goals, the company has five objectives derived from them. Each of the five objectives has one target associated with it for a total of five.

An annual review of its Goals, Objectives, and Targets (**GOTs**) is conducted when the AO Report is completed. The company provided excerpts from its 2022 AO Report showing five focus areas which are all related to its control room. The company's staff stated these focus areas are related to GOTs from past years and are now part of its continual improvement cycle.

AP-06 Organizational Structure, Roles, and Responsibilities

Finding status	No issues identified
Regulation	OPR
Regulatory reference	6.4
Regulatory requirement	The company must have a documented organizational structure that enables it to (a) meet the requirements of the management system and meet its obligations under these Regulations; (b) determine and communicate the roles, responsibilities and authority of the officers and employees at all levels of the company; and (c) demonstrate, based on an annual documented evaluation of need, that the human resources allocated to establishing, implementing and maintaining the management system are sufficient to meet the requirements of the management system and to meet the company's obligations under these Regulations.
Expected outcome	It is expected that the company can demonstrate that: • It has a documented organizational structure for its control room, operations staff, Supervisory Control and Data Acquisition (**SCADA**) support staff and other support staff. • The documented organizational structure matches the way the control room is organized and staffed. • It has determined and communicated the roles, responsibilities, and authorities for control room management and operation to all control room staff and those who interact with them. • It has a documented process that it uses to communicate roles, responsibilities, and authorities to control room staff and others that need to know (for example, training notes). • It conducts an annual documented evaluation of the human resources required to operate and maintain its pipeline control system and leak detection system.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Pipeline Control Management Process* • *Workforce Planning Meeting* • *Workforce Planning 2023;* • *Pembina Pipeline Corporation – Edmonton Control Centre CRM Workload Assessment Report* The following interviews are related to this finding: • INT 1.2 Organizational Structure and Operational Control

Finding summary	The company has demonstrated that it has a documented organizational structure for the control room and that it conducts an annual evaluation of need for the operations of the control room including such things as leak detection. The company meets the requirements of sub-section 6.4 of the OPR.

Detailed Assessment

PKM Cochin ULC has satisfied the expected outcomes listed above.

The company provided organizational charts which combined both headquarters and the control room staff. The breakdown in positions extended from the General Manager level to the individual control room staff member, SCADA staff, and other control room support positions.

The company provided 15 job profiles of various positions, from management to individual controller involved in the management and operation of the control room. These job profiles provide the documented roles, responsibilities and authorities for each position. In addition, these job profiles also identify the competencies and qualifications that need to be met for each position.

The company provided several documents to demonstrate how it completes its annual evaluation of need. The documents indicate that a numerical approach is taken where the company calculates the number of hours needed to effectively run the control room, taking into account such things as operator vacation time, average sick leave, training hours, and other related time away from the control screens. The company then compares that against the number of hours available for each control room operator and looks for gaps between the two. If gaps are identified, control room management then look at options, such as overtime, to fill in where required.

To validate the annual evaluation of need, the company completed a pilot study in 2022 of controller workload for several of its control room consoles. The study looked at a number of factors to determine the actual workload activities conducted by controllers over specific shift periods.

AP-07 Operational Control

Finding status	No issues identified
Regulation	OPR
Regulatory reference	6.5(1)(q)
Regulatory requirement	A company shall, as part of its management system and the programs referred to in section 55, establish and implement a process for coordinating and controlling the operational activities of employees and other people working with or on behalf of the company so that each person is aware of the activities of others and has the information that will enable them to perform their duties in a manner that is safe, ensures the safety and security of the pipeline and protects the environment.

Expected outcome	It is expected that the company is able to demonstrate that it has established and implemented a process for coordinating and controlling the operational activities of control room staff and other people working with or on behalf of the company so that each person is aware of the activities of others and has the information that will enable them to perform their duties in a manner that is safe, ensures the security of the pipeline, and protects the environment. It is expected that:
	
	• The company has a compliant process that is established and implemented to supervise and ensure the operations of the control room are correct.
	• The methods for coordinating and controlling operational activities are defined.
	• Employees and other people working with or on behalf of the company are aware of the activities of others.
	• Employee's operational activities are planned, coordinated, controlled, and managed.
	• People working for or on behalf of the company:
	  ▪ are pre-qualified for their assigned duties to ensure safety, the security of the pipeline and to protect the environment;
	  ▪ are assigned work plans that have been reviewed by the company and are assessed for the interoperation with the work to be performed by other people working on behalf of the company; and
	  ▪ have adequate oversight performed by company representatives for their assigned tasks to ensure safety, security of the pipeline and the protection of the environment.

Relevant information provided by the company	The following key documents and records are related to this finding: • *Pipeline Control Management Process* • *Pembina Leak Detection Manual* • *Segment Imbalance Response Flow Chart* • *SPCC Leak Triggers* • *Cochin Alarm Manual* • *SPCC Operations and Projects Standard* • *Alarm System / Siren Verification Test* • *Task Hazard Assessment* • *Safety Culture Alignment Roles and Responsibilities* • *Example – Cochin Pressure Reduction Contractor Call* • *CER Operations and Maintenance Manual* The following interviews are related to this finding: • INT 1.2 Organizational Structure and Operational Control
Finding summary	The company coordinates and controls operational activities using numerous documents including the *Pipeline Control Management Process*, the *CER Operations and Maintenance Manual*, and various shift handover procedures.

