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August 4, 2023

British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, B.C.
V6Z 2N3

Attention: Patrick Wruck, Commission Secretary

Dear Patrick Wruck:

Re: FortisBC Energy Inc. (FEI)

Application for a Certificate of Public Convenience and Necessity (CPCN) for Approval of the Interior Transmission System Transmission Integrity Management Capabilities Project (Application) ~ Project No. 1599365

FEI Rebuttal Evidence to the Residential Consumer Intervener Association (RCIA) Intervener Evidence

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In accordance with the further regulatory timetable established in British Columbia Utilities Commission Order G-115-23, FEI hereby files its Rebuttal Evidence on the RCIA Intervener Evidence in the above referenced proceeding.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Sarah Walsh

Attachments

cc (email only): Registered Interveners

Application for Approval of a Certificate of Public Convenience and Necessity for the Interior Transmission System Transmission Integrity Management Capabilities Project

Rebuttal Evidence of FortisBC Energy Inc.

to the Intervener Evidence filed by the Residential Consumer Intervener Association (RCIA)

August 4, 2023

1. REBUTTAL TO THE EVIDENCE OF RYALL ENGINEERING LIMITED

Q1: What is the purpose of this Rebuttal Evidence?

A1: In this Rebuttal Evidence, FEI responds to the evidence of Ryall Engineering Limited (REL) filed by the Residential Consumer Intervener Association (RCIA)[1] and RCIA's responses to information requests (IRs) on that evidence.[2] The capitalized terms in this Rebuttal Evidence are defined in the Application. For example, "FEI" or the "Company" refers to FortisBC Energy Inc.

Although FEI has addressed a number of matters in this Rebuttal Evidence, FEI's silence on any particular matter should not be construed as agreement.

Q2: What are the key claims made by REL in its evidence?

A2: REL makes two primary recommendations in its evidence.

First, REL recommends that FEI delay the installation of the pressure reducing equipment at the East Kootenay Exchange (Yahk Station)[3] until FEI receives feedback from the ILI vendor that there are too many instances of severe cracking for FEI to address prior to the next winter peak demand on the ITS.

Second, REL recommends delaying the removal of selected heavy-wall segments on the SAV VER 323 and KIN PRI 323 pipelines until the initial EMAT ILIs confirm that these heavy-wall segments have actually caused a loss of ILI data.

Q3: Please summarize FEI's response to these claims.

A3: REL's recommendations are based on false premises and assumptions which do not align with FEI's proactive and systematic management of threats to the integrity of its transmission pipeline systems, industry practice, and the goal-oriented statutory and regulatory obligations it is subject to. Contrary to REL's evidence, FEI needs to install pressure reducing equipment at the Yahk Station to support its EMAT ILI activities, and the proactive replacement of the three heavy-wall pipeline segments within the Project scope are both cost-effective and prudent.

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1 Exhibit C2-6.
2 Exhibits C2-7 to C2-9.
3 REL refers to this station as the "EKE Station".

Q4: How is the remainder of this rebuttal evidence organized?

A4: FEI's Rebuttal Evidence is organized as follows:

1) In Section 2, FEI rebuts REL's evidence regarding the installation of pressure reducing equipment at the Yahk Station.

2) In Section 3, FEI rebuts REL's evidence regarding the removal of heavy-wall segments on the SAV VER 323 and KEN PRI 323 pipelines.

3) Section 4 concludes this Rebuttal Evidence.

2. INSTALLATION OF PRESSURE REDUCING EQUIPMENT AT YAHK STATION IS REQUIRED TO SUPPORT EMAT ILI ACTIVITIES

Q5: On page 10 of its evidence, REL states that, a vendor will indicate to FEI whether there are any instances of severe cracking "soon after" completing the EMAT ILI runs. In support of this, REL states in footnote 4 that, based on Exhibit B-1 Application Appendix D pp. 2, 4 and CTS TIMC CPCN Proceeding Exhibit B-1 p. 89:

> **The CPH BUR 508 EMAT ILI was completed in September 2020 and FEI received confirmation from the ILI vendor that "there was no severe cracking identified". This confirmation was received no later than five months following the ILI as FEI incorporated this information into its CTS TIMC CPCN Application filed on February 11, 2021.**

Can FEI in fact rely on ILI vendors to inform FEI of any instances of severe cracking "soon after" completing an ILI run?

A5: No, FEI cannot rely on the fact that vendors will inform it of instances of severe cracking "soon after" completing an ILI run. As part of undertaking the CTS TIMC pilot project, vendors provided results on a "best efforts" basis, but FEI did not have certainty regarding when the vendor would provide results. In particular, the identification and sizing of cracking features identified through an EMAT ILI run (unlike other tools) generally requires more human intervention and interpretation before results are provided.

Based on information provided by vendors, which aligns with informal information from FEI's peer transmission pipeline operating companies, FEI currently assumes a vendor reporting timeframe of up to 180 days (6 months) for EMAT ILI runs on the CTS. However, this reporting timeframe may change as industry adoption of EMAT ILI tools continues to increase. Vendor capacity to perform post-inspection data interpretation, analysis and reporting is already becoming increasingly constrained by current available resources. Therefore, by the time of the first EMAT ILI runs on the ITS, vendor reporting timeframes could be longer than up to 180 days.

Q6: On page 10 of its evidence, REL states that: "FEI does not need to address every feature found by the EMAT ILI prior to the winter peak, only the most severe features which necessitate the pressure reduction." Is this correct?

A6: No, REL's statement is not entirely correct in that the severity of the crack features in relation to others (e.g., whether they are the "most severe") is not relevant. Rather, FEI will need to address all features that require a pressure reduction, which is determined by the severity of each of the crack features (i.e., failure potential). FEI cannot know in advance of running the ILI tool how many features will need to be addressed and whether it will be only a small subset of the overall features, which REL appears to imply.

Q7: In the response to CEC-RCIA IR1 1.4, REL states that it "does not expect that FEI needs one month to examine the ILI vendor's initial reporting to determine whether the independent pressure reducing equipment needs to be installed." Is REL's conclusion correct?

A7: No. FEI estimates that it will take approximately 30 to 60 days (1 to 2 months) for FEI to complete its initial review of the vendor's initial report and identify potentially injurious cracking on the pipeline requiring a pressure reduction.

During the 30-60 days of the initial review process, FEI conducts the following activities:

1) FEI validates the accuracy of EMAT ILI tool reporting, including assessing reported cracks and the findings of initial integrity digs.

2) FEI reviews crack-like features for their failure potential, including by completing integrity digs and analyzing findings.

3) FEI evaluates whether identified cracking interacts with other ILI tool findings (e.g., corrosion).

Through this initial review process, FEI could identify cracking requiring a pressure reduction that was not previously identified by the vendor.

