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File OF-Surv-OpAud-T217-2019-2020-01
25 March 2020

Mr. W. Alan Sawyer, Jr.
President and CEO
Accountable Officer
Trans-Northern Pipelines Inc.
310 – 45 Vogell Road
Richmond Hill, ON L4B 3P6
Email: [redacted]

Dear Mr. Sawyer:

Canada Energy Regulator (CER) Final Audit Report
Trans-Northern Pipelines Inc. (TNPI) – Control Room Management

Please find attached a copy of the Final Audit Report for the audit of TNPI's Control Room Management conducted during the period from 31 July 2019 to 12 December 2019.

The Canada Energy Regulator (CER) conducted a compliance audit of TNPI Trans-Northern Pipelines Inc. (TNPI) in accordance with subsection 103(3), of the *Canadian Energy Regulator Act* (CER Act)

On 12 February 2020, the CER sent TNPI the Draft Audit Report documenting the evaluation of TNPI's Control Room Management for review and comment. TNPI submitted its response on 11 March 2020. The CER has considered TNPI's comments and has made changes to the Final Audit Report, where appropriate. The CER has now finalized its audit report and has attached it and its various appendices to this letter.

Corrective and Preventive Action (CAPA) Plan

TNPI is ordered to file, with the Secretary of the Commission of the Canada Energy Regulator, a CAPA Plan for approval within 30 calendar days of receipt of this Final Audit Report which describes the methods, timing and rationale for addressing the Non-Compliant finding identified in the audit report.

…/2

The CER will post the Final Audit Report and the approved CAPA Plan on its website. Prior to publishing the report or CAPA Plan, TNPI will be offered an opportunity to review any documents intended to be posted and request redactions based on the *Access to Information Act and Privacy Act*.

The CER will monitor and assess TNPI's corrective and preventive actions until they are fully implemented. Additionally, it is ordered that, where applicable, the approved CAPA Plan requirements will be implemented on a system-wide basis to address similar deficiencies. In addition, the CER will continue to monitor the implementation and effectiveness of TNPI's management system and programs through targeted compliance verification activities as a part of its on-going regulatory approaches to oversee the Control Room Management.

If you require any further information or clarification, please contact Niall Berry, Lead Auditor, Systems Operations Business Unit at 403-471-1921 or at 1-800-899-1265 toll free.

Yours sincerely,

Niall Berry

Niall Berry
Lead Auditor
Inspection Officer Number: 2589

Attachment

cc: [redacted], Manager, Regulatory Affairs and External Affairs, TNPI
[redacted]

[redacted], Manager, Business Services and Secretary Treasurer, TNPI
[redacted]

Suite 210, 517 Tenth Avenue SW
Calgary, Alberta
T2R 0A8

Trans-Northern Pipelines Inc.

Audit Report
Audit of Control Room Management

Compliance Verification Activity: CV1920 - 402
File OF-Surv-OpAud-T217-2019-2020-01

Trans-Northern Pipelines Inc.
109 - 5305 McCall Way NE
Calgary, AB T2E 7N7

Date: 25 March 2020

Executive Summary

The Canada Energy Regulator (CER) conducted a compliance audit of TNPI Trans-Northern Pipelines Inc. (TNPI) in accordance with subsection 103(3), of the *Canadian Energy Regulator Act* (CER Act) during the period from 31 July 2019 to 12 December 2019.

The objectives of the audit were to verify that TNPI had developed and implemented a pipeline control system and a leak detection system in accordance with the requirements of the *National Energy Board Onshore Pipeline Regulations (SOR/99-294*) (OPR) and the *CSA Z662 Oil and Gas Pipeline Systems* standard (CSA Z662) and to verify that control system 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 pipeline control system and leak detection system. The scope applied to normal and abnormal operating conditions, including emergency shut down, as currently employed and looking back for up to six months to verify that TNPI is compliant with relevant sections of the OPR and CSA Z662.

Of the twenty-one (21) regulatory requirements listed in the protocol, the CER found no issues of concern with twelve (12) and found TNPI to be Non-Compliant with nine (9). The findings are summarized in Table 1 and explained in detail in Appendix 1 of this report.

With respect to the identified non-compliances, based on interviews with TNPI staff and a review of the information provided by the company, the CER was of the view that the Non-Compliant Findings would not result in imminent or immediate safety or environmental protection issues.

TNPI is required to develop a Corrective and Preventive Action (CAPA) Plan to address the Non-Compliant findings noted in this report and submit it to the CER for approval within 30 days of receipt of the Final Audit Report. The CER will monitor the implementation of the CAPA Plan to confirm that it is completed in a timely manner. The Final Audit Report will be made public on the CER website.

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1.0 Introduction

In accordance with subsection 103(3) of the *Canadian Energy Regulator Act,* the Canada Energy Regulator (CER or the Regulator) conducted a compliance audit of Trans-Northern Pipeline Incorporated (TNPI) during the period from 31 July 2019 to 12 December 2019. The audit was conducted using the protocol listed in Appendix 1 of this report. Abbreviations and terminology used in the report can be found in Appendix 3.

1.1 Audit Objectives

The objectives of the audit were:

- to verify that TNPI had developed and implemented a pipeline control system and leak detection system in accordance with the requirements of the *National Energy Board Onshore Pipeline Regulations* (SOR/99-294) (OPR) and the *CSA Z662 Oil and Gas Pipeline Systems* standard (CSA Z662); and
- to verify that control system operation and maintenance processes were effectively integrated within the company's management system.

1.2 Audit Scope and Methodology

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, as in place at the time of the audit and looking back for up to six months to verify that it is compliant with relevant sections of the OPR and CSA Z662.

The methodology used to evaluate TNPI's compliance, the CER Audit Team reviewed a sample of the company's documents and records, visited the liquid pipeline primary and backup control rooms and conducted interviews with company personnel.

An audit announcement letter was sent to the company on 31 July 2019 advising TNPI of the CER's plan to conduct the audit and detailing the audit's objectives and scope. On Tuesday, 9 August 2019, the lead auditor provided the audit protocol and initial information request (IR) to TNPI and on 21 September 2019 to open the audit and discuss the plans and schedule.

Document review began on Wednesday, 4 October 2019 and on-site interviews were conducted during the period 28 October 2019 to 2 November 2019.

A pre-closeout summary of the results of the audit was discussed with TNPI on 8 November 2019; the CER Audit Team advised the company of potential compliance gaps. At that time, TNPI was given a week 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 CER in making its final assessment of compliance. A final closeout meeting was conducted with TNPI by the CER Audit Team on 12 December 2019 to inform company of the intended audit findings.

2.0 Facility and Process Description

TNPI head office for its Canadian Operations is in Richmond Hill Ontario. The company operates liquid pipeline systems in Alberta, Ontario and Quebec. The CER only regulates the Ontario and Quebec facilities. For the purposes of this audit, the CER focused the audit scope on the management of the pipeline control room, including the pipeline control system and the leak detection system. The pipelines that are regulated by the CER are shown in Appendix 2.

The primary control room consists of two consoles operated by the control room staff; there is one CER-regulated line operated by the console operators. The primary and back up control rooms are located within the Greater Toronto Area.

Control room operators work shifts that are 12 hours induration. Shift changeovers occur at 6:00 AM and 6:00 PM. Incoming shift workers are expected to arrive 15 minutes before their shift starts. Upon arrival the incoming worker logs onto the system then the outgoing controller spends approximately 15 minutes briefing the incoming controller of the status of the line and any alarms or incidents that may have occurred over the previous period.

TNPI has a corporate operations management system called the Operational Excellence Management System (OEMS), The OEMS provides companywide management system requirements. The OEMS is comprised of sixteen elements outlining mandatory management actions. Each element has accompanying supporting guidelines. The supporting guidelines provide an interpretation of the requirement of each element and reference any applicable process, standards procedures and documentation.

TNPI directed the CER to the OEMS as the documented management system for the six programs required by section 55 of the OPR.

3.0 Assessment of Compliance

3.1 General

The OPR requires companies to develop and implement a pipeline control system and a leak detection system as part of the companies' management systems. Carefully designed and well-implemented management systems are a reflection of companies' commitments to continual improvement in safety and environmental protection throughout the full life-cycle of facilities. They also support a culture of safety and are fundamental to keeping people safe and protecting the environment. The control systems and leak detection systems must also meet the requirements of CSA Z662 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 included, but were not limited to, TNPI 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.

Each company and its management system is required to comply with all applicable requirements of the CER Act, its applicable regulations, standards referenced in the regulations, such as the CSA Z662, and any company-specific Orders and Certificates.

Section 6.1 of the OPR requires a company regulated by the CER to establish and implement a management system that:

- is systematic, explicit, comprehensive and proactive;
- integrates the company's operational activities and technical systems with its management of human and financial resources to enable the company to meet its obligations under the OPR section 6;
- applies to all of the company's activities involving the design, construction, operation, or abandonment of a pipeline, and to the programs referred to in the OPR section 55;
- ensures coordination between the programs referred to in the OPR section 55; and
- corresponds to the size of the company, to the scope, nature, and complexity of its activities, and to the hazards and risks associated with those activities.

3.2 Assessment of TNPI's Regulated Facilities

The CER Audit Team's assessment of TNPI's compliance with the regulatory requirements is summarized in Table 1 and explained in more detail in Appendix 1 of this report. The CER identified no issues of concern with twelve (12) of the protocol items and found TNPI to be non-compliant with nine (9) of the regulatory requirements evaluated as part of this audit.

Examples of the non-compliances noted included: a lack of documented evidence of goals and policies that meet OPR requirements; training and competency issues; deficiencies related to audits and investigations into leaks; and a lack of documentation in support of leak detection settings, such as the allowed time for shut down.

3.3 List of Audit Findings

The CER could assign one of two possible types of findings to each audit protocol item evaluated:

1. No Issues Noted – *No non-compliances were identified during the audit based on the information provided and reviewed within the context of the scope of the audit; or*

2. Non-compliant – *An evaluated regulatory requirement does not meet legal requirements. The company has not demonstrated that it has developed and implemented programs, processes and procedures that meet the legal requirements. A corrective and preventative action plan must be developed and implemented.*

Below is a table that provides a generalized description of the CER's audit findings. They correspond to the Appendix 1 Summary of Findings. That Appendix provides more information regarding the review and substance of each finding.

Table 1: List of Findings

Audit Protocol Item	Regulatory Reference	Protocol Topic	Status	Summary of Finding
AP-01	**OPR s. 6.3(1)**	**Policy and Commitment Statements**	Non-Compliant	The CER has not seen documented policies and goals for meeting the TNPI obligations under section 6, including (b) goals for the prevention of ruptures, liquid and gas releases, fatalities and injuries and for the response to incidents and emergency situations.
AP-02	**OPR s. 6.5(1)(d)**	**Hazard Identification**	No Issues Noted	TNPI demonstrated that it has identified hazards associated with control room operations.
AP-03	**OPR s. 6.5(1)e**	**Risk Assessment**	No Issues Noted	TNPI demonstrated that it has assessed the risks associated with the identified hazards.
AP-04	**OPR s. 6.5(1)(f)**	**Controls**	No Issues Noted	TNPI demonstrated that it has developed suitable controls to manage the risks associated with the identified hazards.
AP-05	**OPR s. 6.5(1)(a)**	**Goals, Targets and Objectives**	Non-Compliant	TNPI directed the Audit Team to various documents including the Business Planning Process document. The document supplied to the Audit Team was dated 20 June 2019 and was still in draft stage at the time of the audit. Goals required by the OPR (for the prevention of ruptures, liquid and gas releases, fatalities and injuries and for the response to incidents and emergency) had not been identified

Audit Protocol Item	Regulatory Reference	Protocol Topic	Status	Summary of Finding
				through any of the process described.
AP-06	**OPR s. 6.4**	**Organizational Structure, Roles and Responsibilities**	No Issues Noted	TNPI demonstrated that it has an adequate organizational structure to manage the control centre and that it has defined the roles and responsibilities for each position.
AP-07	**OPR s. 6.5(1)(q)**	**Operational Control**	No Issues Noted	TNPI demonstrated that it has established and implemented a process for coordinating and controlling the operational activities of the control room.
AP-08	**OPR s. 27**	**Operating & Maintenance Manuals**	Non-Compliant	TNPI demonstrated that it has developed, regularly reviewed and updated as required, control room operations and maintenance manuals. However, the CER noted documentation version control issues at the back up control center.
AP-09	**OPR s. 37(c)**	**Pipeline Control System and Leak Detection System**	No Issues Noted	TNPI demonstrated that it has developed and implemented a control system and leak detection system that has data and alarming integrated with the SCADA system. Given the scope of the audit and the protocol used, the CER did not verify the company's pipeline control system and leak detection system fully met the requirements of CSA Z662-19.
AP-10	**OPR s. 37(b)**	**Pipeline Control System Data Recording System**	No Issues Noted	TNPI demonstrated that it has developed and implemented a pipeline control system that records historical pipeline operation data, messages and alarms for recall.
AP-11	**OPR s. 6.5(1)r**	**Investigation of Incidents, Near Misses and Non-compliances**	No Issues Noted	TNPI demonstrated that, within the scope and objectives of this audit, it has established and implemented a process for the internal reporting of hazards, potential hazards, incidents, and near-misses related to the