Detailed Assessment

PKM Cochin ULC has satisfied the expected outcomes listed above.

The control room is a component of the Operations and Maintenance Program, which is part of the overall OMS. The OMS provides direction for the operations and maintenance of the company's assets. The Operations and Maintenance Program is also directly connected with other processes such as the *Pipeline Control Management Process* (**PCMP**). Company staff directed the auditors to the *CER Operations and Maintenance Manual* for the process to meet this OPR requirement. The manual states its purpose is to provide direction, general references, and guidelines for the operation and maintenance of CER-regulated assets owned and operated by the company. It also states that it's a requirement that all personnel involved in pipeline maintenance and operation of the company's CER-regulated assets have knowledge of, have read, and use the information referenced within the Manual, processes and procedures. The document provides a list of Programs that are applicable to the Manual.

The *Manual*, under the section of Daily Work Practices, appears to include some of the key requirements for this AP such as:

• *Pre-Job meetings* **shall include everyone involved in the work being performed, including third party contractors and consultants;**
• *Pre-Job meetings* **shall outline obvious and potential hazards; and**
• *This information* **shall be noted on the Hazard Assessment/Work Permit and/or pre-job safety meeting and communicated to all necessary personnel on the work site** (emphasis added).

Other documents that describe how work is coordinated between shifts, between the control room and the field, and between the control room and contractors operating remotely in the field include: the *eLogShift Handover Procedure*, the *eLog and Shift Handover Standard*, and the *Cochin Pressure Reduction Contractor Call*, for example.

AP-08 Operating and Maintenance Manuals

Finding status	No issues identified
Regulation	OPR
Regulatory reference	27
Regulatory requirement	A company shall develop, regularly review, and update as required, operation and maintenance manuals that provide information and procedures to promote safety, environmental protection, and efficiency in the operation of the pipeline and shall submit them to the Regulator when required to do so.
Expected outcome	It is expected that the company can demonstrate that: • It has developed, regularly reviews and updates as required, control room operations and maintenance manuals that provide information and procedures to promote safety, environmental protection, and efficiency in the operation of the pipeline. • The manuals include procedures for shift handover communications; fatigue management; alarm management; and procedures to handle Operation Beyond Design Limits (**OBDL**) incidents and leak alarms. • If shift handover communications, fatigue management, alarm management and procedures are not in the Operations and Maintenance (**O&M**) Manuals, the company is able to provide the documents and procedures, where they are located. • The manuals have been established and implemented for a minimum of three months. • The manuals are reviewed regularly and updated as required.
Relevant information provided by the company	The following key documents and records are related to this finding: • *CER Operations and Maintenance Manual* • *Pipeline Control Management Process* • *Standard for Operations and Maintenance Procedures* The following interviews are related to this finding: • INT 2.1 Operating and Maintenance Manuals
Finding summary	The *CER Operations and Maintenance Manual*, the *Pipeline Control Management Process*, and various procedures provide information to promote safety, environmental protection, and efficiency in the operation of the pipeline.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

The company has an OMS with eight programs. One of those programs is the Operations and Maintenance Program. Associated with this program, is the *CER Operations and Maintenance Manual*. This manual documents its operation and maintenance processes, procedures, and practices. It provides a link between the overarching OMS and processes specific to operations and maintenance, including control room management. *The CER Operations and Maintenance Manual* includes information on health, safety, and the environment as it pertains to operations and maintenance activities. This document links to the PCMP, which addresses control room management. These documents were found to be up to date.

The PCMP sets expectations and responsibilities for each role in the control room. It lists responsibilities for shift handover communications in normal, abnormal, and emergency operating conditions. It also addresses human factors such as staffing levels, shift scheduling, workplace ergonomics, employee fatigue training, sleep disorder management, fatigue monitoring, and alertness for duty.

The PCMP addresses alarm management and references the SCADA Alarm philosophy document, emergency procedures, and communications. It also defines requirements and responsibilities for training and competency requirements for the control room.

PKM Cochin ULC provided a demonstration of an online software system that enables employees to quickly and efficiently access the correct procedures required in normal, abnormal, and emergency operating conditions. Hard copy procedures are maintained and available within the same building as the control room, however this software system ensures reliable and fast access to the appropriate procedures and versions.

This software system also enables the control and update of procedures, providing notification to appropriate writers and reviewers prior to document expiration to ensure timely update of procedures. It provides workflows for review and approval, archiving, and publishing of procedures.

During the control room tour, the auditors observed shift handover communications for control room operators and for shift leads, fatigue management controls, alarm management and communications, indicating that these documents have been implemented and are in use.

AP-09 Pipeline Control System - Leak Detection System

Finding status	No issues identified
Regulation	OPR
Regulatory reference	37(c)
Regulatory requirement	A company shall develop and implement a pipeline control system that (c) includes a leak detection system that, for oil pipelines, meets the requirements of CSA Z662 and reflects the level of complexity of the pipeline, the pipeline operation and the products transported.
Expected outcome	It is expected that the company can demonstrate that: • It has developed and implemented a pipeline control system that includes a leak detection system that, for oil pipelines, meets the requirements of CSA Z662:23. • The company can explain and demonstrate the operation of its leak detection system.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Pipeline Control Management Process* • *Leak Detection Program* • *Leak Detection Manual* The following interviews are related to this finding: • INT 1.1 Control Room Tour • INT 2.3 Control Center Operator Role • INT 3.3 Pipeline Control System / Leak Detection System • INT 3.4 Shift Lead and Supervisor Role
Finding summary	The *Leak Detection Program* and *Leak Detection Manual* reflect the complexity of the pipeline operations, the products exported, and align with the requirements of CSA Z662:23.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

AP-21 provides a general overview of the company's pipeline control system, from which the leak detection system is based.