Q8: In the response to CEC-RCIA IR1 1.4, REL also draws a parallel between the YAH TRA 323 pipeline and the CTS TIMC pilot project, stating that "there were no critical indications identified in the vendor's initial reports on the CTS pilot project EMAT ILIs." Is this a valid comparison?

A8: No. While REL is correct that there were no "critical" indications (i.e., no indications that required an immediate pressure reduction) identified in the vendor's initial EMAT ILI reports on the CTS TIMC pilot project, the extent and severity of the findings of the pilot project pipelines are not an indicator of the extent and severity of cracking that will potentially be found on other pipelines, including the YAH TRA 323 pipeline on the ITS.

Q9: On page 10 of its evidence, REL observes (based on FEI's response to RCIA IR2 23.1) that the installation of a PRS will take approximately 35 days if the materials are already procured and ready. Is there the potential for the installation to take longer than 35 days? If so, please explain.

A9: Yes, while REL's analysis correctly assumes scheduled site activities to prepare and install the PRS will take approximately 35 days, FEI clarifies that this is a best-case scenario that only considers the time it would take to install the bypass, yard piping and complete the PRS tie-in. It does not account for the following considerations.

First, the 35-day estimate does not include the time it will take to contract, schedule and mobilize a construction contractor to complete the work on short notice. FEI estimates that it may take several weeks to coordinate resources and mobilize to the Yahk Station, extending the completion of the PRS installation to approximately 60 days.

If FEI resources conducting integrity digs could be diverted to complete the installation of the PRS at the Yahk Station, as suggested by REL, delaying the installation of the PRS until after the EMAT ILI run would divert critical labour resources from completing integrity digs and repairs on the YAH TRA 323 pipeline. These labour resources would first need to demobilize from other active assignments before then mobilizing to the Yahk Station, extending the installation duration by up to 10 additional days (i.e., a total of 45 days).

Second, the 35-day estimate does not contemplate events outside of FEI's control, such as forest fires or extreme weather events, that could impede FEI's ability to meet this timeline. In particular, the time required to install the PRS would increase if access (e.g., fire closures) or working conditions (e.g., smoke, extreme heat) are degraded, such that they are worse than typical conditions in the area.

Q10: On page 11 of its evidence, REL states that its recommended approach follows the same logic as FEI's approach to installing pressure reducing equipment at compressor stations. How does FEI respond?

A10: REL's approach does not follow the same logic. As discussed in the response to BCUC IR2 21.4, the modifications to the control and safety system at five existing facilities are limited to the on-site installation of pressure safety valves onto existing flanges, plug-in modifications to existing pressure switches and minor reprogramming of existing control systems. It does not require the intrusive installation procedures to manually bypass operations and complete the significant alterations to the Yahk Station that are required to install the PRS, as outlined in the response to RCIA IR2 23.3.

Q11: On page 10 of its evidence, REL concludes that, assuming FEI completes an EMAT ILI run on the YAH TRA 323 pipeline in the second quarter of the year, FEI would have nearly five months to receive preliminary feedback from the ILI vendor before

it would need to install the PRS. Is it feasible to install the proposed PRS after receiving the results of the baseline EMAT ILI run?

A11: No. As outlined below, it is not feasible to defer installation of this PRS until after feedback has been received from the vendor.

First, as explained in A5 above, FEI's current expectation is that EMAT ILI reporting with respect to cracks over the full length of the EMAT-inspected pipeline could be provided by the vendor up to 180 days (6 months) following a given tool run. While vendors provide results on a "best efforts" basis (i.e., anytime between the EMAT tool run date and the 180-day timeframe), FEI cannot rely on, or predict with certainty, when reporting will be received.

Second, as explained in A7 above, after the report from the vendor has been received, FEI must undertake its own initial analysis and assessment of vendor-provided information, which FEI expects will take approximately 30 to 60 days (1 to 2 months). Importantly, these activities may result in the identification of cracking requiring a pressure reduction that was not previously identified by the vendor.

In the table below, FEI outlines the feasible timelines to complete the EMAT ILI tool run, receive and interpret the vendor report, and install the proposed PRS at the Yahk Station. This table relies on the following assumptions:

- Based on the weather in the region where the YAH TRA 323 pipeline is located, suitable hydraulic conditions to run ILI tools are generally available between late-March and late-October, although in the operational history reviewed by FEI (from the past approximately 10 years) FEI has only performed tool runs on this pipeline between April and May.

- The vendor provides its preliminary report between approximately 120 days to 180 days (4 to 6 months) following the tool run.

- FEI conducts initial reviews, including conducting initial validation digs, based on the results of the preliminary report within 30 to 60 days (1 to 2 months) of receiving the vendor report.

- Mobilization of contract resources, completion of the work to install and commission the PRS at the Yahk Station takes approximately 60 days (2 months) following identification of cracking.

As shown in the table below, there are no feasible scenarios as either:

1) the EMAT ILI tool cannot be run due to hydraulic conditions (January, February, November, and December); or

2) if the tool run can be completed, there is a possibility that PRS will be required when it is not feasible to install (December to April). FEI expects that it could

identify cracking requiring a pressure reduction, and would need to respond by reducing the pressure, any time between the earliest and the latest dates, thus making each scenario not feasible.

As such, FEI cannot wait until after the EMAT ILI run to install the PRS at Yahk Station.

Table 1: Timeline and Feasibility of YAHK Station PRS Installation

Tool Run **Red** – Not feasible due to hydraulic conditions **Orange** – Potentially feasible with hydraulic conditions **Green** – Feasible with hydraulic conditions	**Vendor Identifies Cracking and FEI Determines a Pressure Reduction is Required**		**FEI Identifies Cracking and FEI Determines a Pressure Reduction is Required**		**PRS is Operational** **Red** – Not feasible due to weather conditions **Orange** – Potentially feasible with weather conditions **Green** – Feasible with weather conditions		**Feasible?**
	Earliest (4 mo. after EMAT run)	**Latest** (6 mo. after EMAT run)	**Earliest** (1 mo. after vendor earliest)	**Latest** (2 mo. after vendor latest)	**Earliest** (2 mo. after vendor earliest)	**Latest** (2 mo. after FEI latest)	
Jan							No
Feb							No
Mar	Jul	Sept	Aug	Nov	Sept	Jan	No
Apr	Aug	Oct	Sept	Dec	Oct	Feb	No
May	Sept	Nov	Oct	Jan	Nov	Mar	No
Jun	Oct	Dec	Nov	Feb	Dec	Apr	No
Jul	Nov	Jan	Dec	Mar	Jan	May	No
Aug	Dec	Feb	Jan	Apr	Feb	Jun	No
Sept	Jan	Mar	Feb	May	Mar	Jul	No
Oct	Feb	Apr	Mar	Jun	Apr	Aug	No
Nov							No
Dec							No

Further, REL's suggestion that FEI should have a "drop dead" date at which it installs the PRS[4] is without merit. It would not be prudent for FEI to plan to install the PRS as late as possible in the year, as there are weather conditions and other factors beyond FEI's control which could interfere with or delay installation of the PRS, which could result in FEI needing to reduce pressure using the existing single control valve and impacting the YAH OLI 610 pipeline over the winter.

