# Chapter 24
# SaskEnergy—Keeping Existing Transmission Pipelines Operating Safely

## 1.0 Main Points

By December 2021, SaskEnergy implemented the three outstanding recommendations we first made in our 2020 audit related to keeping existing transmission pipelines operating safely.

SaskEnergy owns and operates about 15,000 kilometres of natural gas transmission lines to deliver natural gas to more than 400,000 residential, farm, commercial, and industrial customers located throughout Saskatchewan.[1]

SaskEnergy now has documented rationale for how often it conducts block valve, leak survey, and depth of cover inspections to monitor pipeline conditions and assess the risk of pipeline failure (e.g., natural gas leakage). Documented rationale not only shows how SaskEnergy addresses key risks, but also helps personnel understand the basis for planned inspection frequency.

SaskEnergy implemented clear expectations as to when to receive final reports for pipeline inspections from contractors, and when staff are to review, approve, and enter them into its risk-modelling IT system. In addition, it improved timeliness of entering inspection activities and repair results into appropriate IT systems. For example, we found staff entered inspection and repair results within two months of completion, which aligns with good practice. Up-to-date IT systems support effective decision-making about upcoming inspection plans and repairs.

Having effective processes to operate pipelines safely, reduces the risk of fires or explosions caused by ignition of leaking natural gas from transmission pipelines.

## 2.0 Introduction

SaskEnergy is responsible for the safe operation of its natural gas transmission pipelines.[2] In 2020, SaskEnergy reported to its regulator (the Ministry of Energy and Resources) three incidents related to transmission pipelines. These incidents resulted in the release of about 8,000 cubic meters of natural gas. In 2021, six incidents resulted in about 11,000 cubic meters of natural gas release.[3]

This chapter describes our follow-up audit of management's actions on the three recommendations we made in 2020. Our *2020 Report – Volume 1*, Chapter 11, concluded that for the 12-month period ended January 31, 2020, SaskEnergy Incorporated had,

[1] SaskEnergy Incorporated, *2020–21 Annual Report,* p. 4.
[2] *The SaskEnergy Act*, s. 15.
[3] Saskatchewan Upstream Oil and Gas IRIS Incident Report. Saskatchewan. Oil and Gas News, Bulletins, Statistics and Reports. www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/oil-and-gas/oil-and-gas-news-and-bulletins (9 February 2022).

except in the areas of three recommendations, effective processes to keep existing natural gas transmission pipelines operating safely.

To conduct this audit engagement, we followed the standards for assurance engagements published in the *CPA Canada Handbook—Assurance* (CSAE 3001). To evaluate SaskEnergy's progress toward meeting our recommendations, we used the relevant criteria from the original audit. SaskEnergy's management agreed with the criteria in the original audit.

To complete this follow-up audit, we interviewed key SaskEnergy staff, and examined policies, plans, and other records related to inspections of natural gas transmission pipelines. We also tested a sample of pipeline inspections, surveys, and repairs to assess whether inspection results were entered into appropriate IT systems.

# 3.0 STATUS OF RECOMMENDATIONS

This section sets out each recommendation including the date on which the Standing Committee on Crown and Central Agencies agreed to the recommendation, the status of the recommendation at December 31, 2021, and SaskEnergy's actions up to that date.

## 3.1 Expected Frequency for All Pipeline Inspections Documented

***We recommended SaskEnergy Incorporated document the rationale for how often it carries out each of its transmission pipeline inspection activities.*** (*2020 Report – Volume 1*, p. 143, Recommendation 1; Crown and Central Agencies Committee agreement August 23, 2021)

**Status**—Implemented

SaskEnergy updated its Pipeline Integrity Management Program to include rationale for the frequency of its transmission pipeline inspection activities it did not previously document (i.e., block valves, depth of cover, leak surveys).