Together, the *Leak Detection Program* and *Leak Detection Manual* describe how the leak detection system works and how it satisfies the requirements within CSA Z662:23 Annex E. For example, these documents discuss the:

- leak detection strategy and detection methods;
- leak detection system, including critical instruments, data, processes, and personnel;
- leak detection operations and maintenance requirements,
- performance metrics for leak detection; and
- leak detection system testing, results evaluation, documentation, and performance improvement.

During the tour of the control room, the company explained and demonstrated the leak detection system to the auditors. Information gathered from control room observations, interviews with leak detection SMEs, control room operators, and the documentation all aligned with the *Leak Detection Program* and *Leak Detection Manual*.

Multiple methods are used to detect leaks, which include a combination of physical monitoring and computer modelling. Numerous consoles measure these parameters and alarms are set if the parameter exceeds its threshold. Upon an alarm, control room operators follow a set of procedures to understand the nature of the alarm and to take appropriate measures. Additionally, multiple screens monitor and trend the various parameters in real time. This system is tested on a regular basis using leak simulations.

AP-10 Pipeline Control System - Data Recording System

Finding status	No issues identified
Regulation	OPR
Regulatory reference	37(b)
Regulatory requirement	A company shall develop and implement a pipeline control system that (b) records historical pipeline operation data, messages, and alarms for recall.
Expected outcome	It is expected that the company can demonstrate that it has developed and implemented a pipeline control system that records historical pipeline operation data, messages, and alarms for recall. It is further expected that: • The company can explain and demonstrate the operation of the data, messaging, and alarm recording system. • The company can produce a printout of alarms and incidents including OBDL and leak incidents. • The company can demonstrate that the list of OBDL and leak incidents matches the CER list of reported incidents. • The company can provide justification for any non-reported OBDL incidents and leak incidents.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Pipeline Control Management Process* • Cochin Alameda Events November 5, 2023 The following interviews are related to this finding: • INT 1.1 Control Room Tour • INT 2.1 Operating & Maintenance Manuals / PCS Data Recording System
Finding summary	The company produced records of historical pipeline operation data, messages, and alarms from its pipeline control system.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

AP-21 provides a general overview of the company's pipeline control system, from which the leak detection system is based. AP-08 describes the leak detection system. The data recording system supports these other two systems.

During interviews, staff indicated that data captured in SCADA is duplicated in several other software systems for long-term storage. Redundancy is built into the storage design of historical pipeline operation data.

To demonstrate that historical pipeline operation data, messages, and alarms for recall are recorded, the company provided a printout of these items for a 24-hour period, selected by the auditors. The auditors also observed the information logged in the handover software during the control room tour.

AP-11 Investigation of Incidents, Near Misses and Non-Compliances

Finding status	No issues identified
Regulation	OPR
Regulatory reference	6.5(1)(r)
Regulatory requirement	A company shall, as part of its management system and the programs referred to in section 55, establish and implement a process for the internal reporting of hazards, potential hazards, incidents, and near-misses and taking corrective and preventive actions, including the steps to manage imminent hazards.
Expected outcome	It is expected that the company can demonstrate that it has established and implemented a process for the internal reporting of hazards, potential hazards, incidents, and near-misses related to the operation of the pipeline and for taking corrective and preventive actions, including the steps to manage imminent hazards. It is expected that: • The company has a compliant process that is established and implemented. • The company has defined its methods for internal reporting of hazards, potential hazards, incidents, and near-misses. • Hazards and potential hazards are being reported as required by the company's process. • Incidents and near-misses are being reported as required by the company's process. • The company has defined how it will manage imminent hazards. • The company is performing incident and near-miss investigations. • The company's investigation methodologies are consistent and appropriate for the scope and scale of the actual and potential consequences of the incidents or near misses to be investigated. • The company has defined the methods for taking corrective and preventive actions. • The company can demonstrate through records that all corrective and preventive actions can be tracked to closure.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Safety Program* • *Incident Reporting, Investigation and Analysis Standard* • *CER Operations and Maintenance Manual* • Six examples of hazard, incident, and near miss reporting The following interviews are related to this finding: • INT 2.2 Investigation of Incidents, Near Misses and Non-compliances and Analysis of Leak Alarms.
Finding summary	The *Incident Reporting, Investigation and Analysis Standard*, together with examples of control-room-related reporting demonstrate that the process is established and implemented.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

Element 4 of PKM Cochin ULC's OMS addresses investigating and reporting of incidents and near misses. This element is applicable to all OMS programs, including the Safety Program and the Operations and Maintenance Program. Element 4 is referenced within the *Safety Program*, the *CER Operations and Maintenance Manual*, and is discussed in detail within the *Incident Reporting, Investigation and Analysis Standard*. According to this standard, the four key steps involved in incident and near-miss reporting, investigation, and analysis include the following:
- identify and report;
- investigate;
- take action; and
- learning & analysis.