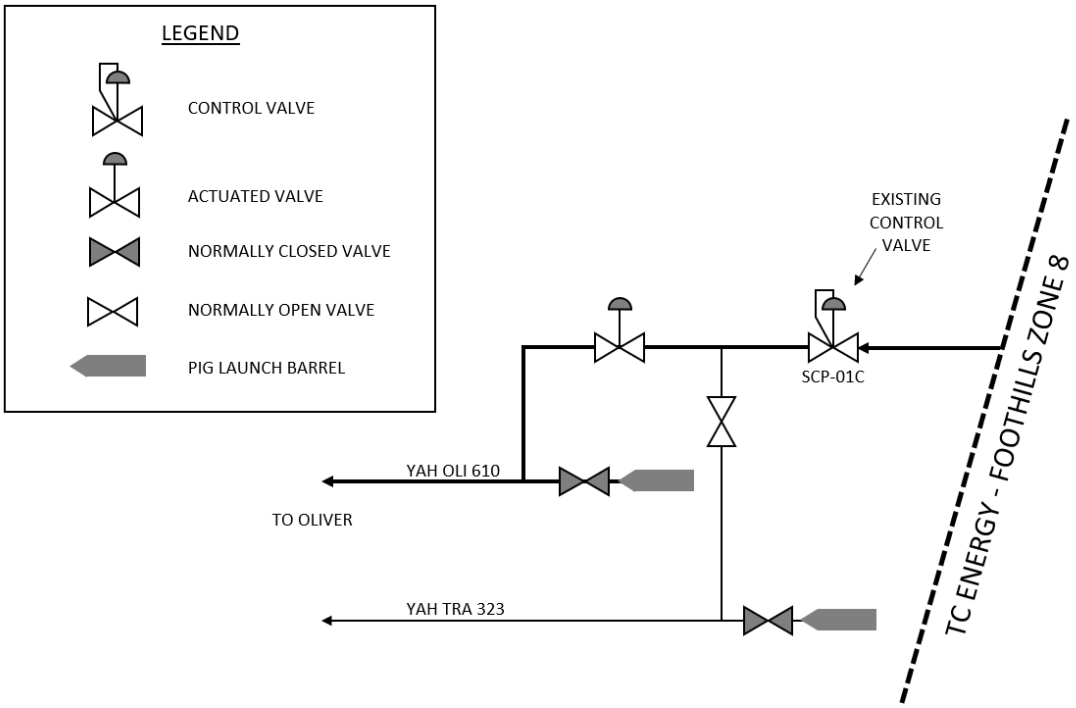
In any case, as discussed in A12 and A15 below, FEI requires the PRS for maintenance flexibility and ongoing operational reasons. Notably, if FEI had the PRS installed in advance of the EMAT run as proposed, FEI could use it to drop pressure in the YAH TRA 323 pipeline to perform integrity digs and repairs on that line right away, instead of having to use the existing single control valve and impacting the YAH OLI 610 pipeline. As such, FEI would see immediate use of the PRS following the run, regardless of whether it determines the need for a longer-term pressure reduction to 80 percent EOP.

[4] Exhibit C2-8, CEC-RCIA IR1 1.4.

Q12: On page 11 of its evidence, REL dismisses FEI's claim that it needs independent year-round and ongoing pressure control of YAH TRA 323 for maintenance flexibility to complete integrity digs, to allow for a 20 percent pressure reduction following the initial or subsequent EMAT ILI runs, and to provide operational flexibility. REL states on page 11 that, in its view, the PRS at the Yahk Station is only required if the implementation of a pressure reduction of up to 20 percent of the EOP is required. What is FEI's response?

A12: As shown in the image below, there is currently a single control valve that is used to control pressure on the YAH TRA 323 and YAH OLI 610 pipelines.

Figure 1: Configuration of Existing Control Valve at Yahk Station



The limitations of having a single control valve are as follows.

Implementation of a Pressure Reduction on the YAH TRA 323 Pipeline

The use of the existing control valve would restrict pressure on YAH OLI 610 pipeline, unnecessarily reducing the capacity of this pipeline and, ultimately, limiting FEI's ability to deliver its maximum load of 105 MMSCFD to the CTS via the Kingsvale to Oliver 323 pipeline. FEI relies upon the maximum load of 105 MMSCFD as part of the total supply required for the CTS and other communities between Kingsvale and Huntingdon (particularly during winter), as well as to respond to unexpected circumstances in off-peak seasons (e.g., minor supply reductions on the T-South system upstream of Kingsvale). If a pressure reduction were to occur on the YAH OLI 610 pipeline during Winter 2030/31, following the EMAT ILI tool run on the YAH TRA 323 pipeline, FEI would only be able to

supply a maximum of 68 MMSCFD to the CTS on a Design Degree Day (i.e., a reduction of 37 MMSCFD in capacity).

Operational Flexibility

If FEI is required to expose the YAH TRA 323 pipeline for any reason, including to complete integrity digs and/or pipeline repairs resulting from any ILI run, it is standard procedure to temporarily reduce the operating pressure of the pipeline to perform the work safely. Since a pressure reduction also limits pressure on the YAH OLI 610 pipeline, FEI's flexibility to perform work on the YAH TRA 323 pipeline is limited at times by the need for capacity on the YAH OLI 610 pipeline. Having independent pressure control on each line will allow for more flexibility in timing to complete integrity work and improve FEI's ongoing capabilities to collect and respond to integrity data, as well as its ability to resource.

Moreover, maintaining capacity on the YAH OLI 610 pipeline in a reduced pressure scenario requires operating gas-fired compressor stations during off-peak times. This results in higher O&M costs and increased greenhouse gas emissions, due to both the added run time and potential inefficient operation of the compressors under this type of operating scenario.

The installation of independent pressure control on the YAH TRA 323 will provide FEI with improved operability, reliability and resiliency on its YAH TRA 323 and YAH OLI 610 pipelines, and will also allow for more efficient and economic operation of these pipelines over the long-term. Therefore, while FEI has identified that it needs independent pressure control on the YAH TRA 323 pipeline now to support a longer-term pressure reduction on the YAH TRA 323 pipeline in the event that severe cracking is found, the flexibility provided by the PRS is also important for FEI's operations and FEI would prioritize installing independent pressure control on the YAH TRA 323 pipeline through Sustainment Capital independently of the ITS TIMC Project.