Audit Protocol Item	Regulatory Reference	Protocol Topic	Status	Summary of Finding
				operation of the pipeline and for taking corrective and preventative actions.
AP-12	**OPR s. 32(1.1)**	**Emergency Procedures Manual**	No Issues Noted	TNPI demonstrated that it has developed, regularly reviews and updates as required an emergency procedures manual to respond to emergencies specific to the control room as well as manuals for system emergencies.
AP-13	**CSA Z662-15 – Clause E.4.3.2**	**Analysis of Leak Alarms**	No Issues Noted	TNPI demonstrated that it analyzes all leak alarms to determine the cause.
AP-14	**CSA Z662-15 Clause 10.5.2.1**	**Safe Shut Down of Pipeline in an Emergency**	No Issues Noted	TNPI demonstrated that it has established emergency procedures for the safe control or shutdown of the pipeline system in the event of an emergency.
AP-15	**OPR s. 6.5(1)(j)**	**Training, Competence and Evaluation**	No Issues Noted	TNPI demonstrated that it has established competency criteria and training programs for pipeline controllers.
AP-16	**OPR s. 6.5(1)(k)**	**Training, Competence and Evaluation**	Non-Compliant	TNPI did not demonstrate that it has established and implemented a process for verifying that control room personnel are trained and competent on an on-going basis.
AP-17	**OPR s. 56 (b)**	**Annual Training program Report**	Non-Compliant	While TNPI did verify that it provides a training list of personnel who are missing training, it did not demonstrate that it annually compares the actual training received by control room staff with the planned training and conveys this information to Senior Management.
AP-18	**OPR s. 55(1)(2)**	**Control Room Audits**	Non-Compliant	TNPI was able to demonstrate that it is conducting audits and assessments of

Audit Protocol Item	Regulatory Reference	Protocol Topic	Status	Summary of Finding
				its Control Room activities and procedures, but did not demonstrate that the audits assessed all of the technical requirements of the OPR and referenced standards. In addition, TNPI was unable to demonstrate that it is adequately taking corrective and preventive actions to address deficiencies noted during the audits.
AP-19	**CSA Z662-15 Clause E.8.4**	**Leak Detection System – Audits of Special Incidents**	Non-Compliant	TNPI did not demonstrate that, as part of its audits, it conducts assessments of the leak detection system to evaluate incidents as required by CSA Z662-15 Clause E.8.4. [Note: CSA Z662-15, used in the scope of this audit, was updated in 2019. TNPI's CAPA Plan must ensure compliance with the CSA Z662-19 requirements]
AP-20	**OPR s. 6.5(1)(x)**	**Annual Management Review**	Non-Compliant	While TNPI was able to demonstrate that it has a process for conducting an annual management review of its control room operations, the Audit Team found deficiencies; for example, audits and corrective actions were not being monitored through the MR process to ensure that audits and CAPAs were being completed.
AP-21	**OPR s. 37(a)**	**Pipeline Control Systems and Leak Detection**	Non-Compliant	TNPI demonstrated that it has a developed and implemented a Supervisory Control and Data Acquisition (SCADA) system. However, no evidence was provided that the Company had a commissioning strategy, or a process to manage the displays for its SCADA system.

4.0 Conclusion

Within the scope of this audit, the CER found that TNPI was operating its liquid pipeline control and leak detection systems in a manner that protects the safety of its employees and the public and protects the environment. TNPI was able to demonstrate that its liquid pipeline control centre's operations are integrated within the company's Operations Excellence Management System.

The CER identified no issues of concern with twelve (12) of the protocol items and found TNPI to be non-compliant with nine (9) of the regulatory requirements evaluated as part of this audit.

TNPI demonstrated that, within the scope of the audit, it had established and implemented:

- an effective organizational structure.
- 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

With respect to the identified non-compliance's, based on interviews with TNPI staff and a review of the information provided by the company, the CER is of the view that the non-compliant findings do not result in imminent or immediate safety or environmental protection issues. TNPI is required to develop a Corrective and Preventive Action Plan (CAPA Plan) to analyze, address, and manage the deficiencies identified in this report and submit it to the CER within 30 days of receipt of the Final Audit Report for approval.

The CER will monitor and assess the implementation of TNPI's CAPA Plan to confirm that it is fully implemented on a timely basis and in a manner that protects the safety of employees, those working on behalf of the company, and the public, as well as the environment.

The CER will make its Final Audit Report public on the CER website.

Appendix 1.0 - Audit Assessment Tables

AP-01: Policy and Commitment Statements

Regulatory Requirement: **OPR s. 6.3(1)** The company shall establish documented policies and goals for meeting its obligations under section 6, including (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 company is able to 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.
Summary of Information Made Available by TNPI: To demonstrate compliance with this requirement, TNPI supplied the CER Audit Team with: - EHSS&ER Policy - Event Reporting Policy - Operational Excellence Management System (OEMS) - Safety and Environmental Absolutes - Standards of Business Conduct - Trans-Northern Pipelines Inc. 2019 Company (Leadership) Goals, Objectives, and Targets (GOTs)
Assessment: TNPI directed the CER Audit Team to various policy documents and the Operations Excellence Management System (OEMS), including: • TNPI's Environmental Health, Safety, Security, Emergency Response and Operational Integrity Policy that describes TNPI Leadership's accountability to develop, utilize, evaluate and continually improve the OEMS to achieve the goal of "Zero harm" to people and the environment and their expectation of a sound and workable emergency response plan. • TNPI's Safety and Environmental Absolutes Policy describes the simple rules for employees to follow to be safe and to protect the environment. Included in these rules is the expectation that employees follow procedures and immediately report all incidents and hazards to their supervisor. • TNPI's Event Reporting Policy states that all hazards, potential hazards, incidents and near misses must be reported and that all incidents both with and without loss will be investigated and reviewed by management to identify the inadequacy or failure of management system(s) so they can be improved through corrective actions. • TNPI's Standards of Business Conduct provides the basic rules, standards and behaviours that all TNPI employees are expected to adhere to in order to maintain the confidence of the company's stakeholders. • Element 14 of the OEMS section 14.1 Goals, Objectives and Targets describes the requirements for setting and communicating goals and targets.

The CER Audit Team reviewed these documents and did not find documented goals for the prevention of ruptures, liquid and gas releases, fatalities and injuries and for the response to incidents and emergency situations. The company has commitment statements, visions and principles in its various documentation including codes of conduct that the company and its employees are expected to follow for the protection of health and safety and the protection of the environment. However, in the opinion of the CER Audit Team, these did not meet the requirements of the OPR. As a result, the CER Audit Team found this to be Non-Compliant.

Finding: Non-Compliant

Based on the information made available and reviewed by the CER Audit Team, within the scope of this audit, TNPI was found to be non-compliant with this regulatory requirement. A CAPA Plan must be developed to analyze, address and manage this deficiency.

AP-02: Hazard Identification

Regulatory Requirement: **OPR s. 6.5(1)** A company shall, as part of its management system and the programs referred to in section 55, **OPR s. 6.5(1)(d)** establish and maintain an inventory of the identified hazards and potential hazards.
Expected Outcomes: The company is able to demonstrate that it has identified the hazards and potential hazards associated with the pipeline control room and has included them in the inventory. Specific areas for demonstration related to this protocol question include: • 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; and • the inventory is being used as part of the risk evaluation and controls processes.
Summary of Information Made Available by TNPI: To demonstrate compliance with this requirement, TNPI supplied the CER Audit Team with the following documents: • Risk Management Standard; and • TNPI's Hazard and Potential Hazard Inventory.
Assessment: TNPI directed the CER AUDIT TEAM to the TNPI OEMS Manual element 2 – Risk Assessment and Management. This is the program level hazard ID, risk assessment and control development process for the company. Supporting the OEMS element 2 is a guideline that describes the responsibilities, process steps, tools, time frames, and supporting policies, documents and standards. **TNPI Hazard Inventory** The TNPI Hazard Inventory currently contains over 250 hazards and potential hazards. Each TNPI program identifies potential and new hazards through brainstorming activities found in the hazard ID and evaluation process. On an annual basis, the TNPI Hazard Inventory is updated and was last updated on 28 August 2019. The inventory is a list of hazard/threat categories and examples of undesirable outcomes that can be used as an aid to identify other potential hazards. The hazards are separated into categories such as energy, explosion, flammability, psychosocial, security, etc. The company aligns the hazards with a company program, the corresponding OEMS element and gives each hazard an identifier.

Regulatory Requirement: **OPR s. 6.5(1)** A company shall, as part of its management system and the programs referred to in section 55, **OPR s. 6.5(1)(d)** establish and maintain an inventory of the identified hazards and potential hazards.
The hazards specific to the control room were represented in the inventory. Two examples include: a failure to identify a release; and operator fatigue. The corporate overall hazards of safety, security and emergency hazards also are applied to the control room. Through the documents and records made available for review and the responses provided during interviews with management and employees, TNPI was able to demonstrate that it has an established and maintained inventory of the identified hazards and potential hazards.
Finding: No Issues Noted. Based on the information made available and reviewed by the CER AUDIT TEAM within the scope of this audit, no non-compliances relating to this protocol item were identified during the audit.

AP-03: Risk Assessment

Regulatory Requirement: **OPR s. 6.5(1)** A company shall, as part of its management system and the programs referred to in section 55, **OPR s. 6.5(1)(e)** establish and implement a process for evaluating and managing the risks associated with the identified hazards, including the risks related to normal and abnormal conditions.
Expected Outcome: The company is able to demonstrate that they have evaluated and are managing the risks of the identified hazards associated with running an effective control room, including the risks related to normal and abnormal conditions. Specific areas for demonstration related to this protocol question include: • the company has a compliant process for evaluating and managing risks that is established and implemented; • the method(s) for risk evaluation and managing the risks are based on referenced regulatory standards and are appropriate for the nature, scope, scale, and complexity of the company's operations, activities, and s.55 programs ; • risk is evaluated for all hazards and potential hazards and includes normal and abnormal conditions; • risk levels are monitored on a periodic basis as-needed, and re-evaluated for changing circumstances; • risk is managed using defined method(s) appropriate to the s.55 programs; and • risk acceptance criteria is determined for all hazards and potential hazards.
Summary of Information Made Available by TNPI: TNPI supplied the CER Audit Team with documentation used for the liquid pipelines risk assessment process including its: • Risk Management Standard • Management of Change Standard • Corporate risk registry • Business continuity plan
Assessment: TNPI directed the CER Audit Team to the TNPI OEMS manual element 2 – Risk Assessment and Management. This is the program level hazard ID, risk assessment, and control development process for the company. Supporting the OEMS element 2 is a guideline that describes responsibilities, process steps, tools, time frames and supporting policies, documents and standards. The OEMS references the Risk Management standard, the scope of the standard covers Health, Safety, Security, Environment and Integrity. The scope also covers all projects, operational and non-operational phases including design, construction operations and maintenance. The Environment,

Health Safety, Security and Emergency Response department is responsible for the entire completion of the processes.

The risk management standard describes the process steps for hazard identification, evaluation, risk assessment, and mitigation (controls).

The process steps also reference responsibilities, actions, output and annual management review. Evidence of a review dated 28 August 2019 was presented.

The Standard provides a corporate risk matrix that is used to support TNPI's risk assessments. The risk matrix outlines the probability and severity-consequence categories (i.e. Health, Safety and Security, Environment and Integrity, Public/Reputational, Financial) and scales and ranges to be used for the completion of risk assessments.

The Standard outlines risk tolerance levels, acceptable and unacceptable risk levels, internal notifications, control timing, and control plan approval requirements. When risks are beyond tolerance levels, guidance is provided on the risk mitigation approaches to be considered. Descriptions of the hierarchy of risk treatment options to be applied (i.e. design controls, engineering controls, administrative controls, and physical controls) are outlined, including requirements for re-evaluation of risks after the mitigations have been applied. Risk levels are evaluated with and without control activities. The evaluation determines if the level of risk is acceptable and if not, further mitigation actions are determined and implemented. The evaluation considers:

1. Inherent Risk: In cases that an identified hazard has no mitigation in place, the inherent, or unmitigated risk is determined.

2. Current Risk: In cases that mitigation programs or activities are in place, the current risk level is determined.

3. Residual Risk: If the current risk level is deemed unacceptable (i.e. requiring additional mitigation), additional mitigation activities are developed and the resulting (or residual) risk is determined.

The CER AUDIT TEAM noted that through document review, interviews with management and employees, and record review no issues were found with this audit protocol item.

Finding: No Issues Noted.

Based on the information made available and reviewed by the CER AUDIT TEAM within the scope of this audit, no non-compliances relating to this protocol item were identified during the audit.

AP-04: Controls

Regulatory Requirement:

OPR s. 6.5(1) A company shall, as part of its management system and the programs referred to in section 55,

OPR s. 6.5(1)(f) establish and implement a process for developing and implementing controls to prevent, manage and mitigate the identified hazards and the risks and for communicating those controls to anyone who is exposed to the risks.

Expected Outcome: The company is able to demonstrate that it has developed and implemented controls for the identified hazards associated with the pipeline control room and that it has communicated the risk controls to anyone exposed to the risks. Specific areas for demonstration related to this protocol question include:

- the company has a compliant process for developing and implementing risk controls;
- the method(s) for developing risk controls are appropriate for the nature, scope, scale, and complexity of the company's operations and activities and s.55 programs;
- risk controls are developed and implemented;
- risk controls are adequate to prevent, manage and mitigate the identified hazards and risks;
- risk controls are monitored on a periodic basis and as-needed and re-evaluated for changing circumstances; and
- risk controls are communicated to those exposed to the risks.