Imminent hazards are addressed during the first step of identify and report. Third party incident reporting software is used to capture incidents, near misses, hazards, and move them through these four steps.

PKM Cochin ULC provided six examples of control room related incidents, near-misses, and hazards that had been managed using this process. Examples include emergency shutdowns due to a malfunctioning alarm and power failure of a third-party pump, respectively; and a production loss event resulting from a need to shut a pipeline down to troubleshoot a metering issue. Action items were developed to resolve identified deficiencies and these action items were tracked to completion.

AP-12 Emergency Procedures Manual

Finding status	Non-compliant
Regulation	OPR
Regulatory reference	32(1.1)
Regulatory requirement	The company shall develop an emergency procedures manual, review it regularly and update it as required.
Expected outcome	It is expected that the company can demonstrate that: • It has developed, regularly reviews, and updates as required an emergency procedures manual to respond to control room specific emergencies (i.e., bomb threat). • It tests the emergency procedures to ensure workers are familiar with them.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Corporate Emergency Response Plan* • *Sherwood Park Emergency Response Plan* • *EM Plan Activation Standard* • *EM Activation Procedure* • *EM SPCC Emergency Management Operating Guide* • *EM CEOC Operating Guide* • *Pipeline Control Management Process* • *Sherwood Park Control Centre (**SPCC**) Tabletop Exercise Report* • *SPCC Evacuation Immediate Accelerator* • *SPCC Evacuation Planned Accelerator* The following interviews are related to this finding: • INT 3.1 Emergency Procedures Manual and Safe Shut Down of a Pipeline in an Emergency
Finding summary	While the company has developed an emergency procedures manual, several components within the manual have not been updated for over four years.

Detailed Assessment

PKM Cochin ULC does not satisfy the expected outcomes listed above. This section first discusses the auditee's process, and then discusses the deficiencies.

PKM Cochin ULC has developed its emergency procedures manual and associated documents, which include control room specific emergencies.

The *Corporate Emergency Response Plan* provides guidance and direction on effective response actions during emergencies. It is PKM Cochin ULC's foundational emergency management plan, and works in conjunction with area-specific plans, such as the *Sherwood Park Emergency Response Plan*. All personnel have the responsibility and authority to activate this plan. This document is up to date, and the revision table indicates that it is reviewed and revised annually. This plan discusses various types of hazards and emergencies, some of which pertain to control room specific emergencies such as bomb threats.

Other supplemental documents, also referenced in the *Corporate Emergency Response Plan*, were provided which demonstrate that instructions exist pertaining to emergencies specific to the control room. For example, the *Sherwood Park Emergency Response Plan* provides more detail relating to items such as contact information, resource requirements, and pipeline specific information. The *EM SPCC Emergency Management Operating Guide* provides information relating to activities to be undertaken by control room staff in the event of an emergency. The *SPCC Evacuation Immediate Accelerator* and the *SPCC Evacuation Planned Accelerator* are examples of procedures providing step by step instructions for the control room operators.

Section 2.2 of the *Corporate Emergency Response Plan* requires annual testing of their emergency response exercises. PKM Cochin ULC provided a report outlining their last tabletop exercise conducted in 2023. This report includes a section on lessons learned, as well as action items to resolve findings.

However, several of these documents have not been updated for at least four years:
- *EM SPCC Emergency Management Operating Guide*;
- *EM EM Plan Activation Standard;*
- *EM Activation Procedure; and*
- *EM CEOC Operating Guide.*

The company indicated that the lapsed documents had not been updated due to a restructuring of the *Emergency and Continuity Management Program*. However, it is critical for emergency management documents to be accurate and up to date at all times.

AP-13 Analysis of Leak Alarms

Finding status	No issues identified
Regulation	CSA Z662:23
Regulatory reference	Clause E.4.2.1
Regulatory requirement	Analysis of leak alarms shall be conducted to determine the cause of the alarm. The leak alarm shall not be discounted and declared invalid without such analysis. All alarms shall be assumed to have a cause. Methods to determine the cause of the leak alarm shall be documented in a leak alarm analysis procedure.
Expected outcome	It is expected that the company can demonstrate that: • It analyzes all leak alarms to determine the cause and has developed methods to determine the cause. • It has procedures and records that demonstrate how leak alarms are handled within the control room. • It has developed and follows methods to determine the cause of leak alarms. • It has records that demonstrate that it analyzes all leak alarms. • It does not discount any alarms or declare alarms false without investigating their cause.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Leak Detection Manual* • *CER Operations and Maintenance Manual* • *Pipeline Control Management Process* • Various Segment Imbalance Response Protocols • Excerpt from *Integrity Logbook* The following interviews are related to this finding: • INT 1.1 Control Room Tour • INT 2.2 Investigation of Incidents, Near Misses and Non-compliances and Analysis of Leak Alarms • INT 2.3 Control Room Operator Role • INT 3.3 Pipeline Control System / Leak Detection System • INT 3.4 Shift Lead and Supervisor Role
Finding summary	The company provided records to demonstrate that leak alarms are analyzed. Interviews indicate that all alarms are assessed, and no alarm is declared invalid without an assessment.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

PKM Cochin ULC uses an integrated leak detection strategy to detect product releases, of which the methods used are described in the *Leak Detection Manual*. Once a leak is detected, a leak alarm will be displayed on the control room console. The *CER Operations and Maintenance Manual* states that alarms are investigated by using a set of structured protocols which includes Segment Imbalance Response Protocols. The company provided examples of these protocols. PKM Cochin ULC provided excerpts from the *Integrity Logbook* to demonstrate alarms which had been investigated between June and July.