Q13: On page 12 of its evidence, REL calculates that FEI could save $1.97 million or 3 percent of the Project's cost (excluding contingency) by removing the PRS at the Yahk Station from the Project scope. Are REL's calculations correct?

A13: REL's calculations are based on FEI's responses to RCIA IR2 23.2 and 23.3 which identify construction costs and salvage costs of $1.363 million and $0.607 million, respectively, totaling the approximate $1.97 million. These potential savings would be reduced by the incremental cost of approximately $67 thousand associated with a second mobilization and demobilization of crews to Yahk Station to install the PRS.

While engineering costs would not be materially impacted, there may be incremental additional costs for field review visits and record collection that would not be efficiently completed with the ILI barrel modifications. FEI also notes that, by not installing the PRS, REL is recommending that FEI spend approximately $1.81 million to procure and fabricate

the PRS with no added benefit to the system. This contrasts with the proposed PRS, which will provide the multiple benefits discussed in Answer A12.

Q14: On page 13 of its evidence, REL states that FEI has not explained why it cannot use the existing control regime to complete the increased number of integrity digs and repair, and FEI can use the existing pressure control facilities to complete maintenance activities, "just as FEI has for decades." How does FEI respond?

A14: As discussed in Section 5.4.4 of the Application, FEI will not know how many features will be found on any of the 8 ITS pipelines until after their respective baseline EMAT ILI runs and resulting data analysis is complete. FEI is aware through its discussions with peer pipeline operators that initial EMAT ILI tool runs can result in a significant number of indications that require timely inspection and validation. These indications do not always require repair; however, until they are excavated and inspected, they may need to be treated as an integrity risk. FEI expects that it may need to reduce the operating pressure of the YAH TRA 323 for longer periods than have been previously needed for the following reasons:

- **Establishing a Safe Operating Pressure:** If severe cracking is indicated through the EMAT ILI run or subsequent data analysis, FEI may need to reduce the operating pressure on the pipeline. This pressure reduction may need to be sustained through winter if FEI is unable to repair the cracking feature prior to winter. FEI's ability to repair the cracking feature prior to winter may be limited by when it receives the data, inclement weather, etc. FEI has not previously been required to reduce the operating pressure of its ITS pipelines through peak winter periods for integrity reasons; however, cracking features may necessitate this response.

- **Need to Perform an Increased Number of Integrity Digs and Repairs:** FEI may need to undertake more integrity digs and associated repairs resulting from: (1) inspecting and validating baseline EMAT ILI results, which could be a potentially large number of indications; and (2) the addition of EMAT ILI to FEI's overall ILI program (i.e., more types of ILI tool runs are being undertaken on its pipelines requiring an increased number of post-ILI integrity digs and repairs).

With potentially longer pressure reductions on the YAH TRA 323 pipeline, there will be increasing unnecessary capacity impacts to the YAH OLI 610 pipeline each year if the existing pressure control regime is used. The ability to independently control pressure will allow FEI more flexibility to schedule and complete necessary work on the YAH TRA 323 pipeline, while maintaining its existing service reliability and resiliency with the YAH OLI 610 pipeline.

Q15: On page 16 of its evidence, REL states that, in its view, FEI will not need pressure reduction for future EMAT ILIs because the YAK TRA 323 pipeline will be inspected

and repaired with no severe cracking features remaining by the time of the next EMAT ILI. REL says that, while Dr. Chen's analysis indicated that the time to failure may be five years based on the most aggressive conditions, these conditions will no longer be present following the mitigation repairs performed by FEI, because FEI will repair all the cracks found that could grow to a deleterious size or, at a minimum, would require a pressure reduction within the re-inspection period. How does FEI respond?

A15: While ILI intervals are set to minimize the likelihood that new integrity features, or those remaining on the line, will fail before the next ILI, it is not possible to set ILI intervals such that there can be 100 percent certainty that no new or remaining integrity features will grow to a critical size impacting the integrity of the pipeline before the next ILI. This is due to the following uncertainties:

1) **ILI Performance:** ILI data cannot be assumed to be 100 percent accurate, as there are probability of detection (POD), probability of identification (POI) and probability of sizing (POS) uncertainties for all ILI tools.[5] There is also the possibility that the ILI tool could be performing outside of specifications under certain conditions and miss more features that are above the ILI detection thresholds than the specified probability of detection.

2) **Crack Growth Rates:** Crack growth rate estimates are inherently uncertain and crack features below the detection threshold of the ILI tools can grow to critical size impacting the integrity of the pipeline before the next ILI. FEI notes that Dr. Chen's analysis referenced by REL was not conducted for the purpose of determining re-inspection intervals. Notably, just because FEI has not found an instance of more aggressive conditions during opportunity digs does not mean that such conditions cannot occur on FEI's system. As FEI has only conducted digs on approximately 1 percent of its pipelines, the potential for more aggressive conditions cannot be ruled out.

3) **Pipeline Environment:** There is the potential for change in the environment of the pipeline, including the potential for changing conditions in between ILI runs. For example, land movement can occur that is not readily detectable by above-ground methods, which could accelerate pipeline cracking in between ILI runs.

Indeed, despite efforts to time ILI intervals appropriately, the pipeline industry has experienced failures of in-line inspected pipelines.

Further, the capability to implement a pressure reduction at any time throughout a calendar year on transmission pipelines is desirable for reasons beyond FEI's baseline

[5] As part of its independent review of the CTS TIMC Project, Dynamic Risk provided the following definitions of these terms: POD "is defined as the probability of an anomaly being detected by an ILI technology." POI "refers to the probability of correct identification of anomalies, components, or characteristics that are detected by an ILI tool." POS "is the probability that the reported dimensions are within the specified tolerances." (Exhibit B-1, Application, Appendix O-1, Section E.7.2.3.4).

EMAT inspections. The following descriptions of actual recent events illustrate how pressure reduction capability is valued and has been used for both in-line inspected and non-in-line inspected pipelines to achieve safe operation.

Cracking on the Livingston Pattullo 457 Pipeline

In July 2022, FEI was performing an integrity dig to inspect a metal loss feature identified through MFL ILI on the Livingston Pattullo 457 pipeline. During the inspection, FEI observed cracking which was not reported by the EMAT tool run in 2019 as part of the CTS TIMC pilot inspections.

In-ditch assessment identified significant interlinked crack lengths exceeding 100 mm. FEI was unable to measure the depth of crack using in-ditch methods and, therefore, could not establish that this crack was not a rupture threat to the pipeline. In response to uncertainty about the pipeline condition and safety, FEI adopted pressure reduction (1.25 safety factor) to 80 percent of the established operating pressure. This integrity-driven pressure restriction was lifted in November 2022 upon completion of lab testing and confirmation that the cracking did not exceed the detection threshold of the EMAT tool ran in 2019, and also that this particular cracking had an acceptable safety factor.