Summary of Information Made Available by TNPI:

TNPI supplied the CER Audit Team with documentation used for the liquid pipelines risk assessment process including:

- Legal Requirements and Compliance Process
- Management of Change Procedure
- Risk Management Standard

Assessment:

TNPI directed the CER Audit Team to the TNPI OEMS manual Element 2 – Risk Assessment and Management. This is the program level hazard ID, risk assessment and control development process for the company. Supporting the OEMS element 2 is a guideline that describes responsibilities, process steps, tools, time frames and supporting policies, documents and standards.

The Risk Management Standard outlines how TNPIs risk management approach is working with each of the programs. The process outlines the responsibilities and steps to apply the corporate risk matrix to TNPI's potential risk, determine any unacceptable risks, and develop or improve existing mitigations (controls) to reduce the unacceptable risks to acceptable levels.

TNPI evaluates the risk level and tolerability of the risks that determines priority and hierchy. The higher priority risks are then determined to require mitigation and are assigned to the appropriate TNPI Program Owner for program planning and mitigation. This includes field operations and the control room. Once the risk has been assessed, a decision is made to either:

- Tolerate, terminate, transfer the risk; or
- Put a plan in place to eliminate or further reduce the risk treatment options.

If a risk is tolerable or transferred, it undergoes management and monitoring, and requires that management procedures are developed to ensure that the risk does not increase. If further mitigation controls are identified during the risk assessment process change, or if they cannot be implemented in the timeframe required, then it will need to be documented, reassessed and re-approved. When treatment options are required, controls are reviewed and developed to further mitigate the risk with the preferred option being to eliminate the risk.

A hierarchy of controls has been developed to support the selection of controls and is outlined in the standard. (These are: Elimination, Engineering, Administration and Physical or Personal Protective Equipment)

TNPI has developed the Control Room Management Program (CRMP) to mitigate the hazards and risks associated with the 24x7 control room operation and to support response to abnormal pipeline conditions including integrity pipeline maintenance, overpressure conditions, and leak events to minimize the impacts of these events. Controls have been developed to mitigate operator fatigue, information exchange, emergency failures in the control room including security threats and incorrect operations. Controls include backup systems, fatigue managing, shift change procedures, training programs and operational procedures.

The CER Audit Team noted that through document and record review, and interviews with management and employees no issues were found with this audit protocol item.

Finding: No Issues Noted.

Based on the information made available and reviewed by the CER Audit Team within the scope of this audit, no non-compliances relating to this protocol item were identified during the audit.

AP-05: Goals, Targets and Objectives

Regulatory Requirement:

OPR s. 6.5(1) A company shall, as part of its management system and the programs referred to in section 55,

OPR s. 6.5(1)(a) 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 Company is able to demonstrate that it has established and implemented a process for setting the objectives and specific targets and key performance indicators 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. Specific areas for demonstration related to this protocol question include:

- the company has a compliant process that is established and implemented;
- the company has set objectives and targets and key performance indicators;
- all objectives are relevant to the company's management system when considering the scope of the process and their application to s.55 programs;
- an annual review of the objectives and targets is performed by the company; and
- the annual reviews are being completed and have determined if the objectives were achieved.

Summary of Information Made Available by TNPI:

TNPI provided the CER Audit Team with the following documents:

- Business Planning Process DRAFT document June 2019.
- Management Review Process
- Measurement and Monitoring Process
- Workforce Planning Process
- Annual Officers Report of 2018

Assessment:

TNPI directed the CER Audit Team to a number of business process documents. Included was the Business Planning Process document that was in draft and written 20 June 2019. The document describes the steps and responsibilities to develop the annual Company goals, objectives, targets and business plans aligned with the Company's strategic goals, objectives and business drivers, and cascade them throughout the organization.

The Leadership Team is responsible to develop annual Company Goals, Objectives and Targets (GOTs) for each Business Driver. The Company GOTs are cascaded throughout the organization through TNPI's Performance Management Process activities. Each leader and individual develop team/individual develop goals and targets aligned with the Company GOTs and Business Drivers.

On an annual basis, leadership reviews and reports on performance of the Company, its' programs and the management system (OEMS) in the

Accountable Officer Report.

The Management Review Process document describes the process of how the Leadership Team provides oversight by reviewing the Company's performance information (e.g. Company GOTs, Program KPIs, and OEMS KPIs) and determining if any additional action is required to ensure compliance, conformance or successful performance. Actions are assigned and captured in the Leadership Meeting minutes.

The Management Review held on 4 December 2018 reviewed the KPIs, highlights, challenges and work plans of each of the OEMS Elements and programs with a focused discussion on the 2018 six priority elements. This OEMS Management Review Minutes 4 December 2018 provides as summary of the discussion including highlight for each element and program and identifies actions for certain OEMS element owners as an outcome of the meeting discussion.

The CER AUDIT TEAM noted that the management team does develop and use KPIs throughout the company. However, given that the primary document was written in June of 2019 and was in draft format, it could not be an existing process. Therefore, the CER AUDIT TEAM finds this audit protocol item Non-Compliant.

Finding: Non-Compliant

Based on the information made available and reviewed by the CER Audit Team, within the scope of this audit, TNPI was found to be non-compliant with this regulatory requirement. A CAPA Plan must be developed to analyze, address and manage these deficiencies.

AP-06: Organizational Structure, Roles and Responsibilities

Regulatory Requirement:

OPR s. 6.4 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 section 6; (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 section 6.

Expected Outcome: The company is able to demonstrate that:

- it has a documented organizational structure for its control room, operations staff, SCADA support staff and other support staff;
- 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; and
- it conducts an annual documented evaluation of need of the human resources required to operate and maintain its pipeline control system and leak detection system.

Summary of Information Made Available by TNPI:

TNPI supplied the CER Audit Team with the following documents:

- Annual Budget Preparation procedure
- Business Planning process
- Control Room Management Program
- Line Control Crew Schedule Procedure
- Line Controller
- Manager Product Movement
- Operations Coordinator, Control Center
- Scheduler
- Senior Line Controller
- Supervisor Product Movement
- TNPI CR Training Plan
- TNPI Organizational Chart
- Workforce Planning Overview PPT

Assessment:

TNPI directed the CER AUDIT TEAM to OEMS Element 5A: Organization Structure element 5A of the OEMS. This describes an overview TNPI's organizational structure and how responsibilities and authorities are developed, implemented and communicated and employee performance is managed to achieve the Company's goals and objectives.

The Control Room Management Program document describes in detail the responsibilities and authorities of control room staff during both Normal and Abnormal operations.

TNPI gave the Audit Team access to a copy of the TNPI Organizational Chart that shows employees in the control room (Product Movement Organization) 20 positions with 1 vacant Line Controller at the time the chart was printed. The SCADA Organization indicated 5 positions.

TNPI has descriptions for each position in the Company. The development of position descriptions is supported by guides and templates. Employees are assessed against the competencies identified in these documents to ensure understanding of their roles, responsibilities and authorities related to their specific roles.

TNPI supplied a PPT Work Planning Overview including an annual evaluation of need and position descriptions of Control room employees and management.

TNPI provided sufficient evidence to the CER Audit Team that it has established and implemented an organizational structure with roles, responsibilities and authorities and that it conducts an annual evaluation of need of its control room staff.

Finding: No Issues Noted.

Based on the information made available and reviewed by the CER Audit Team within the scope of this audit, no non-compliances relating to this protocol item were identified during the audit.

AP-07: Operational Control

Regulatory Requirement: **OPR s. 6.5(1)** A company shall, as part of its management system and the programs referred to in section 55, **OPR s. 6.5(1)(q)** 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 security of the pipeline and protects the environment.
Expected Outcome: 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; and • 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.
Summary of Information Made Available by TNPI: TNPI supplied the CER Audit Team with access to: • 12.2 Shift Change Briefing Report Form • Contractor Management Procedure • Contractor Management Standard • Control Room Management Program • Critical Operations Communication Procedure • Field to Control Centre Communication • Line Balance Alarm Analysis • Line Control Crew Schedule • Line Control Emergency Response Manual • Line Control Shift Change Procedure

- Line Controller
- Manager Product Movement
- Monthly Shipper Nomination Allocation
- Operations Excellence Management System
- Operations Coordinator Control Centre
- Required Reading Binder Procedure
- Scheduler
- Sr Line Controller
- Supervisor Product Movement
- Working Alone Procedure After Hours Log

Assessment:

TNPI directed the CER Audit Team to OEMS element 6 and the guideline to element 6 dated 4 June 2019) for coordinating and controlling the operational activities of employees and other people working with or on behalf of the company. Included are management system (MS) overview policies, contractor prequalification and management, communication procedures, crew scheduling activities, job descriptions and work procedures.

The Control Room Management Program ensures that operating information and alarms are effectively managed, control room controllers have the necessary competencies to safely and effectively operate the pipeline system in normal, abnormal and emergency conditions, and key risks attributed to shift work and operator fatigue are managed.

Other examples of programs included in this guideline included Integrity Management, Safety Management, Construction, and Damage Prevention

The guideline document is a new document, and through interviews and record reviews, the CER Audit Team was able to verify the documented process explained were established and implemented.

These do constitute activities related to coordination and control and present an overarching process that would meet the requirements of the OPR requirements for control room management.

Finding: No Issues Noted.

Based on the information made available and reviewed by the CER Audit Team within the scope of the audit, no non compliances relating to this protocol item were identified during the audit.

AP-08: Operating and Maintenance Manuals

Regulatory Requirement: **OPR s. 27:** 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 CER when required to do so.
Expected Outcome: The company is able to demonstrate that it has developed, reviewed and updated 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, including but not limited to guidance on issues such as: • shift handover communications; • fatigue management; • alarm management; and • handling of over-pressurization and leak alarms.
Summary of Information Made Available by TNPI: TNPI provided the CER Audit Team with its: • 12.2 Shift Change Briefing Report Form • Alarm Philosophy • Control Room Management Program • Line Control Emergency Response Manual • Overpressure Protection Project Surge Tank Procedures • TNPI Corporate Emergency Response Plan
Assessment: TNPI directed the CER Audit Team to the Control Room Management Program manual. The manual sets expectations and lists responsibilities for each role and for shift handover communications in normal, abnormal and emergency operating conditions. It addresses: work-load staffing balance, shift scheduling, employee fatigue training and sleep disorder management, workplace environmental design, fatigue monitoring and alertness for duty. The CRMP also includes safety-related SCADA alarms (defined in Section 1.7 of the same document and the Alarm Philosophy Document) TNPI also directed the CER AUDIT TEAM to the Emergency Response Plan. The plan explains how emergencies involving TNPI's facilities, infrastructure or operations can be detected and/or reported by members of the public, private property owners, public first responders, regular

ground or aircraft patrol, or company personnel engaged in monitoring operating parameters.

Included in the Plan are:

- Requirements for immediate shutdown
- Notification Requirements
- Incident Reporting and Investigation
- Authorization for Restart
- Resumption to normal operation

Safety Related Alarms Management Practice

- As a component of the alarm investigation process, alarms are cross referenced with test mode reports, or followed up by field personnel to determine their validity.
- Daily reviews of valid alarms confirm communications with the field services were made for valid alarms and fault reports for the alarm condition were entered for investigation if applicable.

TNPI was able to demonstrate that the company had developed documented Operations and Maintenance manuals. However a number of issues were noted by the Audit Team.

- LAN Backup Procedure did not align to a standard template or have revision information (date, version, contact) stated in the procedure.
- The Controlled Document Preparation section states *"Controlled documents will be reviewed a minimum of every three years (non-critical controlled documents reviewed every 5 years) unless a process, practice, equipment or regulation has initiated a change.*" Overdue revision dates were noted on a number of documents. As an example, The TTC Toronto-York-Spadina Subway Keele/Finch West Crossing Site Specific Emergency Response Plan showed a revision date of 2015-04-22 that indicated that the document was not reviewed for more than three years or the most current revision and review date is not shown on the document.
- The CER AUDIT TEAM visited the backup control room and the Line Control Emergency Response Manual hardcopy was available; however, the revision date on this copy was dated March 2014. The online revision of this document was dated April 28, 2017 revision 2. In addition, the Intelex Document Revision Report record provided as a submission for this procedure (#5456) did not align. This version was revision 3 with a release date of October 5, 2017**.**
- Discrepancies were noted in documents. A line balance calculation time period stated in the Line Balance Leak Detection Manual was different in the Sept 2019 SCADA-CR Training Line Balance Leak Detection document. It was noted that information was duplicated in various documents.

A robust document control program and review schedule is needed to ensure critical control room documents are current and information is clearly stated. Therefore, this element is considered non-compliant.

Finding: Non-Compliant.

Based on the information made available and reviewed by the CER Audit Team, within the scope of this audit, TNPI was found to be non-compliant with this regulatory requirement. A CAPA Plan must be developed to analyze, address and manage these deficiencies.