Interviews with staff confirmed their understanding of the protocols to follow to handle a leak alarm. Staff indicated that all leak alarms are assessed and that no alarms are discounted or declared false without investigating their cause.

AP-14 Safe Shutdown of Pipeline in an Emergency

Finding status	No issues identified
Regulation	CSA Z662:23
Regulatory reference	Clause 10.5.2.1
Regulatory requirement	Operating companies shall establish emergency procedures that include: (a) procedures for the safe control or shutdown of the pipeline system, or parts thereof, in the event of a pipeline emergency; and (b) safety procedures for personnel at emergency sites.
Expected outcome	It is expected that the company can demonstrate that: • It has established emergency procedures for the safe control or shutdown of the pipeline system in the event of an emergency. • It has established safety procedures for personnel at emergency sites. • It trains and tests control room personnel on the emergency shutdown procedures. • There is someone on each shift who has the authority to shut down the pipeline.
Relevant information provided by the company	The following key documents and records are related to this finding: • Corporate and control room emergency response plans • Various Segment Imbalance Response Protocols • *Corporate Emergency Response Plan* • *Sherwood Park Emergency Response Plan* • *EM Plan Activation Standard* • *EM Activation Procedure* • *EM SPCC Emergency Management Operating Guide* • *EM CEOC Operating Guide* • *Leak Detection Manual* • *CER Operations and Maintenance Manual* • *Pipeline Control Management Process* • Tests and reports pertaining to the back up control room • *Pipeline Control Management Process* • *Sherwood Park Control Centre Tabletop Exercise Report* The following interviews are related to this finding: • INT 1.1 Control Room Tour • INT 2.3 Control Room Operator Role • INT 3.1 Emergency Procedures Manual and Safe Shut Down of a Pipeline in an Emergency • INT 3.4 Shift Lead and Supervisor Role.
Finding summary	Imbalance response protocols, emergency response plans, and emergency operating guides all work together to allow for the safe control or shutdown of a pipeline system, and safety procedures for personnel at emergency sites.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

AP-12 describes the various emergency procedures that relate to safe control or shutdown of the pipeline system, as well as safety procedures for personnel at emergency sites. They include imbalance response protocols, emergency response plans, and emergency operating guides. Many of these emergency procedures result in either an emergency shutdown and/or an evacuation. Thus, the company has established emergency procedures for the safe control or shutdown of the pipeline system in the event of an emergency, and it has established safety procedures for personnel at emergency sites.

The *Pipeline Control Management Process* and interviews with staff indicate that the controllers have full and independent authority and responsibility to divert flow, shut down, and/or isolate pipeline systems if they believe it is unsafe to continue operations.

Interviews with staff indicated that they are able to describe emergency procedures including emergency shutdown procedures. As indicated in AP-12, the company also provided records demonstrating the testing and training of staff relating to emergency shutdown procedures.

AP-15 Defining Competency and Training Requirements

Finding status	No issues identified
Regulation	OPR
Regulatory reference	6.5(1)(j)
Regulatory requirement	A company shall, as part of its management system and the protection programs referred to in section 55, establish and implement a process for developing competency requirements and training programs that provide employees and other persons working with or on behalf of the company with the training that will enable them to perform their duties in a manner that is safe, ensures the safety and security of the pipeline and protects the environment.
Expected outcome	The company can demonstrate that it has established competency criteria and training programs for pipeline controllers. It is expected that: • The company has a compliant process for developing competency requirements and training programs. • The company has defined what competency requirements are needed. • Training programs are traceable and trackable to the defined competency requirements and effective at achieving the desired competencies. • Employees and those working on behalf of the company are competent to carry out their assigned work. • Persons working with or on behalf of the company are provided with adequate training applicable to section 55 programs and the management system.
Relevant information provided by the company	The following key documents and records are related to this finding: • *OMS Training and Competence Standard* • *Training, Mentorship and Qualification (**TMQ**) for Operations Standard* • *TMQ Competency Library* • *SPCC Onboarding and Common Mentoring Checklist* • Checklists for general and specific consoles • Training records The following interviews are related to this finding: • INT 2.3 Control Centre Operator Role • INT 3.2 Competency and Training • INT 3.4 Shift Lead and Supervisor Role
Finding summary	The *TMQ for Operations Standard and* the *TMQ Competency Library (SPCC)* outline the training and competency process for the control room staff.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

The company has a process to identify, develop, deliver, and analyze training and competency requirements that enables employees to perform their control room duties ensuring safety and security of the pipeline and protection of the environment. As part of its OMS, the *OMS Training and Competence Standard* provides overarching guidance for purpose, scope training documentation framework and roles and responsibilities related to employee training. The *Training and Competence Standard* addresses: legislated training requirements, company mandated requirements, internal and external tracked training, and untracked open offerings. It allows competence to be achieved through a combination of formal learning, as well as through experience and practice, and through relationships such as mentors. Competency profiles and proficiency levels are defined for each role.

The *TMQ for Operations Standard* is designed to satisfy the requirements of the *OMS Standard*, as it pertains to all front-line operations and maintenance staff, which includes control room staff. The curriculum for console operations has three main phases. First the SPCC training team conducts general onboarding training. Then a mentor provides console-specific training and mentoring. When the individual is ready, then a qualifier will assess and sign-off on successful candidates. Various checklists were provided for general console and specific console assessments.