Precautionary Pressure Reduction on Huntingdon Nichol 762 Pipeline

In October 2022, FEI implemented a precautionary pressure reduction to 80 percent of the established operating pressure for the Huntingdon Nichol 762 pipeline. This pressure restriction was adopted due to uncertainties in pipe stress and strain due to observable ground settlement in the vicinity of the pipeline.[6] FEI subsequently planned and undertook ILI with an inertial mapping unit (IMU) equipped tool. The post-ILI analysis included a comparison of these results against 2016 data, thus providing FEI with sufficient certainty that the pipeline integrity was not compromised. The precautionary pressure restriction was lifted in late-January 2023.

Leak on the Trail Lateral 168 Pipeline

On December 2, 2022, FEI discovered a leak on the Trail Lateral 168 pipeline (a pipeline which is not in-line inspected, and which is planned for a pressure reducing station as part of the Inland Gas Upgrade project). Without ILI data, FEI had insufficient data to assess the potential of a future rupture failure and has temporarily implemented a pressure reduction to mitigate the potential for rupture failure until such time as the Inland Gas Upgrade project work is complete.

Reduction in Operating Pressure by Other Operators

In October 2018, Westcoast Energy Inc. (Enbridge) adopted a 20 percent operating pressure reduction following a cracking-related failure of a transmission pipeline in the

[6] This particular pipeline could accommodate a winter pressure restriction as it is looped by the Huntingdon Roebuck 1066 pipeline.

Prince George area.[7] In that instance, Westcoast's two pipelines were operated with a 20 percent reduction until such time as the integrity of the lines could be confirmed.

Other gas transmission pipeline incident reports published on the Transportation Safety Board of Canada's website[8] also illustrate industry's use of operating pressure restrictions, including the TransCanada PipeLines Ltd. (NOVA Gas Transmission Ltd.) failure near Fort McMurray, Alberta[9] (Incident date: 2013-10-17, Report release date: 2015-11-03). When this pipeline was returned to service approximately one month after the incident, this failed pipeline had a restricted operating pressure of 80 percent (7168 kPa) of its pre-failure operating pressure (8960 kPa). As a precaution, another pipeline operating in the vicinity of the failure site was also temporarily reduced to 80 percent of the discovery pressure.

3. REMOVAL OF HEAVY-WALL SEGMENTS ON THE SAV VER 323 AND KIN PRI 323 PIPELINES

Q16: FEI has identified the need to replace three heavy-wall segments, one on the SAV VER 323 pipeline and two on the KIN PRI 323 pipeline. REL recommends that FEI defer replacement of heavy-wall segments until the baseline EMAT ILIs confirm the presence of blind spots caused by speed excursions resulting from heavy-wall segments. Does FEI agree with this recommendation?

A16: No, REL's recommendation should be rejected. FEI has proposed to proactively modify three heavy-wall pipe segments, one on the SAV VER 323 pipeline (Event 1) and two on the KIN PRI 323 pipeline (Events 29 and 31), because it has a high confidence that EMAT tool speed excursions will occur at these locations, resulting in unusable data.

First, as explained in the response to BCUC IR1 8.5, the need to proactively replace these three heavy-wall pipe segments is driven by the results of previous MFL-C tool runs in which:

- The tool exceeded the *maximum* velocity for data collection (i.e., a more severe speed excursion when compared to other pipe segments), meaning no usable data was collected on these segments.

- The speed excursion impacted a significantly longer length of pipe than the heavy-wall segment itself, meaning it may be more costly and/or impactful to mitigate cracking on the impacted pipe following the EMAT ILI tool run, as explained in more detail below.

[7] https://www.tsb.gc.ca/eng/rapports-reports/pipeline/2018/p18h0088/p18h0088.html, Section 1.6.1.
[8] https://www.tsb.gc.ca/eng/rapports-reports/pipeline/index.html.
[9] https://www.tsb.gc.ca/eng/rapports-reports/pipeline/2013/p13h0107/p13h0107.html.

Second, if FEI were to defer the heavy-wall replacements at these three locations, and a speed excursion occurred resulting in a blind spot, FEI would have three options (shown in the table below) to mitigate potential cracking in the blind spot. Due to the severity and length of the speed excursion observed at each of the three locations during previous MFL-C runs, the pros of the proactive heavy wall replacement outweigh the cons. Further justification of each proposed proactive heavy-wall replacement is provided below the table.

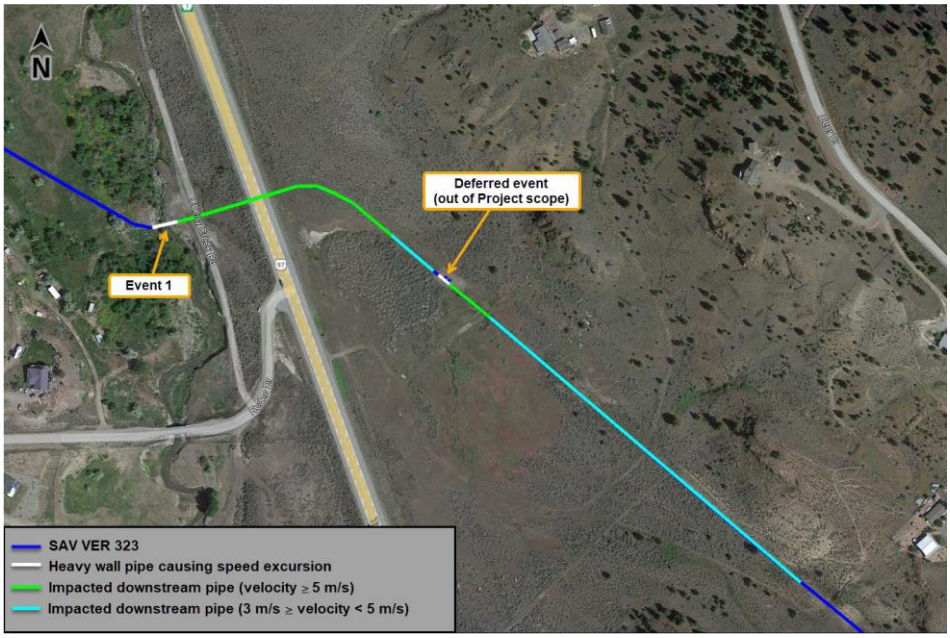
Table 2: Comparison of Options for Responding to Blind Spots