AP-09: Pipeline Control System and Leak Detection System

Regulatory Requirement: **OPR s. 37** 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 Z662-15 and reflects the level of complexity of the pipeline, the pipeline operation and the products transported.
Expected Outcome: The company is able to 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.
Summary of Information Made Available by TNPI: Information provided by TNPI to the CER Audit Team included: • Control Room Management Program • Line Balance Leak Detection Manual • Line Control Emergency Response Manual • TNPI Corporate Emergency Response Plan • Critical Safety Equipment Maintenance Program • Critical PM – MOC Process • Deactivating Critical Alarms, Critical Systems and Critical Equipment • Alarm Philosophy • Live Leak Detection – Operability Testing • Simulated Leak Detection – Operability Testing • TNPI CR Training Plan • Line Balance Leak Detection Training Presentation • Line Balance Leak Detection Resource Guide • Leak System Testing Records – Intelex • LMS 4.1 Technical Datasheet 14.061-cert • Oil and Gas OASyS DNA 7.6 Technical Datasheet 15.021 • LDS Calibration records North Toronto Example • LDS software Update MOC CMC_66722_20170411 Deploy base line DNP3 and CIP protocols for evaluation v1.0 • TNPI Certificate 12 Inch North Toronto • Leak Detection System Additional Information • Tour of primary and backup Control Rooms • Observation of a Line Control Operator shift change • Interviews with SCADA Team Lead, Product Movements Manager, Supervisor and Line Control Operators

Assessment:

The Company's response stated *"TNPI has developed a pipeline and leak detection system that meets the requirements of CSA Z662-15, including the requirements outlined in Annex E".* The pipeline systems are monitored 24x7 for leaks by Line Control Operators and supported by a Supervisor and Manager, and the SCADA System Support Team. The company also utilizes ROW surveillance, and facility and equipment inspections as methods to detect leaks.

The Company demonstrated that it has a developed and implemented leak detection system that has data and alarming integrated with the Supervisory Control and Data Acquisition (SCADA) system. The PLM module runs the leak detection calculations that is based on material line balancing. This is based on the Schneider Volume Balance application that is explained in the OASys DNA Liquids Management Suite V4.1 Technical Datasheet section 2.6.2 Leak Detection using Volume Balance. Graphical user interface screens have been specifically developed for the leak detection system that is described in the Line Balance Leak Detection Manual.

Alignment to CSA Z662-15 applicable requirements were discussed with the Company and the supporting documents, records, and observations are listed below.

- The Line Balance Leak Detection Manual provided an overview of the PLM leak detection system. The manual stated the PLM system monitors the meters in and out, plus the line pack and/or tank change. The Line Balance PLM Overview section describes the calculation is done to determine the deviation every 1, 5 and 60 minutes (short term) and 1, 12 and 24 hours (long term). A line balance alarm is generated if the threshold is exceeded in the 5 minute or 1 hour rolling period. Thresholds are set to balance leak detection sensitivity and acceptable false alarms. An observation was made that temperature compensation is not automatically adjusted for seasonal changes and is done by the Senior Line Control Operators. The SCADA Procedure for Adjusting Batch Tracking Capacity was provided that describes the steps to adjust the temperatures and line balance alarms that will be generated by the leak detection system. The Company stated the leak detection system is adequate for its operations**.**
- The leak detection system alarms are reviewed daily, during business hours, as shown in the agenda of the Morning Meeting – Operations Review record provided by the Company. The Control Room Management Plan – Section 6 Alarm Management described this monthly alarm review that monitors for systemic issues and identifies corrective actions. The company performs tests to verify the leak detection system and Line Control Operator response. Live Leak Detection and Simulated Leak Detection Operability Testing procedures were provided and supported by the Leak System Testing Records record. A record list provided by the Company indicated simulated leak detection operability and live leak operability tests are conducted annually.
- All leak detection equipment connected to the Supervisory Control and Data Acquisition System (SCADA) is deemed critical and managed though procedures that include the Critical Safety Equipment and Maintenance Program, Deactivating Critical Alarms, Critical Systems and Critical Equipment and the Critical PM – MOC Process. The company stated that the leak detection system has redundant transmitters that can be utilized to maintain operation. Leak detection equipment calibration and maintenance is managed though the IFS maintenance planning system. Examples of calibrations were shown in the LDS Calibration records North Toronto Example and The TNPI Certificate 12 Inch North Toronto, that described the details of a 12 inch prover calibration certification performed by a third party.
- The Review Process section of the Line Balance Leak Detection Manual stated "*A maximum volume of 3 m3* (3000 liters) *over the alarm threshold and/or 8 minutes investigation time (whichever comes first) for a given rate of leakage is permitted."* Line Control Operators are trained to monitor pipeline pressure and flow changes that can be indicators of leaks and the method used when pipeline sections are shut in. Line Controller Operators are trained on the leak detection system. The Pipeline Controller Training Plan and Signoff document identifies

the leak detection training and the September 2019 Line Balance Leak Detection training presentation was provided as an example. Line Control Operator response is tested during simulated or live leak operability tests that occur on an annual basis.

For a detailed description of the pipeline control Supervisory Control and Data Acquisition (SCADA) system, please refer to the assessment section of AP-21: Supervisory Control and Data Acquisition (SCADA) design, maintenance and operational functions.

Though document review, inspection and interviews the company demonstrated that it has a developed and implemented a control system and leak detection system that has data and alarming integrated with the SCADA system.

Note: The audit scope limited the audit to the control room, as such a full review of the requirement within CSA Z662-19 was not verified.

Finding: No Issues Noted.

Based on the information made available and reviewed by the CER Audit Team within the scope of the audit, no non-compliances relating to this protocol item were identified during the audit.

AP-10: Pipeline Control System Data Recording System

Regulatory Requirement:

OPR s. 37: A company shall develop and implement a pipeline control system that **(b)** records historical pipeline operation data, messages and alarms for recall.

Expected Outcome: The company is able to demonstrate that it has developed and implemented a pipeline control system that records historical pipeline operation data, messages and alarms for recall.

Summary of Information Made Available by TNPI:

To demonstrate compliance with this requirement, Trans-Northern Pipeline Inc. provided the CER Audit Team with:

- Control Room Management Program
- Alarm Philosophy
- Leak System Testing Records – Intelex
- 20190926 Overpressure Incident - SCADA Information
- 20190930 Operations Activity Summary View
- Tour of the primary and backup Control Rooms
- Observation of a Line Control Operator shift change
- Interviews with Supervisory Control and Data Acquisition (SCADA) Team Lead, Product Movements Manager, Supervisor and Line Control Operators

Assessment:

TNPI directed the CER AUDIT TEAM to the Alarm Philosophy document and control room management program. Observations of the SCADA system trends and alarms/events were made when the CER Audit Team visited the Control Room.

The Company stated during interviews that the SCADA system, that includes leak detection data, is retained:

- 18 months for real time
- 6 years for the Decision Support System
- Lifetime and stored on optical drives

An operator alarm, command and acknowledgement summary list was provided for a 24 hour period on 30 September 2019. The Company is reviewing alarms and focused on meeting key performance indicators described in Alarm System Performance Monitoring (section 10) of the Control Room Management Program.

One Operation Beyond Design Limit (OBDL) incident from the past 6 months was provided; there were no leak events. This occurred on September 26, 2019 and was reported to the CER AUDIT TEAM. A screen capture of the facility, with an overpressure trend and associated alarms was provided as records. This incident was confirmed in the CER AUDIT TEAM database: INC2019-104.

The SCADA system that was upgraded in 2016 has the capability to retain data points, events, alarms, and configurations. Trending and summary screens are available, that allows the Line Controller to readily filter and view information.

Shift Changes for the Line Control Operators were observed on 30 October, 2019. Line Control Operators discussed operations on the two operational consoles and completed shift change log reports. These written logs that are based on a Shift Change Briefing template, captures operational & emergency information that is passed to Line Control Operators during shift change. Logs are stored in a binder within the Control Room for reference, and archived electronically. Recent shift change briefing reports are faxed to the backup facility if operational transfer occurs. The Company is in the process of upgrading to an electronic log format that has been developed in Microsoft SharePoint.

The Company was able to demonstrate through documentation, records and interviews that its SCADA system and program has the capability to record historical pipeline operational data, messages and alarms.

Finding: No Issues Noted.

Based on the information made available and reviewed by the CER Audit Team within the scope of the audit, no non-compliances relating to this protocol item were identified during the audit.

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

Regulatory Requirement:

OPR s. 6.5(1) A company shall, as part of its management system and the programs referred to in section 55,

OPR s. 6.5(1)(r) establish and implement a process for the internal reporting of hazards, potential hazards, incidents and near-misses and for taking corrective and preventative actions, including the steps to manage imminent hazards;

Expected Outcome: 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 preventative 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; and
- 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.

Summary of Information Made Available by TNPI:

Information provided by TNPI to the CER Audit Team to demonstrate compliance with this regulatory requirement included:

Documents

- Control Room Management Program
- Event Reporting Policy
- Event Reporting Procedure
- Event Reporting – How To
- Event Investigation Procedure
- Incident Investigation Report Template
- Corrective Action Process
- Intelex Event Management – Mobile Applications Instructions
- ROW Maintenance and Surveillance Program
- Perform Line Walk Procedure
- Line Walk Patrol Report Form
- Perform Vehicle Patrol Procedure
- Perform Aerial Patrol Procedure
- Aerial and Vehicle Patrol Report Form

Records

- 2017-2019 Near Misses and Incidents
- Intelex Event Reporting – New Incident Management – Entry Screen
- Daily Event Communications to TNPI Leadership
- 2017-2019 Near Miss HIDs and Incidents CRM and CAPAs
- Montreal Feeder Line Unreported Overpressure Incidents (Event Investigation Report #529)
- Montreal Station Overpressure (Event Investigation Report #613)
- Clarkson Station Overpressure (Event Investigation Report #614)
- Maitland Overpressure (Event Investigation Report #809)
- Clarkson Power and Generator Failure (Event Investigation Report #1177)

Assessment:

TNPI has a number of policies, processes, procedures and tools in place for incident management, investigations and corrective actions. These work in an integrated way that outline the expectations, steps and responsibilities to:

- Identify, respond to, classify and report on incidents, near misses and hazards;
- Provide internal and external notifications of incidents, near misses and hazards;
- Assign event responsibilities (owners, leads, resources to participate in investigations commensurate with the risk ranking of the event);
- Investigate and identify causes and root causes of the event;
- Develop and track any corrective actions required to mitigate risks associated with the root causes;
- Validate the effectiveness of corrective actions;
- Identify and communicate lessons learned both internally and externally; and
- Provide oversight of incident management by tracking, trending, reporting and reviewing incident, near miss and hazard data as well as progress of incident investigations and implementation of associated corrective actions.

To ensure that TNPI is comprehensive in its incident management approach, it has defined events to include: incidents, near misses, hazards (including potential hazards), regulatory non-compliances, and violations of TNPI policies and procedures.

TNPI has an enterprise-wide management system that it has titled as its Operational Excellence Management system (OEMS), based on the Plan-Do-Check-Act cycle. The OEMS is made up of sixteen (16) elements each containing requirements and expectations that support the effective management of operational and related business function risks.

According to TNPI, the OEMS *"consolidates and organizes numerous TNPI standards, systems and processes that provide the foundation to consistently execute work and measure performance".* The OEMS Elements applicable to the incident management process include:

- OEMS Element 12: Incident Management, Investigations and Corrective Actions;
- OEMS Element 2: Risk Assessment and Management;

- OEMS Element 7: Management of Change; and
- OEMS Element 16: Management Review.

Within its OEMS, TNPI's Event Reporting Policy states that all hazards, potential hazards, incidents and near misses must be reported and that all incidents both with and without loss will be investigated and reviewed by management to identify the inadequacy or failure of management system(s) so they can be improved through corrective actions. The policy encourages staff to identify and report all incidents, near misses and hazards without fear of penalty, sanction or discrimination.

TNPI has an Event Investigation Procedure that manages the investigation of incidents, hazards, and near misses. Events are investigated based on severity and potential frequency, allowing TNPI to categorize all reported events to enable the analysis of trends and opportunities for improvements. TNPI's approach in this procedure consists of four themes:

- Immediate Response and Reporting of Event;
- Classification and Notification of Events;
- Investigation, Risk Assessment; Causal Analysis and Corrective Action; and
- Key Learnings, Effectiveness Reviews and Trend Analysis

The procedure stipulates:

- What must be reported;
- Reporting notifications;
- Management responsibilities;
- Determination of causes focusing on the effectiveness of management systems and specifically relevant elements of OEMS;
- Development of corrective actions;
- Communication of the investigation's findings and lessons learned.

The procedure also has a focus on Operation beyond Design Limits (Overpressure) incidents and response requirements for imminent hazards, linking those to the various individual procedures used to support the identification of hazards (e.g. Unauthorized Crossing Activity).

Investigations are carried out dependent on the severity of the incident, with Systematic Causal Analysis Technique (SCAT) methodology used to support the determination of the incident causes and root causes of more severe or complex events. For each event, control room activities are reviewed to determine if they were a contributing factor (root cause) of the incident. Once the root cause of the incident is determined, corrective action activities are determined using TNPI's Corrective Action Process.

The Corrective Action Process defines the minimum requirements and responsibilities for creating, administering, tracking, reporting and managing corrective actions through their implementation and resolution. TNPI considers a range of activities that may create corrective actions and has outlined those within its process, including the system where the actions are stored.