The *TMQ Competency Library (SPCC)* defines the competencies for the staff working in the control room and the associated assurance criteria.

Qualification records were sampled to verify that the process was being implemented and being used as described.

Annual plan-do-check-act reviews of the training, mentoring, and qualification processes occur and are discussed with senior management to make changes to the program as necessary. The company reviews incidents and identified hazards to determine any changes that may be required for competencies and/or training requirements.

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AP-16 Verifying Competency and Training

Finding status	No issues identified
Regulation	OPR
Regulatory reference	6.5(1)(k)
Regulatory requirement	A company shall, as part of its management system and the programs referred to in section 55, establish and implement a process for verifying that employees and other persons working with or on behalf of the company are trained and competent and for supervising them to ensure that they perform their duties in a manner that is safe, ensures the security of the pipeline and protects the environment.
Expected outcome	The company can demonstrate that it has established and implemented a process for verifying that control room personnel are trained and competent and for supervising them to ensure they perform their duties in a manner that is safe, ensures the security of the pipeline and protects the environment. It is expected that: • The company has a compliant process for verifying employees and other persons working with or on behalf of the company are trained and competent. • Records are maintained demonstrating employees and other persons working on behalf of the company are trained and competent as applicable to the Integrity Management Program and, specifically, the control room. • The company has a compliant process for supervising employees and other persons working on behalf of the company. • Supervision of employees and other persons is adequate to ensure they perform their duties in a manner that is safe, ensures the security of the pipeline and protects the environment.
Relevant information provided by the company	The following key documents and records are related to this finding: • *OMS Training and Competence Standard* • *Training, Mentorship and Qualification (TMQ) for Operations Standard* • Role Profile SPCC Control Centre Operator • Role Profile Shift Lead • *Checklists for general and specific consoles* • *Training records* The following interviews are related to this finding: • INT 2.3 Control Room Operator Role • INT 3.2 Competency and Training • INT 3.4 Shift Lead and Supervisor Role
Finding summary	The *Training, Mentorship, and Qualification (TMQ) for Operations Standard* outlines the process to verify training and competency of staff. The role of the shift lead and technical lead is to supervise and support the control room operators, ensuring safe operations.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

AP-15 introduced the TMQ *for Operations Standard* which outlines the qualification process that is used to both generate and verify the competency of control room operators. New control room operators first complete a general company orientation. Discussions with their leader and a designated mentor occur to understand the training, mentoring, qualification requirements, and expectations for their role. The employee completes an onboarding checklist with an onboarding partner and completes assigned training programs. The employee is assigned a mentor, who works side by side with the employee to develop and confirm competency for each task in a mentoring checklist. The employee goes through a number of training and mentoring cycles and discussions with their leader and mentor to determine readiness for qualification. Once ready, an employee is observed by a qualifier on a test simulator to ensure appropriate responses and actions to various scenarios related to control room operation. Once qualified, the employee assumes regular console operator duties supported by shift leads and supervisors. Both mentors and qualifiers are identified and assigned by leadership and receive training to execute these specific duties.

PKM Cochin ULC utilizes a Learning Management System to define, plan, and track training for employees. Specific competencies are identified for control room employees from which training is developed, including classroom, online, and hands on training. The Pembina Learning System racks employee training, schedule, completion, and reoccurrence.

As part of their ongoing development, employees are exposed to occasional test situations such as simulated leaks, tabletop exercises, etc. which serve to test the response of the operator as well as the operation of the leak detection system. Employees also have ongoing discussions with their leader regarding progress and any issues that need to be addressed.

Additionally, the control room is staffed with a shift lead and a technical lead, who are both experienced control room operators. In addition to verifying competency on an ongoing basis, they are also able to view the control room operator's consoles and provide support to individual control room operators as required.

Stress and fatigue are examples of two key issues that must be managed to ensure safe operations. Control room operators, shift leads, and technical leads are all trained in identifying the symptoms of stress and fatigue. Incorporating concepts related to human factors into the work schedule and the design of the control room, as observed by auditors in the control room tour, minimizes the potential for staff to suffer from stress and fatigue. Additionally, redundancy in training allow staff to stand in for others who might need to take a break from their consoles.

AP-17 Annual Training Program Report

Finding status	No issues identified
Regulation	OPR
Regulatory reference	56(b)
Regulatory requirement	A company shall, in addition to complying with the record retention requirements set out in the CSA standards referred to in section 4, retain an annual report on the training program developed under section 46 that compares the actual training received by employees to the planned training.
Expected outcome	It is expected that the company can demonstrate that: • It prepares an annual report that compares the actual training received by employees and other staff working on behalf of the company in the control room to the planned training.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Team Training Operations Report May 2023* The following interviews are related to this finding: • INT 2.3 Control Room Operator Role • INT 3.2 Competency and Training • INT 3.4 Shift Lead and Supervisor Role
Finding summary	The *Team Training Operations Report May 2023* compares planned training to the actual training completed.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

The company uses a learning system platform to assign and track individual-specific training and other qualification-related activities. This system generates reports, such as the *Team Training Operations Report May 2023*, which compares the planned training to the actual training completed.