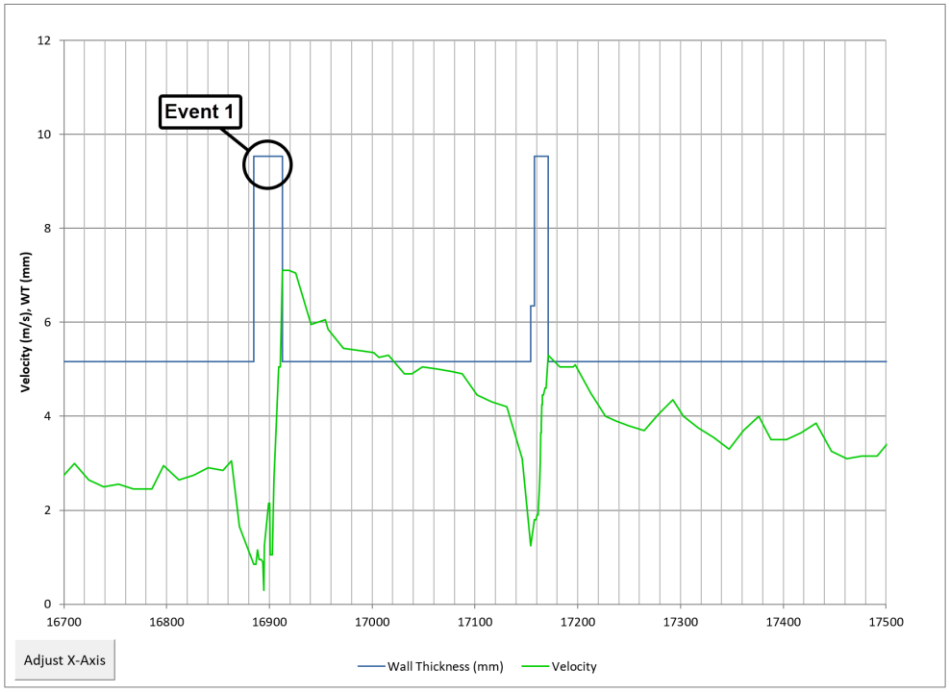
Before EMAT ILI Tool Run	After EMAT ILI Tool Run		
Proactive Heavy-Wall Replacement (Causing Speed Excursion)	**Reactive Heavy-Wall Replacement** (Causing Speed Excursion)	**Pipeline Exposure and Recoat (PLE)** (Downstream Impacted Pipe)	**Pipeline Replacement (PLR)** (Downstream Impacted Pipe)
PROS			
• Supports optimal tool velocity for all ILI tool runs, including EMAT ILI (which could lower lifecycle integrity management costs for all ILI-monitored threats, as degraded data requires conservative response). • Can be completed with sufficient resources and planning horizon to complete work without interruption of or impact to other operational activities.	• Supports optimal tool velocity for all ILI tool runs, including EMAT ILI (which could lower lifecycle integrity management costs for all ILI-monitored threats, as degraded data requires conservative response).	• Can mitigate cracking for exact length of blind pipe for a given EMAT tool run, which may be more cost-effective than the proactive heavy-wall replacement (depending on length of blind spot).	• Can mitigate cracking for exact length of blind pipe for a given EMAT tool run, which may be more cost-effective than the proactive heavy-wall replacement (depending on length of blind spot).
CONS			
• MFL-C tool data is used to predict where speed excursions with blind spots will occur and EMAT tool performance is not known. Actual speed excursion length could result in other integrity management methods becoming more cost-effective.	• FEI may not be able to complete reactive replacements within suitable timelines to demonstrate mitigation of cracking threats or to avoid a reduced operating pressure during winter months. • May be associated with higher costs due to additional EMAT ILI run following the replacement (and before the next scheduled inspection interval), if necessary.	• Speed excursions with blind spots continue to occur and could vary in length for each and any ILI tool run (e.g., EMAT, MFL, AFD), meaning the previous PLE may no longer be sufficient. • A conservative assumption would be applied to Degraded data that may result from the future speed excursions, which could lead to higher lifecycle costs and future repeat impacts to landowners. • FEI may not be able to complete PLE work within suitable timelines to demonstrate mitigation of cracking threats or to avoid a reduced operating pressure, especially during winter months when capacity is required.	• Speed excursions with blind spots continue to occur and could vary in length for each and any ILI tool run (e.g., EMAT, MFL, AFD), meaning the previous PLR may no longer be sufficient. • A conservative assumption would be applied to degraded data that may result from the future speed excursions, which could lead to higher lifecycle costs and future repeat impacts to landowners. • FEI may not be able to complete PLR work within suitable timelines to demonstrate mitigation of cracking threats or to avoid a reduced operating pressure, especially during winter months when capacity is required.

Heavy Wall Replacement for Event 1 on the SAV VER 323

As shown in the images below, the MFL-C tool run at this location travelled above the typical optimal velocity range (1-3 m/s) for a significant length following the heavy-wall Cherry Creek crossing pipe, including a section shortly after heavy-wall crossing where the tool traveled above the typical maximum velocity for data collection (7 m/s).

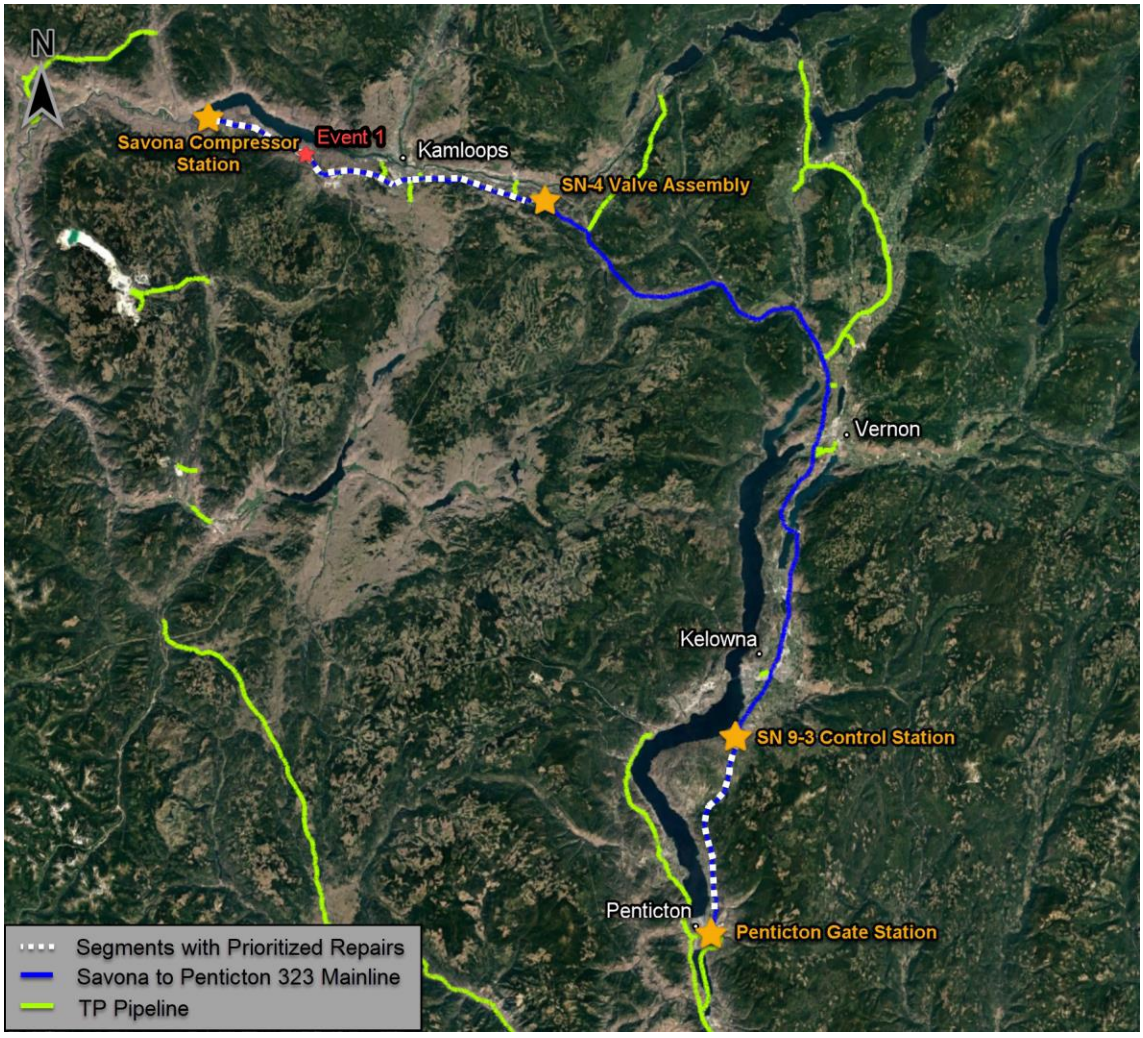
Figure 2: Event 1 Heavy Wall Pipe and Speed Excursion