In addition to having processes in place to ensure corrective actions are established, TNPI also has a procedure (Corrective Action Effectiveness Assessment) that outlines the steps to review and assess the effectiveness of implemented corrective actions and of the communication of lessons learned of High Actual and Potential Risk Incidents. The effectiveness review determines if the corrective actions have been effectively implemented; the corrective actions have prevented the recurrence of similar Incidents; the appropriate root causes have been identified; lessons learned have been effectively communicated. Any deficiencies identified by the evaluation will require additional remedial corrective actions. The company provided the CER AUDIT TEAM with documents and records that verified that the processes have been implemented and are being used.
Finding: No Issues Noted. Based on the information made available and reviewed by the CER Audit Team within the scope of the audit, no non-compliances relating to this protocol item were identified during the audit.

AP-12: Emergency Procedures Manual

Regulatory Requirement:

OPR s. 32(1.1): The company shall develop an emergency procedures manual, review it regularly and update it as required.

Expected Outcome: The company is able to demonstrate that it has developed, regularly reviews and updates as required an emergency procedures manual to respond to control room specific emergencies (e.g. bomb threat).

Summary of Information Made Available by TNPI:

Information provided by Trans-Northern Pipeline Inc. to the CER Audit Team to demonstrate compliance to this regulatory requirement included:

- TNPI Emergency Response Plan (ERP)
- Line Control Emergency Response Manual
- Site specific emergency response manuals
- Intelex Document Revision Report – Line Control ERP
- Emergency Response Tests 2016-2019
- 2018-10-11 After Action Report – Montreal System Integrity TTX
- Emergency Response Tests 2016-2019 - Follow Ups
- Intelex - Emergency Response - Follow Up Actions Report Example 44
- Diapason 2 Emergency Response Exercise #44 - Follow-Up Action #00088
- Diapason 2 Emergency Response Exercise #44 - Follow-Up Action #00088
- Tour of the primary and backup Control Rooms
- Observation of a Line Control Operator shift change
- Interviews with Product Movements Manager, Supervisor and Line Control Operators

Assessment:

The TNPI Corporate Emergency Response Plan (ERP) describes the responsibility of the Line Control Operator when an emergency occurs. Section 4.1 General Response Activation steps through the procedure. This section describes the notifications, records and actions, including the activation of the Incident Command System (ICS). The Company indicated that this document is available through online access and a hardcopy in the primary and backup Control Rooms. Three site specific emergency plans were provided in the Company's response.

The Line Control Emergency Response Manual is used by the Line Control Operator. This procedure describes the emergency response activation and response to leaks specific to pipeline segments, and Line Control evacuation procedures. The Company stated that this is available through online access and a hardcopy in the primary and backup Control Rooms.

The Line Control Emergency Response Manual hardcopy consists of approximately of 140 pages. The Company is in the process of implementing the Procedure Accelerator application. This application allows fast access to response steps, links to other procedures, revision information, and logs the decisions made by the Control Center staff. Implementation is scheduled for early 2020. As an interim measure the Company has added

an ERP (Emergency Response Plan) button to the SCADA display.

Emergency Procedures are reviewed by the Line Control Operators on an annual frequency. The Intelex system schedules participation in field exercises that test corporate emergency response. The Emergency Response Tests 2016-2019 record provided the test name, frequency, test date, next planned date, and results for field exercises and call center drills.

The company provided example of lessons learned from an overpressure incident that occurred on 23 August 2018. The required reading records: Lessons Learned – 08 -2018 Control Room Specific Required Reading Thermal Pressure and the Lessons Learned – 09-2018 Control Room Specific Signoff supported the lessons learned requirement.

Interviews conducted with Line Controllers indicated that they were familiar with corporate emergency response plan and control room specific emergency response procedures.

The Company demonstrated that is has developed emergency procedures to be used by control room staff and that these procedures are reviewed by all staff on at least an annual basis. These emergency procedures are regularly reviewed and updated.

Finding: No Issues Noted.

Based on the information made available and reviewed by the CER Audit Team within the scope of this audit, no non-compliances relating to this protocol item were identified during the audit.

AP-13: Analysis of Leak Alarms

Regulatory Requirement:

CSA Z662-15 - E.4.3.2: Analysis of leak alarms shall 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 developed. The leak detection system analysis procedure shall state a maximum analysis period. If the cause of the leak alarm has not been declared within the period, the pipeline shall be brought to a safe state until the leak alarm cause has been determined.

Expected Outcome: The company is able to demonstrate that it analyzes all leak alarms to determine the cause and has developed methods to determine the cause.

Summary of Information Made Available by TNPI:

Information provided by Trans-Northern Pipeline Inc. to the CER Audit Team to demonstrate compliance to this regulatory requirement included:

- Line Control Emergency Response Manual
- Line Balance Alarm Analysis
- Control Room Management Program
- TNPI Emergency Response Plan (ERP)
- AP13 Line Balance Leak Detection - Additional Supporting Information
- Daily Business Meeting Agenda (Screenshot)
- Standing CRMP Monthly Meeting Agenda (Screenshot)
- Operations Morning Meeting - Action List 2019
- Pipeline Monitoring – PLM – Filtered (Leak) Event Summaries records
- Monthly Alarm Data Review records
- Monthly CRMP Review Minutes records
- Tour of the primary and backup Control Rooms
- Observation of a Line Control Operator shift change
- Interviews with Supervisory Control and Data Acquisition (SCADA) Team Lead, Product Movements Manager, Supervisor and Line Control Operators

Assessment:

The Line Control Emergency Response Manual provided the Flow Chart of Detection of Possible Containment Loss or Leak. This described the observations required to determine whether to shut down the pipeline. Some examples are leak detection alarm that cannot be explained, meter variation out of norm, higher flow into pipe than out, and pressure discrepancies. This flow chart stated the *"Controller has the discretion to shut down in the absence of the above but not to keep running in the presence of these."* In addition, a Flow Chart of a Reported or Suspect Leak is provided next that describes the response if Line Control is contacted about a leak or spill. There are specific requirements that would trigger the Line Control Operator to shut down if product is pooling on land, product is visible on water, and report of strong odor of product from public,

employees or agencies. Section 2.04 Leak Analysis describes the steps to investigate and determine whether to shut down the pipeline. Item 5 Leak Analysis Flow Chart shows the steps in decision making.

The Line Balance Alarm Analysis document, section Leak Review Steps, described the specific steps that a Line Control Operator must review to verify an alarm triggered by the PLM, that is the leak detection module in SCADA.

The Company's Control Room and SCADA Support Team meet daily to review all SCADA alarms, including leak detection alarms triggered by the PLM. Monthly alarm review meetings, identified in section 6.2 Monthly Review of Safety-Related Alarms of the Control Room Management Program, focused on trends and determination of systemic issues. Examples of the Daily Business Meeting and Standing CRMP Monthly Meeting agendas were provided. Supporting records included the Monthly Data Review Minutes, Monthly CRMP Review Minutes, and the PLM Filtered Leak Event Summaries. The Operations Morning Meeting – Action List 2019 record described the review process that includes the issue, action, who is responsible and date completed.

Interviews were conducted with two Line Control Operators. They were able to describe the procedure used to investigate leak alarms. Line Control Operators are supported by the Product Movements Supervisor and Manager, and the SCADA System Support Team. The Product Movements Manager and Supervisor stated that they were confident that the Line Control Operators could analyze leak alarms and shutdown, if necessary.

The Company was able to demonstrate to the CER AUDIT TEAM that it has technology and procedures to analyze all leak alarms to determine the root cause. Based on the evidence provided it appears that Company does not discount and declare invalid such alarms without analysis. The Company uses leak detection analysis documentation to determine the cause of leak alarms. This process has a maximum analysis period of eight minutes before the pipeline is safely shutdown.

Finding: No Issues Noted.

Based on the information made available and reviewed by the CER Audit Team within the scope of the audit, no non-compliances relating to this protocol item were identified during the audit.

AP-14: Safe Shutdown of Pipeline in an Emergency

Regulatory Requirement:

CSA Z662-15 Clause 10.5.2.1 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: The company is able to demonstrate that it has established emergency procedures for the safe control or shutdown of the pipeline system in the event of an emergency; and safety procedures for personnel at emergency sites.

Summary of Information Made Available by TNPI:

Information provided by Trans-Northern Pipeline Inc. to the CER Audit Team to demonstrate compliance to this regulatory requirement included:

- TNPI Corporate Emergency Response Plan
- Line Control Emergency Response Plan
- Line Balance Emergency Response Manual
- Control Room Management Program
- Pipeline Control Philosophy
- 4.03 Line Protection Software 1
- 4.04 Line Protection Software 2
- TNPI CR Training Plan
- TNPI Training Workbook
- Line Control Training Status - Emergency Response Training
- Line Control Crew Shift Schedule - 2019
- Emergency Response Tests with SCADA evac
- System Enhancement Reference- ERP on SCADA
- Tour of the primary and backup Control Rooms
- Observation of a Line Control Operator shift change
- Interviews with Product Movements Manager, Supervisor and Line Control Operators

Assessment:

The Company provided the Line Control Emergency Response Plan that describes the steps a Line Control Operator will take to shut down the pipeline. Section 2.02 (Response to a Possible Leak) provides a flow chart decision tree that triggers a shutdown and investigation, and Section 2.04 Leak Analysis provides a flow chart decision tree that helps the Line Controller analyze the data. The procedural responses are separated into facility and pipeline segment procedures that step through evaluating leak alarms and performing emergency shutdowns. Emergency shutdown of the Company's pipelines due to the evacuation of the Control Center is described in section 5 (Line Control Evacuation Procedures)

The Company provided the TNPI Training Workbook that describes the “Shutting Down the Pipeline” modules for specific pipeline segments. Training objectives include: describe conditions under that a pipeline segment will be shutdown, shut down a pipeline segment under scheduled or emergency conditions and describe the effects of a pipeline segment shutdown. These modules include purpose, Controller responsibilities, emergency shutdown due to abnormal conditions, emergency shutdowns, scheduled shutdowns and a self-assessment. The Line Control Status – Emergency Response Training record provided a sample list of training associated with response to abnormal conditions and emergencies. This included Leak Detection/PLM Training, Abnormal Operation Conditions Training, Event Reporting and Investigation Procedure Training and ICS. The Emergency Response Tests with SCADA evac records provided a sample list of exercises that include Full-Scale Emergency Response Exercises and Line Control Evacuation – SCADA Backup Control Centre.

The Control Room Management Program Section 3.4.3 Emergency Operations states *“The Controller has operational authority and responsibility to perform the following actions under emergency conditions: Know how to identify and safely respond to conditions that warrants an emergency shutdown to prevent and/or minimize the probability of danger to employee personnel and/or negatively impact the environment.”*

Interviews with control room staff (two Line Control Operators, Supervisor, & Manager) all stated that the Line Control Operator has the clear authority to shut down the pipeline. The Line Controllers are cross trained on both operational consoles and can monitor when a Line Control Operator steps away from their console or is unavailable for duty. The CER AUDIT TEAM observed a shift change. Line Control Operators discussed operational information, reviewed alarm and maintenance activities. All Line Control Operators participated that indicated a team based approach to operating the pipeline system.

The Company provided safety procedures for personnel at emergency sites.

- Critical Operations Communication Procedure: describes steps to ensure required communication occurs between field services and the control room during critical maintenance activities
- Field to Control Centre Communication Protocol: describes steps to ensure the control centre is aware of field operations activities
- Working Alone Procedure – After Hours Log: describes how the Company is aware of employee’s locations when working after normal working hours.

The Company demonstrated that it has established emergency procedures for the safe control or shutdown of the pipeline system in the event of an emergency; and safety procedures for personnel at emergency sites.

Finding: No Issues Noted.

Based on the information made available and reviewed by the CER Audit Team within the scope of this audit, no non-compliances relating to this protocol item were identified during the audit.

AP-15: Training, Competence and Evaluation

Regulatory Requirement:

OPR s. 6.5(1) A company shall, as part of its management system and the programs referred to in section 55,

OPR s. 6.5(1)(j) establish and implement a process for developing competency requirements and training programs that provide employees and other persons working with or on behalf of the company with the training that will enable them to perform their duties in a manner that is safe, ensures the security of the pipeline and protects the environment.

OPR s. 46(1) A company shall develop and implement a training program for any employee of the company who is directly involved in the operation of the pipeline.

OPR s. 46(2) The training program shall instruct the employee on

(a) The safety regulations and procedures applicable to the day-to-day operation of the pipeline;

(a.1) The security processes, procedures and measures applicable to the day-to-day operation of the pipeline;

(b) responsible environmental practices and procedures in the day-to-day operation of the pipeline;

(c) the procedures for the proper operation of the equipment that the employee could reasonably be expected to use; and

(d) the emergency procedures set out in the manual developed under section 32 and the procedures for the operation of all emergency equipment that the employee could reasonably be expected to use.

(3) The company shall use reasonable efforts to ensure that any employee who attends a training program has a working knowledge of the subject-matter of the program at the end of the program.

Non-Mandatory Requirement - CSA Z662-15 - E.9.1: Pipeline controllers shall receive appropriate initial training and retraining. The operating company shall develop a policy for pipeline controller training, testing and retraining. Testing shall be performed to determine pipeline controller competency before the pipeline controller operates the pipeline. The operating company shall establish competency criteria for pipeline controllers. The leak detection system developers, support staff, and pipeline controllers shall be competent in understanding the leak detection methodology, critical equipment and processes, the software application, and the influence of each on the performance of the leak detection system.

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 required;
- 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; and
- persons working with or on behalf of the company are provided with adequate training applicable to s.55 programs and the management system.