AP-18 Control Room Audits

Finding status	No issues identified
Regulation	OPR
Regulatory reference	55
Regulatory requirement	A company shall conduct audits with a maximum interval of three years of the following programs: (1)(b) the integrity management program referred to in section 40, including the pipeline control system referred to in section 37; and (2) the documents prepared following the audit shall include (a) any deficiencies noted; and (b) any corrective action taken or planned to be taken.
Expected outcome	It is expected that the company can demonstrate that: • It conducts audits of the pipeline control system with a maximum interval of three years. • The audit reports note any deficiencies and any corrective actions taken or planned to be taken.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Quality Assurance Program (QAP) Audit Procedure* • *Tier 3 Quality Assurance Program Audit Report - Operations and Maintenance Program* The following interviews are related to this finding: • INT 4.1 Control Room and Leak Detection Audits
Finding summary	The company conducted an operations and maintenance program audit in July 2023 which included the pipeline control system. This audit noted deficiencies and associated corrective actions.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

The company provided the auditors with the *Tier 3 Quality Assurance Program Audit Report - Operations and Maintenance Program* dated July 2023. The audit scope included regulatory requirements based on: OPR section 55(1)(b) the integrity management program referred to in section 40, the pipeline control system referred to in section 37, and requirements from CSA Z662:23 Annex E. The audit also noted deficiencies and associated corrective actions.

AP-19 Audits of Leak Detection System

Finding status	No issues identified
Regulation	CSA Z662:23
Regulatory reference	Clause E.9
Regulatory requirement	The leak detection system shall be reviewed and audited periodically to determine whether it is in accordance with the provisions of this Annex. Where discrepancies are identified, appropriate revisions shall be made. The methods, responsibilities and results of the reviews and audits shall be documented. Such reviews and audits should include: a) Scope and objectives; b) Review/audit frequency and timing; c) Responsibilities for managing and performing the audit; d) Previous incidents or false alarms; e) Occasions where the leak detection system was inoperative; f) Previous reviews, internal audits and external audits; g) Reviewer/auditor independence; h) Reviewer/auditor competency; i) Reviewer/auditor procedures; and j) Operations under normal and special conditions.
Expected outcome	The company can demonstrate that: • It conducts reviews and audits of the leak detection system periodically. • Its evaluations have determined the root cause of incidents and recommended corrective and preventive actions. • Corrective and preventive actions stemming from the audits and evaluations have been (or are being) implemented.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Tier 3 Quality Assurance Program Audit Report - Operations and Maintenance Program* The following interviews are related to this finding: • INT 4.1 Control Room and Leak Detection Audits
Finding summary	The company conducted an operations and maintenance program audit in July 2023 which included the leak detection system. This audit contained all of the content required by Clause E.9.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

As discussed in AP-18, the company conducted an audit of the Operations and Maintenance Program, including the pipeline control system in July 2023. This audit also included the leak detection system. The methods, responsibilities, and results of the audit are documented in the *Tier 3 Quality Assurance Program Audit Report - Operations and Maintenance Program.* This audit report also addresses items (a) through (j) as specified in the regulatory requirement.

AP-20 Annual Management Review

Finding status	No issues identified
Regulation	OPR
Regulatory reference	6.5(1)(x)
Regulatory requirement	A company shall, as part of its management system and the programs referred to in section 55, establish and implement a process for conducting an annual management review of the management system and each program referred to in section 55 and for ensuring continual improvement in meeting the company's obligations under these Regulations.
Expected outcome	The expected outcomes are as follows: The company can demonstrate that it has a process for conducting an annual management review of its control room operations and for ensuring continual improvement in meeting the company's obligations under the OPR Regulations. It is expected that: • The company has a compliant process that is established and implemented. • The company's methods for conducting the management review are defined. • The company has defined methods for reviewing the management system and each section 55 program. • The company has maintained records to demonstrate the achievement of meeting obligations under these Regulations are continually improved. • The company has identified, developed, and implemented corrective actions as part of its continual improvement.
Relevant information provided by the company	The following key documents and records are related to this finding: • *OMS Management Review Standard* • *OMS 2021 Accountable Officer Report* • *OMS 2022 Accountable Officer Report* excerpt • 2021 Annual Accountable Officer Meeting Minutes The following interviews are related to this finding: • INT 6.1 Annual Management Review
Finding summary	The *OMS Management Review Standard* outlines the process for conducting an annual management system performance review. Two annual reports were provided, demonstrating implementation of this process.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

OMS Management Review Standard sets the process to conduct an annual management review of the company's management system and its programs, including the Operations and Maintenance Program which houses the pipeline control system. Thus, the process is established.

The OMS *Management Review Standard* requires the company to:
- schedule and conduct review activities within required timeframes;
- assess the adequacy and effectiveness of the programs under the OMS;
- ensure compliance, evaluate performance measures, evaluate program GOTs; and
- identify improvements.

This standard also defines the roles and responsibilities of employees and management in the process and sets out the review schedule (deadlines) and required attendees. The output of this standard is an annual AO report. Thus, the methods for conducting the management review are defined.

Interviews with staff indicate that quarterly update meetings are held with the OMS Steering Committee, OMS Steward Committee, and OMS Working Group. These meetings are designed to present and discuss progress on annual management review items, continuous improvement initiatives, and to monitor OMS program performance, which includes pipeline control systems. Required agenda items of the AO Review include:
- status of actions from previous reviews;
- changing internal and external circumstances (regulatory, organization, facilities, process) that can impact the company;
- status of GOTs;
- risk and legal reviews;
- audit results,corrective actions and opportunities for improvement.