Event 1 is located in the community of Savona, BC and, importantly, falls within the section of the pipeline that FEI must operate without a pressure reduction in the winter of the baseline run year in order to maintain capacity. As discussed in the response to BCUC IR1 1.2.1 and shown in the image below, FEI must complete integrity digs and repairs on approximately 64 kilometres of the SAV VER 323 pipeline between Savona Compressor Station and the SN-4 Valve Assembly to allow this segment of pipeline to operate without a pressure reduction and meet capacity needs.

Figure 3: Location of Event 1 on SAV VER 323



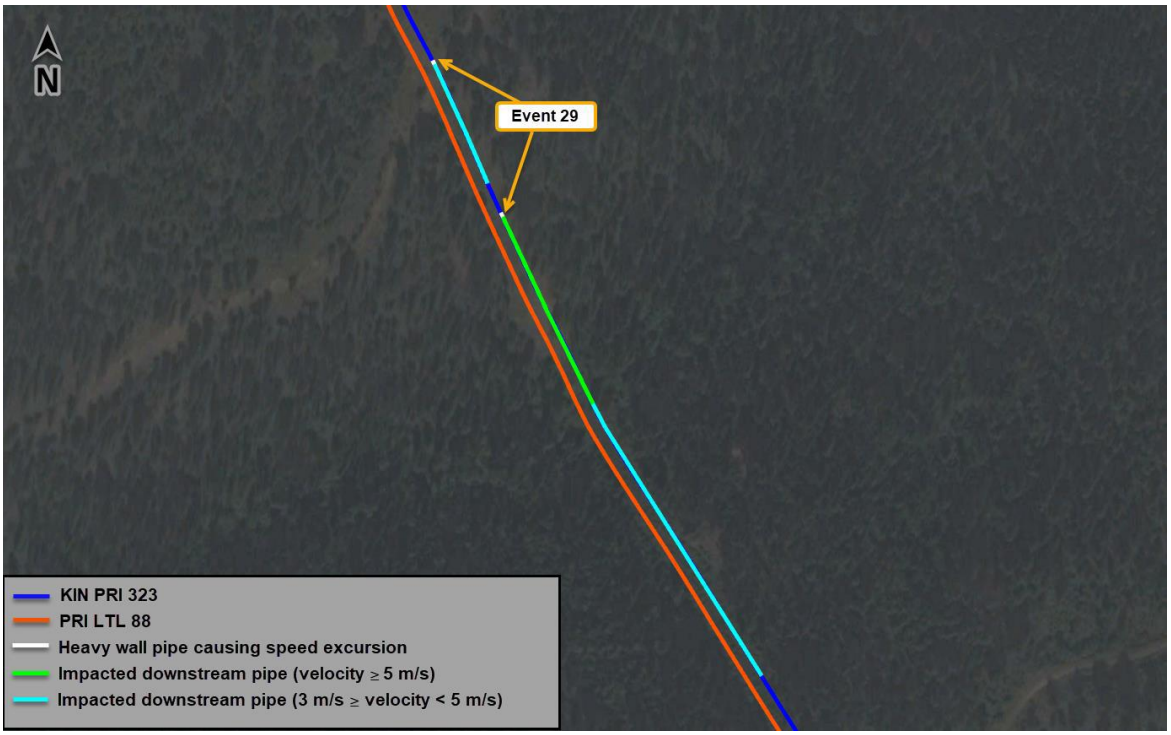
If severe cracking is identified on the SAV VER 323 pipeline, FEI expects to address the blind spot because it would otherwise be unable to demonstrate that the pipeline in its entirety is safe for operation. Due to the time constraints to complete integrity digs and repairs and restore pressure in this segment of the pipeline, FEI also expects that its only available option would be to expose the impacted pipeline to determine if there is cracking on the segment, and then repair and recoat it so that it could be operated without a pressure reduction. This work would be a significant and impactful undertaking, as the pipeline crosses under the Trans-Canada Highway.

By proactively replacing the Event 1 heavy-wall pipe between Savona Compressor Station and the SN-4 Valve Assembly, FEI can avoid potentially complex, costly and impactful exposure and recoat work that would also take up a considerable amount of time within the time period FEI has to complete digs and repairs before pressure on the pipeline must be restored to serve customers in the area during the winter.