Summary of Information Made Available by TNPI:

The information provided by TNPI to the CER Audit Team to demonstrate compliance to this regulatory requirement included:

Documents

- Control Room Management Plan
- Learning and Competency Process
- TNPI CR Training Plan
- TNPI Training Workbook
- Manager, Product Movement Position Description
- Supervisor Product Movement Manager, Product Movement Position Description
- Line Controller Position Description
- Operations Coordinator, Control Centre Position Description
- Scheduler Position Description
- Senior Line Controller Position Description

Records

- CRM Training Matrix

Assessment:

TNPI has an enterprise-wide Operational Excellence Management System (OEMS) based on the Plan-Do-Check-Act cycle. The OEMS is made up of sixteen (16) management system (MS) elements each containing requirements and expectations that support the effective management of operational and related business function risks.

Within the OEMS, TNPI has established a process to provide oversight over competency, training and evaluation. The process considers both the technical components of the role as well as company-specific requirements. The process, supported by the OEMS, is intended to:

- Identify, document and regularly review technical and professional competencies for the different positions existing within TNPI;

- Articulate competency and qualification requirements;
- Assess and evaluate competency against job requirements to identify skills gap and determine learning and development needs;
- Plan, develop and implement learning activities to address the identified learning and performance gaps;
- Develop an annual assessment of an on-going learning schedule and capability development plan for each employee;
- Include all changes to work environment and/or regulatory requirements in the refresher learning activities;
- Manage training programs to address any competency and/or qualification gaps;
- Measure training program effectiveness;
- Maintain and update records on competencies, qualifications, training programs and learning evaluations; and
- Document all learning activities for demonstration of compliance to Learning and Competency Process

The MS Elements most relevant to training, competency and evaluation include:

- Element 5A - Organizational Structure;
- Element 5B - Learning and Competency;
- Element 16 - Management Review

Element 5A - Organizational Structure: It is designed to ensure the structure, responsibilities and authorities at TNPI are effectively developed, implemented and communicated, including key technical and professional competencies for each role in the Company. The stated objective of this element is to ensure that employee performance, including the review of competencies, is effectively managed to successfully achieve the Company's goals and objectives.

Element 5B - Learning and Competency: Its purpose is to ensure TNPI clearly defines competency requirements for each position in the organization, assesses individuals against those requirements to determine competency gaps, and identifies, develops and implements the required training and development activities to close the gaps. It is supported by a suite of processes, procedures and tools that outline expectations, guidance, steps and responsibilities that work together to enable the required competencies to be defined and assessed and the required learning activities identified and implemented to ensure the competencies are attained.

Element 16 - Management Review: Guides the process through that TNPI regularly reviews training completion, including any mandatory training not completed on time.

TNPI Learning and Competency: The TNPI Training Program is comprised of a series of processes, procedures, forms and templates designed to work together to ensure that TNPI's employees are trained and competent. The key program components include:

- Competency Definition
- Training Development
- Competency Assessment Reporting and Review
- Competency Definition

Competency Definition: TNPI Human Resources (HR) works with technical leaders and subject matter experts (SMEs) to identify technical and professional competencies. TNPI develops position descriptions for the various positions within the control room, that include the key technical and professional competencies required for each role. The job descriptions are maintained in Intelex and are reviewed every three years. The definition of these competencies and the development of role descriptions are supported by position description writing guides and templates. These provide a consistent approach to capture the key responsibilities, education, skills and knowledge, and key competencies of each Company role and ensure alignment of the position to the organization's strategy (business drivers), goals and objectives.

Training Development: The Learning and Competency Process supports the learning and development of TNPI employees by ensuring training and refresher learning activities are developed, planned, scheduled and provided for each required training topic identified in position learning plans and employees' individual capability development plans. The effectiveness of training activities is assessed by evaluating employee competence post training.

Competency Assessment: The Learning and Competency Process requires that TNPI's employees are regularly assessed and evaluated to ensure they are competent to perform the responsibilities and authorities of their position. The Process ensures the frequency of competency assessments is completed considering the risk associated with the role, work scope and environment changes and regulatory requirements associated to the work. The assessment of employee competency is supported by TNPI's performance management cycle that ensures that personnel possess the required skills and capabilities to perform their role. This process ensures employees are regularly assessed and evaluated against their required competencies, areas of competency improvement and development are identified, and learning and training objectives are defined to close any competency gaps.

Reporting and Review: The company uses a proprietary system called 'Intelex' for document and data management. It is also used to retain employee training requirements, track course due dates for individual employees, and maintain a history of course completion for each employee. The training information from Intelex, including key performance indicators (KPI) are reviewed by leadership and reported as part of the OEMS Management Review process for information and action as required.

TNPI utilizes the processes described above to develop competency and training requirements for control room staff. Competency requirements are outlined within the Line Controller Position descriptions and within the Control Room Management Program and summarized in the Pipeline Controller Training Plan & Signoff form. The training requirements are managed in Intelex as per the Training Matrix and Competencies, and are verified before the Controller is allowed to operate the pipeline independently. These training and competency requirements are reviewed every three years to identify potential improvements to the training program.

TNPI has a Workforce Planning Process that outlines the steps for each organizational unit to review its organizational structure, review competency requirements and determine if resources are adequate.

TNPI has onboarding training consisting of the common safety, security and environmental training that all employees must take. It is largely delivered and completed on-line. Line controllers are given two weeks to complete the onboarding training. They are then assigned a mentor to oversee the completion of their on-the-job training (OJT) package consisting of a number of skills that they have to demonstrate. This OJT

training occurs over approximately a 6-month period.

To support continued maintenance of competencies, Controllers are to complete identified refresher training on a scheduled basis. As well, Controller competencies are to be evaluated during pipeline leak tests, emergency table top drills and full emergency exercises. Any learnings from these exercises are to be applied to the individuals involved and adjustments made to the Control room procedures, documentation and training requirements (as required).

The CER AUDIT TEAM reviewed all of the documents and records provided by TNPI, as listed above in the section titled: Summary of Information Made Available by TNPI.

In Summary, TNPI was able to demonstrate to the CER Audit Team that it has identified the competencies of control room staff and that it has developed training requirements and training programs to meet those requirements.

Finding: No Issues Noted.

Based on the information made available and reviewed by the CER Audit Team within the scope of the audit, no non-compliances relating to this protocol item were identified during the audit.

AP-16: Training, Competence and Evaluation

Regulatory Requirement:

OPR s. 6.5(1) A company shall, as part of its management system and the programs referred to in section 55,

OPR s. 6.5(1)(k) 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;

OPR s. 46(2) The training program shall instruct the employee on

(a) The safety regulations and procedures applicable to the day-to-day operation of the pipeline;

(a.1) The security processes, procedures and measures applicable to the day-to-day operation of the pipeline;

(b) responsible environmental practices and procedures in the day-to-day operation of the pipeline;

(c) the procedures for the proper operation of the equipment that the employee could reasonably be expected to use; and

(d) the emergency procedures set out in the manual developed under section 32 and the procedures for the operation of all emergency equipment that the employee could reasonably be expected to use.

(3) The company shall use reasonable efforts to ensure that any employee who attends a training program has a working knowledge of the subject-matter of the program at the end of the program.

Expected Outcome: The company is able to 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 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; and
- 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.

Summary of Information Made Available by TNPI:

The information provided by TNPI to the CER Audit Team to demonstrate compliance to this regulatory requirement included:

Documents

- Control Room Management Plan
- Learning and Competency Process
- TNPI CR Training Plan
- TNPI Owner's Rep Checkout Procedure
- Job Specific Execution Plans
- Contractor Management Standard
- Contractor Management Procedure

Records

- TNPI Staff Performance Management Resource Guide for Employees
- TNPI Staff Performance Management Forms (11)
- Job Observation Checklist – Golden Hour
- Job Observation Checklist – Shift Change
- Job Observation Checklist – Covered Task
- TNPI Staff - Shift Change Job Observation Checklists (5)
- TNPI Staff – Completed and Signed Pipeline Controller Training Plan and Signoff Records (8)
- TNPI Staff – Partially Completed and Signed Pipeline Controller Training Plan and Signoff Records (2)
- Owner Representative Checklists (3)
- Contractor Job Specific Execution Plans (4)
- CRM Training Matrix
- Line Controller Training Status

Assessment:

See the assessment in AP-15: Training Competency and Evaluation.

The company demonstrated that it has developed training requirements and training programs and that it has a process to verify ongoing competency through the use of drills and exercises. The issue of concern for the CER AUDIT TEAM though was that leak detection exercises conducted through the organized real or simulated withdrawal of liquids from the pipeline are not being conducted in a manner or frequency that ensures that all controllers have the opportunity to go through the process. In addition, there was no evidence to demonstrate that table top exercises are being conducted that address all abnormal and emergency scenarios in the Control Room. As a result, the company was unable to demonstrate that it has an adequate process to monitor and verify the ongoing competency of all line controllers. This was verified during interviews with Line Controllers who indicated that they were unaware of ongoing competency checks being carried out by supervisors and

managers to verify the continued competency of staff aside from periodic fluid removal tests.
Finding: Non-Compliant Based on the information made available and reviewed by the CER Audit Team, within the scope of this audit, TNPI was found to be non-compliant with this regulatory requirement. A CAPA Plan must be developed to analyze, address and manage these deficiencies.

AP-17: Annual Training Program Report

Regulatory Requirement:

OPR s. 56 A company shall, in addition to complying with the record retention requirements set out in the CSA standards referred to in section 4, retain

(b) 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: The company is able to 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.

Summary of Information Made Available by TNPI:

The information provided by TNPI to the CER Audit Team to demonstrate compliance with this regulatory requirement included:

Documents

- Learning and Competency Process
- Management Review Process

Records

- Line Control Training Status
- OEMS Element 5B KPIs – Number of Mandatory Courses Overdue – March to June 2019 Comparison

Assessment:

TNPI was able to demonstrate that it has procedures in place to keep track of individual training that is planned and the training that is overdue. It was also able to demonstrate that it has a process in place through its MR Process to make senior management and the Accountable Officer aware of individuals who have outstanding training. However, it was not able to demonstrate that it provides senior management and the Annual Report with the overall status of required and planned training and the training that has been completed. The report is an exception style report rather than an overall status report. The CER AUDIT TEAM noted that the company is implementing a new Learning Management System (LMS) that should address the issue.

The CER AUDIT TEAM finds the company to be Non – Compliant with this regulatory requirement.

Finding: Non-Compliant

Based on the information made available and reviewed by the CER Audit Team, within the scope of this audit, TNPI was found to be non-compliant with this regulatory requirement. A CAPA Plan must be developed to analyze, address and manage these deficiencies.

AP-18: Control Room Audits

Regulatory Requirement:

OPR s. 55(1) A company shall conduct audits with a maximum interval of three years of the following programs: (b) the integrity management program referred to in section 40, including the pipeline control system referred to in section 37;

OPR s. 55(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: The company is able to demonstrate that it conducts audits of the pipeline control system and leak detection system with a maximum interval of three years. The audit reports note any deficiencies and any corrective actions taken or planned to be taken.

Summary of Information Made Available by TNPI:

To demonstrate compliance to this regulatory requirement, TNPI provided the CER Audit Team with its:

Records

- TNPI Compliance and Management System Audit Report, dated June 2013
- TNPI Compliance and Management System Audit Protocols, dated June 2013
- 2016 Audit Plan
- TNPI OI Assessment, dated 6 February 2017
- OEMS Audit Actions, dated 6 February 2017
- Third Party Verification of TNPI CEPA Integrity First Self-Assessment, dated 6 Nov 2017

Assessment:

TNPI provided the CER AUDIT TEAM with The Trans-Northern Pipeline Incorporated Compliance and Management System Audit, dated June 2013 and the associated protocol. The audit protocol included many regulatory requirements from the On-Shore Pipeline Regulations (OPR) and the referenced standard CSA Z662 – Oil and Gas Pipelines. The CER Audit Team did not verify that the protocol included all relevant sections of CSA Z662 but noted that there were some clauses from the standard that were not included in the audit, such as clause E.8.4 (Leak Detection System – Audits of Special Incidents). This clause would be deemed essential in a Section 55 Program Audit.

The objective of a section 55 audit is to verify that the company's program areas are meeting the technical requirements of the OPR and referenced codes and standards, and that the program has effective processes in place and that they are being followed, including non-regulatory procedures developed by the company.

TNPI also demonstrated that it conducted an Internal Assessment in 2016, using the same protocol as was used in the 2013 Audit. As such, the same issue of concern applies as mentioned above.

It was also noted that a number of the findings from the 2013 and 2016 audits, were the same as findings from this CER audit, which indicates

that TNPI is not adequately following up on corrective and preventive actions to prevent reoccurrence. Similar audit deficiencies were noted in the areas of document control, training and competency verification and testing of the leak detection system.

TNPI also provided that CER Audit Team with a Third-Party Verification of Trans-Northern Pipelines Integrity-First Self-Assessment, dated 6 November 2017. This verification was based on the Canadian Energy Pipeline Association (CEPA) Integrity-First Program. The self-assessment focused on Integrity Management and Control Room Management, but does not meet the requirements of an OPR section 55 audit.

While TNPI demonstrated that it is conducting audits of its control room processes and activities, it was unable to demonstrate that the audits assessed all of the technical requirements expected of an OPR section 55 audit. It also was unable to demonstrate that it is taking appropriate corrective and preventive actions to prevent the reoccurrence of deficiencies noted during audits. Furthermore, the company was unable to demonstrate that control room audits are being conducted with a maximum interval of three years.