The Program's purpose is to maintain the safety and reliability of natural gas pipelines and other materials forming part of the transmission pipelines (e.g., block valves), to manage risks, and to keep employees, the public, and the environment safe.[4] The Program describes a series of inspection activities designed to detect pipeline defects such as corrosion and cracking.

In spring 2020, SaskEnergy staff updated the Program to document rationale for frequency of block valve inspections, leak surveys, and depth of cover inspections, which were not documented during our original audit in 2020. See **Figure 1** for a description of these three inspections and planned frequency for each.

[4] SaskEnergy, *Pipeline Integrity Management Program*.

**Figure 1—Major Transmission Pipeline Inspection Activities and Planned Frequency**

| Activity | Description | Planned Inspection Frequency |
|---|---|---|
| **Block Valve Inspections** | Looks for corrosion, cracking, leaks, and damage of block valves (areas that cannot be inspected by, or may not provide accurate results, through an in-line inspection)<br>Block valves are used to stop the flow of natural gas through a pipe (about 400 valves in the transmission pipeline system) | Inspect approximately 20 of 400 block valves each year (i.e., all block valves inspected over a 20-year period)<br>Prioritizes inspections based on the combined risk of the pipeline the block valve is designed to control |
| **Depth of Cover Surveys** | Assesses the depth of the ground soil covering the pipeline to ensure it is sufficient | Completed depth of cover surveys of all non-class 1 pipelines in 2021 (see **Section 4.0** for class information)<br>Ongoing monitoring for depth of cover through other inspection activities (e.g., geo-hazard inspections) for high-risk areas |
| **Leak Surveys** | Identifies dead spots in vegetation along the pipelines and senses gas (technology varies on survey type) indicating a pipeline is leaking natural gas | Conduct an aerial leak survey on the entire transmission pipeline system annually<br>Conduct ground leak surveys on class 2 and 3 locations annually (see **Section 4.0** for class information)<br>Conduct ground leak survey on the entire transmission system on a four-year cycle |

Source: Adapted from various SaskEnergy documents and records.

SaskEnergy established the frequency of these inspections based on its staff's (e.g., pipeline operators) professional judgment and understanding of current industry practices.[5] SaskEnergy outlined rationale for inspection frequency based on risks related to different types of pipeline defects (e.g., corrosion, cracking and dents), as well as risks related to external interference or the environment surrounding the pipeline (e.g., ground movement).

We found SaskEnergy completed depth of cover and leak survey inspections as planned, but only completed a portion of expected block valve inspections due to budget constraints for the period of October 2020 to November 2021 (i.e., completed five inspections compared to 11 planned). SaskEnergy plans to catch up on the remaining current year's block valve inspections in 2022–23.

Having documented rationale for the planned frequency of all types of inspection activities aids SaskEnergy in ensuring its plans adequately address pipeline integrity risks.

## 3.2 Timely Inclusion of Completed Inspection Results and Repairs in IT Systems

***We recommended SaskEnergy Incorporated implement timeframes for including the results of inspections of transmission pipelines into its risk-modelling IT system.*** (*2020 Report – Volume 1*, p. 148, Recommendation 2; Crown and Central Agencies Committee agreement August 23, 2021)

**Status**—Implemented

[5] Canadian Standards Association (CSA) Z662 is a standard governing oil and gas pipeline systems. CSA Z662-19 generally expects pipeline operators to use professional judgment to set the timing and frequency of inspection activities.

***We recommended SaskEnergy Incorporated include the results of key inspection activities and repairs done during the year in its pipeline data storage IT system within specified timelines.*** (*2020 Report – Volume 1*, p. 148, Recommendation 3; Crown and Central Agencies Committee agreement August 23, 2021)

**Status**—Implemented

SaskEnergy developed a mechanism to include inspection results and repair activities within its IT systems in a timely manner.

In-line inspections are a primary inspection activity to gather information about the structure and integrity of transmission pipelines.[6] Inspection results provide current information about pipeline condition and timely entry into IT systems support reliable assessments of pipeline condition and effective decision-making. SaskEnergy uses contractors to conduct in-line inspections.