Quarterly update meetings are held to provide ongoing updates. Minutes from these meetings were provided as evidence.

The company provided an *OMS 2021 Annual Accountable Officer Report*, and excerpts from the *OMS 2022 Annual Accountable Officer Report*. Both reports discuss the performance of the management system and its programs, including pipeline control systems. Thus, the process is implemented.

AP-21 Pipeline Control System

Finding status	No issues identified
Regulation	OPR
Regulatory reference	37(a)
Regulatory requirement	A company shall develop and implement a pipeline control system that (a) comprises the facilities and procedures used to control and monitor the operation of the pipeline.
Expected outcome	It is expected that the company can demonstrate that it has developed and implemented a pipeline control system for its pipelines that meets the requirements of CSA Z662:23. It is further expected that: • The company can explain how the pipeline control system is used to control and monitor the operation of its pipelines. • The company provides documentation that explains the pipeline control system design, maintenance, and operation. • The company provides documentation and records that explain how alarm setpoints and control limits are determined, and changes are managed and monitored. • The company provides documentation and records that explain how malfunctioning, inhibited, and stale data and alarms are analyzed, and managed. • The company can provide documentation and records that explain the backup pipeline control system and when it is used. • The company can provide documentation and records that explain the pipeline system commissioning.
Relevant information provided by the company	The following key documents and records are related to this finding: • *Pipeline Control Management Process* • *CER Operations and Maintenance Manual* • *Leak Detection Program* • *Leak Detection Manual* • *SPCC Operations and Project Standard* • Several Emergency Procedures • Several SCADA-related processes The following interviews are related to this finding: • INT 1.1 Control Room Tour • INT 2.3 Control Center Operator Role • INT 3.3 Pipeline Control System / Leak Detection System • INT 3.4 Shift Lead and Supervisor Role
Finding summary	The *Pipeline Control Management Process* describes the pipeline control system including the facilities and procedures used to control and monitor the operation of the pipeline. Implementation was verified via a control room tour and interviews with staff.

Detailed Assessment

PKM Cochin ULC satisfies the expected outcomes listed above.

The *Pipeline Control Management Process* describes the pipeline control system, the control room structure and personnel, human factors, alarm management, and information requirements. This process is linked to numerous other documents, including the *CER Operations & Maintenance Manual*, the *Leak Detection Program*, the *Leak Detection Manual*, the *SPCC Operations and Project Standard*, several emergency procedures, and several SCADA-related processes. Together, these documents describe the facilities and procedures used to control and monitor the operation of the pipeline. Within these documents are the relevant requirements relating to CSA Z662:23.

The control room tour provided evidence that the pipeline control system has been implemented. The auditors observed a control room staffed with numerous control room operators, a shift lead, and a technical lead. These staff manned multiple consoles, each of which had numerous displays which provided a variety of parameters. The staff were in continual contact with field personnel who are coordinating the maintenance and operation of the pipeline. One of these consoles is related to the PKM Cochin ULC pipeline. The consoles are manned 24/7, and involve a detailed shift handover process, which was observed by the auditors. Numerous redundancies are built into the system to account for a variety of scenarios that, without controls, could compromise the pipeline control system. These redundancies include a backup control room.

The *Leak Detection Manual*, along with numerous SCADA processes describe the philosophy used to determine alarm setpoints and control limits, and how changes are monitored and measured. Monthly reports review the occurrence of different types of alarm malfunctions, including inhibited and stale data alarms. Stale data alarms are those that turn on but do not turn off. Inhibited alarms are those that ring, when they shouldn't. Key requirements in the manual include:
- all alarms must be assessed;
- console operators have the authority to initiate emergency shutdown procedures, as required; and
- only senior management have the authority to initiate a restart of a pipeline after an emergency shutdown.

Human factors play a large role in the design of the control room within the pipeline control system, as it relates to ergonomics, stress levels, fatigue, lighting, stimulation, and exercise.

The SCADA processes describe how a pipeline is commissioned. Examples of progressive key steps include: a tabletop test, a dry site assessment test without product in the pipeline, a test with product in the pipeline, and regular tests thereafter once the pipeline is in operation. The control room captures the deficiencies, which are addressed before moving on to the next phase.

Appendix 2: Terms and Abbreviations

For a set of general definitions applicable to all operational audits, please see Appendix I of the CER Management System Requirements and CER Management System Audit Guide found on www.cer-rec.gc.ca.

Term or Abbreviation	Definition
AO	Accountable Officer
AP	Audit Protocol
CER	Canada Energy Regulator
CER Act	*Canadian Energy Regulator Act* (S.C. 2019, c.28, s.10)
CSA Z662:23	*Canadian Standards Association Z662:23*
GOTs	Goals, Objectives and Targets
OBDL	Operation Beyond Design Limits
OMS	Operations Management System
OPR	*Canadian Energy Regulator Onshore Pipeline Regulations* (SOR/99-294)
PCMP	*Pipeline Control Management Process*
SCADA	Supervisory Control and Data Acquisition
SME	Subject Matter Expert
SPCC	Sherwood Park Control Centre (the control room)
The company	PKM Cochin ULC
TMQ	Training, Mentorship and Qualification