Finding: Non-Compliant

Based on the information made available and reviewed by the CER Audit Team, within the scope of this audit, TNPI was found to be non-compliant with this regulatory requirement. A CAPA Plan must be developed to analyze, address and manage these deficiencies.

AP-19: Leak Detection System – Audits of Special Incidents

Regulatory Requirement:

CSA Z662-15 clause E.8.4: audits shall also include and evaluate, where applicable, details of the following categories of incidents, the action taken, and the results achieved:

a) Pipeline leaks that were not detected by the leak detection system or that were not acted upon by personnel responsible for interpreting and responding to the leak detection system;

b) Occasions when the leak detection system was inoperative because of equipment or system failures exceeding 1 h in duration;

c) Alarms caused by maintenance;

d) Alarms that have an indeterminate cause; and

e) Invalid alarms of the same cause that occur frequently.

Note: Although Annex E of CSA Z662-15 is non-mandatory, Clause 4.20.2 states that r*egardless of the method of leak detection used, operating companies should comply as* ***thoroughly as practical*** *with Annex E regarding record retention, maintenance, auditing, testing and training.*

Expected Outcome: The company is able to demonstrate that it conducts audits of the leak detection system that evaluates incidents where:

- the leak detection system did not detect the leak;
- the personnel responsible for interpreting and responding to the leak detection system did not act upon leak alarms;
- the leak detection system was inoperative because of equipment or system failures exceeding 1 hours in duration;
- alarms were caused by maintenance;
- alarms have an indeterminate cause; and
- alarms of the same cause occur frequently.

Summary of Information Made Available by TNPI:

To demonstrate compliance to this regulatory requirement, TNPI provided the CER Audit Team with:

Documents

- Control Room Management Program

Records

- Daily Alarm Reviews (Daily Business Meeting Agenda)
- CRMP Monthly (Alarm) Review May 2019
- CRMP Monthly (Alarm) Review August 2019
- Monthly CRMP Review Meeting Minutes May 2019

- Monthly CRMP Review Meeting Minutes August 2019

Assessment:

Although TNPI was able to demonstrate that it conducts daily and monthly meetings to discuss the status of alarm events, it was not able to verify that it specifically discusses the five categories of alarm events listed in CSA Z662-15 Clause E.8.4. This specific requirement was also not listed in the audit protocols for the 2013 and 2016 audits provided by the company. As a result, the CER Audit Team concluded that his requirement is not being evaluated and verified during scheduled audits. TNPI is to prepare a CAPA Plan to ensure they are compliant with the CSA Z662-19 Clause E.9.

Finding: Non-compliant

Based on the information made available and reviewed by the CER Audit Team, within the scope of this audit, TNPI was found to be non-compliant with this regulatory requirement. A CAPA Plan must be developed to analyze, address and manage these deficiencies. [Note: CSA Z662-15, used in the scope of this audit, was updated in 2019. TNPI's must ensure its CAPA Plan compliance with the CSA Z662-19 requirements]

AP-20: Annual Management Review

Regulatory Requirement:

OPR s. 6.5(1) A company shall, as part of its management system and the programs referred to in section 55,

OPR s. 6.5(1)(x): 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 section 6.

Expected Outcome: The company is able to 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 operations under section 6. 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 s. 55 program;
- the company has maintained records to demonstrate the achievement of OPR s. 6 obligations is continually improved; and
- the company has identified, developed, and implemented corrective actions as part of its continual improvement.

Summary of Information Made Available by TNPI:

To demonstrate compliance to this regulatory requirement, TNPI provided the CER Audit Team with:

Documents

- Management Review Process

Records

- OEMS Management Review 4 December 2018
- OEMS Management Review Minutes 4 December 2018
- Final 2018 Annual Accountable Officer Report, dated 24 April 2019
- OEMS Presentation 26 March 2019
- OEMS Minutes Management Review Q1 2019, dated 26 March 2019
- OEMS Management Review Presentation 27 June 2019
- OEMS Minutes Management Review Q2 2019, dated 27 June 2019
- 2019 Engineering and Integrity Goals, Objectives and Targets
- Product Movement Goals, Objectives and Targets
- CRMP Monthly Review and Actions

Assessment:

TNPI has an enterprise-wide management system that it has titled as its Operational Excellence Management system (OEMS), The OEMS is made up of sixteen (16) elements each containing requirements and expectations that support the effective management of operational and related business function risks. The OEMS consolidates and organizes numerous TNPI standards, systems and processes that provide the foundation to consistently execute work and measure performance.

The OEMS Element applicable to the incident management process is Element 16 (Management Review), that is supported by documented processes:

- Plan and schedule the required management reviews;
- Measure and monitor the adequacy and effectiveness of the OEMS elements and programs;
- Conduct reviews and assessments and document outcomes;
- Monitor progress of decisions and actions;
- Report updates to stakeholders including the Board of Directors
- The steps and responsibilities to conduct reviews of performance information;
- Evaluate the adequacy and effectiveness of TNPI's OEMS components;
- Identify, assign and monitor progress of follow up and corrective actions resulting from any identified gaps in performance; and
- Report performance to stakeholders including the Board of Directors.

The information reviewed by management is compiled using TNPI's Measurement and Monitoring Process. TNPI program and process owners gather data that verifies compliance and conformance and measures progress towards their program's or process' goals, objectives or targets. The program and process owners highlight any significant changes (MOCs), deficient results or areas of concern (e.g. high risk issues) and the actions taken or underway to resolve them through corrective and preventive action plans.

While TNPI was able to demonstrate to the CER AUDIT TEAM that it has management oversight and review processes available and being used, it seems clear though that without adequate audit information and complete training information, senior management may not be getting all the information needed to make decisions. The CAPAS required for the Non-Compliances noted in AP 17, AP 18, and AP 19 will address the information gaps and will be monitored in the CAPA verification process. However, the Management Review process cannot be assessed as being compliant as long as it is missing vital pieces of information. In addition, the fact that audits and overdue corrective actions were not being properly managed by the MR Process, indicates that there is a deficiency in the process.

Finding: Non-Compliant

Based on the information made available and reviewed by the CER Audit Team TNPI has been found Non-Compliant relating to items described in this protocol item. A CAPA Plan must be developed to analyze, address and manage this deficiency.

AP-21: Pipeline Control System and Leak Detection System

Regulatory Requirement: **OPR s. 37** 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: The company is able to 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 Z662-15.
Summary of Information Made Available by TNPI: Information provided by Trans-Northern Pipelines Inc. to the CER Audit Team to demonstrate compliance to this requirement included: • Control Room Management Program • Engineering Standards – Pressure Operating Envelop • Alarm Philosophy • Critical Safety Equipment and Maintenance Program • Checklist for Changing Pressure Settings • LAN and SCADA Backup Procedure • Line Control Operating Procedures • SCADA Procedure for Adjusting Batch Tracking Capacity • Verify Changes in SCADA for Pressure Changes • Management of Change (MOC) Procedure • Back up Control Center System Checks – explanation of Golden Hour Check • CHECKLIST Back Up Control Room - considered shift change TNPI Golden Hour Report V1.0 • Question regarding SCADA Display - confirmatory information • RECORD Update TNPI SCADA Station Displays Project Charter • Completed 12.1 SCADA Testing Forms • Completed 12.8 Alarms Taken Offscan forms • Morning Meeting - Operations Review - Meeting Agenda • Operations Morning Meeting - Action List 2019 • SCADA – Point To Point Commissioning Example (FT OPP project) • SCADA 2015 Course Outline for system update • SCADA SSCR TOC System Upgrade • Sep2019 SCADA-CR Training Line Balance Leak Detection • Sept 2019 Training SCADA-Line Balance Leak Detection - Knowledge check – Answers • Sept 2019 Training - Line Imbalance Quick Reference Guide • TNPI OFF-SITE CONTROL CENTER Monthly TEST Report 20190809

- Backup Control Centre Tests
- Tour of the primary and backup Control Rooms
- Observation of a Line Control Operator shift change
- Interviews with Supervisory Control and Data Acquisition (SCADA) Team Lead, Product Movements Manager, Supervisor and Line Control Operators

Assessment:

The Supervisory Control and Data Acquisition System used by Line Control Operators to control and monitor the pipeline system was developed by a well-known vendor. The current version is up to date. There are two operational and one spare/maintenance console at the primary and backup Control Rooms. Pipeline systems are monitored by Line Control Operators 24 hours a day, 7 days a week. This system was upgraded in 2016 and has had a recent software upgrade in 2017.

The SCADA Team Lead provided an overview of the SCADA system that included architecture, servers, decision summary support and communications.

A tour of the primary and backup control rooms was provided to the CER Audit Team. At the backup control room, the CER Audit Team was shown the server room and backup power system.

Both control rooms have uninterruptible power supplies that allow the Line Control Operators adequate time to shut down the pipeline system should a building power outage occur or an evacuation is required. The SCADA servers have quadruple redundancy and replication capability. There is primary and secondary server, at the primary and backup control rooms.

The SCADA communications system is segregated from the corporate network. A Decision Support System server allows engineering, field and other support groups to view SCADA read-only information on their corporate computer.

The Company submitted the SCADA System Technical Data Sheet. This describes the technical requirements in detail. Specifications were presented by the SCADA Team Lead and included the SCADA Setup and Configuration. The table of contents for this document was supplied as a record. The SCADA system is upgraded periodically with the support of the vendor technical support. The Leak Detection System Software update Management of Change, dated 10 April 2017 was provided as a record of Management of Change for the system. LAN and SCADA Backup Procedure was provided and describes how SCADA information is archived for historical retrieval.

The Control Room Management Program describes the Company's strategy to apply API RP-1165 (Recommended Practice for Pipeline SCADA Displays). Interviews with the Company determined the 2016 SCADA upgrade transferred existing SCADA screens and the API RP 1165 Recommended Practice for Pipeline SCADA System standard was not applied, but planned for a later date.

In section 1.3 Standards of the vendor Oil and Gas OASys SCADA System Technical Data Sheet, states that this SCADA system is capable of conforming to this standard. The API RP-1165 standard focuses on design and implementation of displays used by control room staff to control and monitor the pipeline systems. It addresses best practices for the Human Interfaces (HMI) that includes elements like navigation, colors, fonts and symbols.

Interviews with the control room staff indicated a SCADA display reference document is not available for the upgraded or legacy SCADA system.

The leak detection system SCADA graphical user interface (GUI) is described in the Line Balance Leak Detection manual and training documents. Section 8 Alarm Design Principles and section 9 HMI Design Guidance, of the Alarm Philosophy addresses the requirements of alarms only and does not address controls, display symbols and other elements of API RP-1165. Prior to the upgrade of the SCADA system, a two day mandatory training course was given to the Line Control Operators. The SCADA 2015 Course Outline record was provided as a record. The curriculum focused on the user interface and covered navigation and organization of system displays, alarm recognition and acknowledgement, device controls and overrides, operational communication and printing. The Company supplied the TNPI SCADA Station Displays Project Charter, dated 18 September 2018, that identifies the objective to *"Update all TNPI SCADA displays to follow a CRM standard."* Key deliverables for this project are a SCADA display building document and updated TNPI SCADA station displays.

The Company states the Alarm Philosophy document is a *"guideline for the development, design, implementation, and management of the alarm system for primary and back up Control Centers. The Alarm Philosophy is based on ANSI/ISA 18.2 and API 1167 and meets the requirements for 49 CFR 195, applicable AER and CER regulations for alarm management."* This document describes the alarm definitions, rationalization, prioritization, design principles, information, Human Machine Interface (HMI) Design, performance monitoring, maintenance, implementation, testing, training and records. Alarms are monitored daily with SCADA and control room staff, and actioned as required. The Morning Meeting – Operations Review Meeting Agenda and Operations Morning Meeting – Action List was evidence. A monthly review is also done that identifies systemic problems, and reviews key performance indicators as described in the Control Room Management Program section 6 Alarm Management. An example of Completed Alarms Taken Offscan forms review list was provided. The Engineering Standards – Pressure Operating Envelope standard provides guidance for defining and documenting a Pressure Operating Envelope (OE), identifying actions that must be taken when Operating limits are exceeded, and establishing a common process and terminology to enable effective collaboration. The Management of Change (MOC) Procedure described how alarm changes are managed for SCADA and connected equipment. Table 1 provides information about the type of change, who can initiate, pre-approval, SME review and endorsement and final approval.

The backup control room is tested regularly by the Product Movements staff. It can be activated if there is a catastrophic SCADA failure, for testing, maintenance or if the control room needs to evacuate due to problems with power, fire or communication loss. The Line Control Emergency Response Plan section 5 describes the evacuation procedures for the primary and backup. The SCADA Support Team check the system on a monthly basis. There is health monitoring that alerts the SCADA Support Team 24x7 if there is a problem on the SCADA system. The TNPI Off-Site Control Center checklist, dated 9 August 2019 is an example of a completed test. Record Completed 12.1 SCADA Testing Forms shows that backup control room testing is occurring regularly. The control center employs a Golder Hour Check that is performed by the Line Control Operator when they start their shift. This is also done when a move to the backup control room if required. Various checks are completed that include verifying SCADA information, review of alarms, leak detection operation and other operational details. The Golden Hour Report is a checklist used by the Line Control Operators to ensure a consistent review. Interviews were conducted with Line Control Operators who described the backup testing and checks that they perform to ensure the SCADA is operating properly and data is accurate when a transfer takes place.