SaskEnergy developed a tracking tool (i.e., spreadsheet) to monitor when it receives in-line inspection reports from contractors, reviews reports, conducts assessments, and approves them. The tool also tracks when staff enter inspection results and SaskEnergy's risk assessments into its IT system.

SaskEnergy uses the timeframes contractors include in their requests for proposals (e.g., 35 days for magnetic flux leakage in-line inspections) to guide when contractors are to submit final inspection reports. SaskEnergy tracks expected and actual report submission times.

SaskEnergy also developed reasonable timeframes for its staff's internal review of inspection results and tracks whether it meets its deadlines. For example, SaskEnergy aims to complete its review of an inspection report within 15 days of final report receipt, and conduct risk assessment and update its risk-modelling IT system within 25 days following its review of the report.

For the period of October 2020–November 2021, contractors sent SaskEnergy 18 final reports averaging 41 days from the date of completed inspection (e.g., ranging from 26 to 64 days). On average, SaskEnergy assigned risk ratings and entered this information into the risk-modelling IT system within 10 days of reports being reviewed (e.g., ranging from three to 15 days).

We tested three in-line inspection reports and found SaskEnergy followed its established process for review, assessment, and approval of in-line inspections, including documenting when each step was performed and by whom. SaskEnergy entered risk assessments based on these three inspection reports into its risk-modelling IT system within 15 days of its review of the reports.

Having final inspection results about the most recent pipeline condition in its risk-modelling IT system supports more reliable assessments of pipeline integrity. Reliable assessments of pipeline integrity in turn support the development of appropriate inspection plans and reduces the risk of pipeline failures.

[6] In-line inspections provide non-destructing examination of the pipeline performed by equipment that can travel internally along a pipeline of six inches in diameter or greater. SaskEnergy uses several different in-line inspection tools; each tool has a different purpose (e.g., to find corrosion, stress corrosion, cracking, dents, seam defects, or to map the pipeline).

In addition, we found SaskEnergy improved its process to enter results of other inspection and repair activities (e.g., block valve inspections) into appropriate IT systems. SaskEnergy continues to have a target of entering all inspection activities by the end of fiscal year to support the development of its upcoming annual inspection plan. We tested two in-line inspections, one block valve inspection and one pipeline repair and found SaskEnergy entered each of the activities into appropriate IT systems within two months of completion—this aligns with good practice.

By December 31, 2021, SaskEnergy had not yet entered the results from depth of cover inspections into its IT system, but planned to do so by March 31, 2022. This timing does not impact future SaskEnergy inspection plans. Management indicated they plan to assess, in 2022–23, the need for completing future depth of cover inspections given the positive inspection results and the fact that other routine inspection activities will monitor depth of cover (as described in **Figure 1**).

Having up-to-date data in IT systems that reflect current, reliable assessments of pipeline condition better support decisions about future inspection plans and repairs.

## 4.0 TRANSMISSION PIPELINE BY CLASS

SaskEnergy classifies its transmission pipelines based on the CSA Z662 standard requirements using population density in a specified geographical area.

**Figure 2—SaskEnergy's Transmission Pipeline by Class**

| Class | Description | Number of Kilometers | % of Total Kilometers |
|---|---|---|---|
| 1 | 10 or less residences | 14,880 | 99.2% |
| 2 | 11–45 residences, a building or outside area with 20 or more people during normal use (e.g., playground or recreation area), and/or an industry such as a chemical plant | 92 | 0.6% |
| 3 | 46 or more residences | 30 | 0.2% |
| 4 | Mostly apartments and condominiums with four or more stories | 0 | 0.0% |
| | **Total** | **15,002** | **100%** |

Source: Adapted from www.rds.oeb.ca/CMWebDrawer/Record/682652/File/document (5 January 2022) and SaskEnergy records.