The Company demonstrated that it has a developed and implemented pipeline control system, that is a Supervisory Control and Data Acquisition (SCADA) system. However, the Company was unable to provide sufficient evidence that a commissioning strategy, or process to manage the displays for the SCADA system was in place. A CAPA Plan must be developed to analyze, address and manage the deficiencies listed below.

1. Commissioning evidence was provided and was shown in Point to Point Commission Example (FT OPP project). The Alarm Philosophy

Section 12.1.1 Point to Point Testing describes the steps to commission a new PLC alarm and Section 13. 1 Routine Maintenance of Field Devices describes steps to verify safety related alarms that include set point values, descriptions and response actions. The company was unable to provide evidence that the Company had a commissioning strategy or procedure for the SCADA system. Section 4.4 Point-to-Point of the Control Room Management program stated “See procedure number TBD”. There was no evidence that a process and procedures have been developed to ensure a standardized and consistent method is used to verify SCADA data and control points with associated field equipment. There was insufficient evidence regarding how or when the commissioning is performed, and requirements for records.

2. The Company was unable to provide evidence that the SCADA Support Team and control room staff had a process and procedures that describe how the SCADA display screens are designed, implemented and maintained. This ensures a standardized and consistent approach to design and implementation of SCADA displays when used to control and monitor the pipelines. This is applicable when transferring SCADA display knowledge during Line Control Operator training, and when adding new or updating facilities/equipment that the control room controls or monitors.

Note: The scope of the audit and the protocol used by the CER Audit Team did not verify the Company’s entire pipeline control system and leak detection system, only the activities within the control room were assessed to CSA Z662.

Finding: Non-Compliant

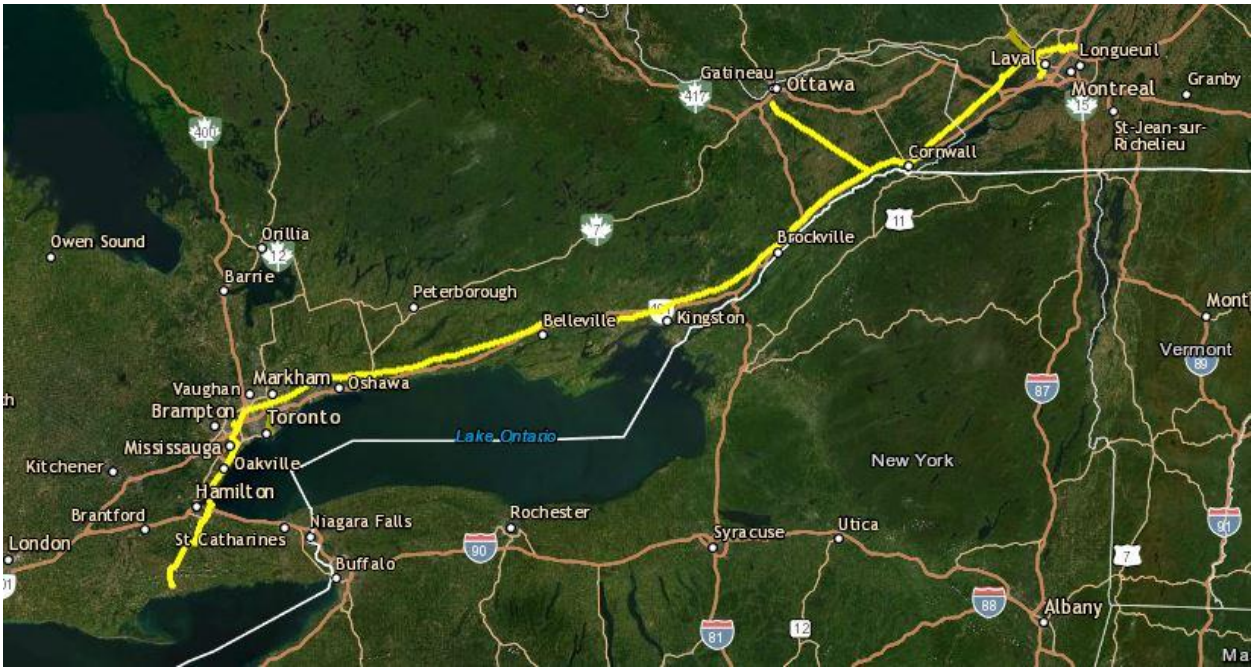
Based on the information made available and reviewed by the CER Audit Team, within the scope of this audit, TNPI was found to be non-compliant with this regulatory requirement. A CAPA Plan must be developed to analyze, address and manage these deficiencies.

Appendix 2.0 - Map and System Description

Trans-Northern operates 850 kilometers of pipeline that transports refined petroleum products such as gasoline, diesel fuel, aviation fuel, and heating fuel flowing east to west, linking Montreal, Quebec, and Oakville, Ontario, as well as flowing west to east between Nanticoke and Toronto, Ontario. Branch lines also connect to Toronto's Pearson International Airport, Montreal's Pierre Elliot Trudeau International Airport, as well as Clarkson and Ottawa, Ontario.

Incorporated in 1949, Trans-Northern Pipelines is built on four strategic pillars the organization seeks to uphold every day: Personal and Process Safety; Environmental Sustainability; Reliability; and People. Suncor Energy Inc., Shell Canada Limited, and Imperial Oil Limited are equal partners in the ownership of Trans-Northern.

Figure 1: TNPI



Appendix 3.1 - Abbreviations

The following abbreviations were used in this report:

AO: Accountable officer

AP: Audit Protocol

API: American Petroleum Institute

CAPA: Corrective and Preventative Actions

CCO: Control Centre Operations

CEPA: Canadian Energy Pipeline Association

CER: Canada Energy Regulator

CER Act: *Canadian Energy Regulator Act*

CRM: Control Room Management

CRMP: Control Room Management Program

CSA: Canadian Standards Association

EHSS&ER: Environment, Health, Safety, Security and Emergency Response

ERP: Emergency Response Plan

GOTs: Goals, Objectives and Targets

ICS: Incident Command System

IMSD: Integrated Management System Document

IR: CER audit Information Request

LDS: Leak Detection System

MOC: Management of change

MR: Management Review

MS: Management System

OBDL: Operation Beyond Design Limits

OEMS: Operations Excellence Management System

OJT: On the Job Training

OPR: *National Energy Board Onshore Pipeline Regulations*

ROW: Right of Way

SCADA: Supervisory Control and Data Acquisition

TNPI: Trans-Northern Pipelines Incorporated

Appendix 3.2 - Glossary of Terminology and Definitions

(The CER has applied the following definitions and explanations in measuring the various requirements included in this audit. They follow or incorporate legislated definitions or guidance and practices established by the CER, where available, and this will continue under the CER.)

Adequate: The management system, programs or processes complies with the scope, documentation requirements and, where applicable, the stated goals and outcomes of the CER Act, its associated regulations and referenced standards. Within the CER's regulatory requirements, this is demonstrated through documentation.

Audit: A systematic, documented verification process of objectively obtaining and evaluating evidence to determine whether specified activities, events, conditions management systems or information about these matters conform to audit criteria and legal requirements and communicating the results of the process to the company.

Compliant: The CER uses this term to indicate that, based on the information made available and reviewed, no non-compliances relating to the protocol item referenced were identified during the audit. A Corrective and Preventive Corrective Action (CAPA) plan is not required to be developed.

Corrective Action Plan: A plan that addresses the non-compliances identified in the audit report and explains the methods and actions that will be used to correct them.

Developed: A process or other requirement has been created in the format required and meets the described regulatory requirements.

Effective: A process or other requirement meets its stated goals, objectives, targets and regulated outcomes. Continual improvement is being demonstrated. Within the CER's regulatory requirements, this is primarily demonstrated by records of inspection, measurement, monitoring, investigation, quality assurance, audit and management review processes as outlined in the OPR

Established: A process or other requirement has been developed in the format required. It has been approved and endorsed for use by the appropriate management authority and communicated throughout the organization. All staff and persons working on behalf of the company or others that may require knowledge of the requirement are aware of the process requirements and its application. Staff has been trained on how to use the process or other requirement. The company has demonstrated that the process or other requirement has been implemented on a permanent basis. As a measure of "permanent basis", the CER requires the requirement to be implemented, meeting all of the prescribed requirements, for three months.

Finding: The evaluation or determination of the compliance of programs or elements in meeting the requirements of the *Canadian Energy Regulator Act* and its associated regulations.

Implemented: A process or other requirement has been approved and endorsed for use by the appropriate management authority. It has been communicated throughout the organization. All staff and persons working on behalf of the company or others that may require knowledge of the requirement are aware of the process requirements and its application. Staff has been trained on how to use the process or other requirement. Staff and others working on behalf of the company have demonstrated use of the process or other requirement. Records and interviews have provided evidence of full implementation of the requirement, as prescribed (i.e., the process or procedures are not partially utilized).

Inventory: A documented compilation of required items. It must be kept in a manner that allows it to be integrated into the management system and management system processes without further definition or analysis.

List: A documented compilation of required items. It must be kept in a manner that allows it to be integrated into the management system and management system processes without further definition or analysis.

Maintained: A process or other requirement has been kept current in the format required and continues to meet regulatory requirements. With documents, the company must demonstrate that it meets the document management requirements in OPR, paragraph 6.5(1)(o). With records, the company must demonstrate that it meets the records management requirements in OPR, paragraph 6.5 (1)(p).

Management System: The system set out in OPR sections 6.1 to 6.6. It is a systematic approach designed to effectively manage and reduce risk, and promote continual improvement. The system includes the organizational structures, resources, accountabilities, policies, processes and procedures required for the organization to meet its obligations related to safety, security and environmental protection.

(The CER has applied the following interpretation of the OPR for evaluating compliance of management systems applicable to its regulated facilities, and this will continue under the CER.)

As noted above, the CER management system requirements are set out in OPR sections 6.1 to 6.6. Therefore, in evaluating a company's management system, the CER considers more than the specific requirements of section 6.1. It considers how well the company has developed, incorporated and implemented the policies and goals on that it must base its management system as described in section 6.3; its organizational structure as described in section 6. 4; and considers the establishment, implementation, development and/or maintenance of the processes, inventory and list described in subsection 6.5(1). As stated in paragraphs 6.1(c) and (d), the company's management system and processes must apply and be applied to the programs described in section 55.

Manual: A document that contains a set of instructions on methods that are employed to accomplish a result. These instructions will be detailed and comprehensive. The document will be organized for ease of use.

Non-Compliant: The audited company has not demonstrated that it has developed and implemented programs, processes and procedures that meet the legal requirements relating to the protocol item referenced. A Corrective and Preventive Corrective Action (CAPA) plan must be developed for approval and implemented.

Plan: A detailed, documented formulation for action to achieve an end.

Practice: A repeated or customary action that is well understood by the persons authorized to carry it out.

Procedure: A procedure indicates how a process will be implemented. It provides a documented series of steps followed in a regular and defined order thereby allowing individual activities to be completed in an effective and safe manner. A procedure also outlines the roles, responsibilities and authorities required for completing each step.

Process: A documented series of actions taking place in an established order, with identified roles and responsibilities, and directed towards a result. A process includes the roles, responsibilities and authorities for the actions. A process may contain a set of procedures, if required.

(The CER has applied the following interpretation of the OPR for evaluating compliance of management system processes applicable to its regulated facilities.)

OPR subsection 6.5(1) describes the CER's required management system processes. In evaluating a company's management system processes, the CER considers whether each process or requirement: has been established, implemented, developed or maintained as described within each section; whether the process is documented; and whether the process is designed to address the requirements of the process, for example a process for identifying and analyzing all hazards and potential hazards. Processes must contain explicit required actions including roles, responsibilities and authorities for staff establishing, managing and implementing the processes. The CER considers this to constitute a common 5 w's and h approach (who, what, where, when, why and

how). The CER recognizes that the OPR processes have multiple requirements; companies may therefore establish and implement multiple processes, as long as they are designed to meet the legal requirements and integrate any processes linkages contemplated by the OPR section. Processes must incorporate or contain linkage to procedures, where required to meet the process requirements.

As the processes constitute part of the management system, the required processes must be developed in a manner that allows them to function as part of the system. The required management system is described in OPR section 6.1. The processes must be designed in a manner that contributes to the company following its policies and goals established and required by section 6.3.

Further, OPR subsection 6.5(1) indicates that each process must be part of the management system ***and*** *the programs referred to in OPR section 55. Therefore, to be compliant, the process must also be designed in a manner that considers the specific technical requirements associated with each program and is applied to and meets the process requirements within each program. The CER recognizes that single process may not meet all of the programs; in these cases it is acceptable to establish governance processes as long as they meet the process requirements (as described above) and direct the program processes to be established and implemented in a consistent manner that allows for the management system to function as described in section 6.1.*

Program: A documented set of processes and procedures designed to regularly accomplish a result. A program outlines how plans, processes and procedures are linked, and how each one contributes toward the result. Program planning and evaluation are conducted regularly to check that the program is achieving intended results.

(The CER has applied the following interpretation of the OPR for evaluating compliance of programs required by the CER regulations.)

The program must include details on the activities to be completed including what, by whom, when, and how. The program must also include the resources required to complete the activities.

Appendix 4.0 – List of Company Staff Interviewed and Documents Reviewed

The lists of company staff interviewed and documents reviewed are maintained on file at the offices of the Canada Energy Regulator.