Heavy Wall Replacements for Events 29 and 31 on the KIN PRI 323

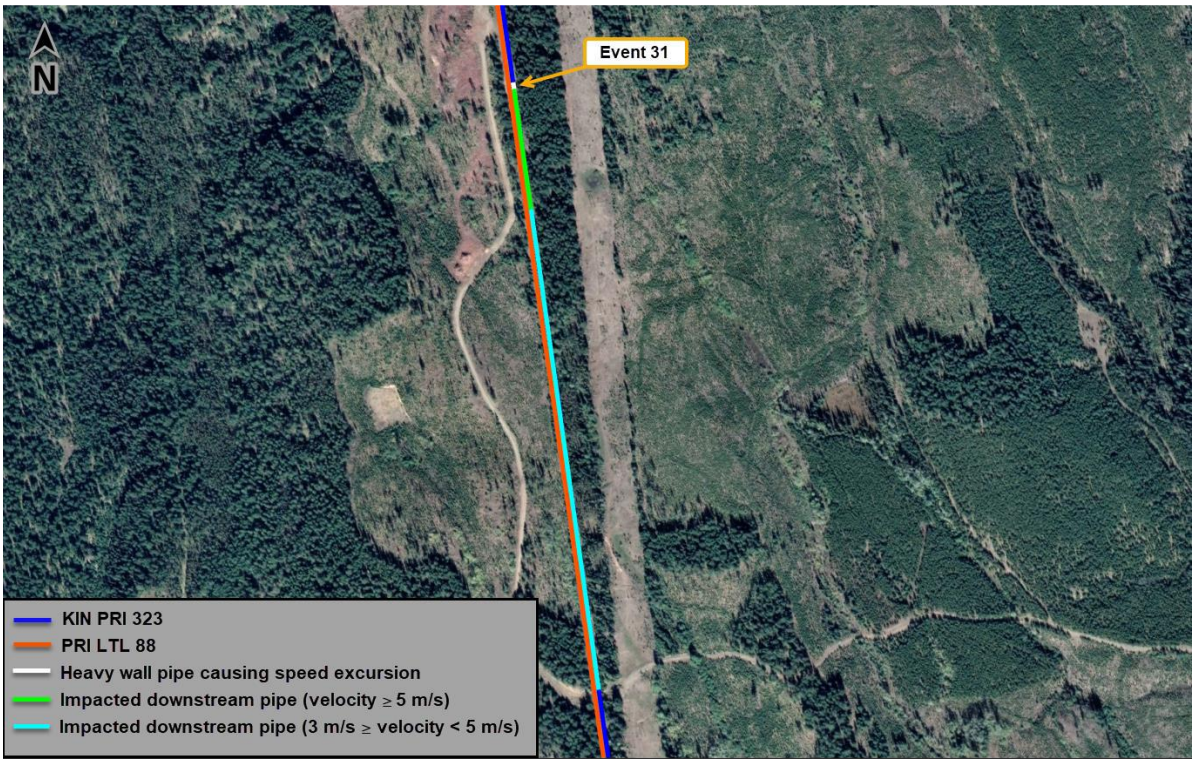
As shown in the images below, at **Event 29**, the MFL-C tool travelled above the typical optimal velocity range (1-3 m/s) for a significant length following the two 2.5 metre segments of heavy-wall pipe, including a section shortly after the second heavy-wall pipe segment where the tool traveled above the typical maximum velocity for data collection (7 m/s), which is well in excess of the typical maximum velocity for EMAT data collection (5 m/s). If severe cracking is identified on the pipeline, FEI expects to operate the pipeline at a reduced pressure until it is able to address the blind spot and demonstrate that the pipeline is safe for operation.

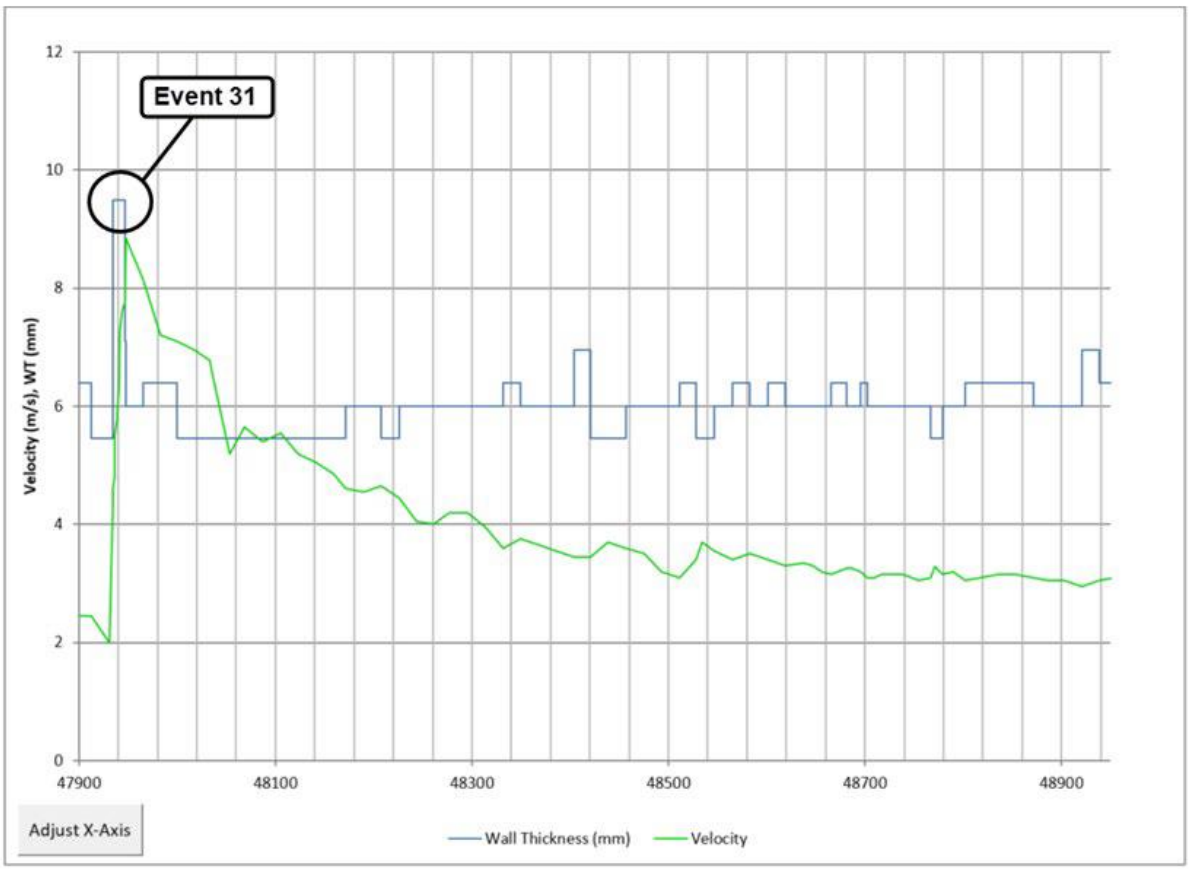
Figure 4: Event 29 Heavy Wall Pipe and Speed Excursion



Similarly, as shown in the images below, at **Event 31**, the MFL-C tool travelled above the typical optimal velocity range (1-3 m/s) for a significant length following the heavy-wall valve assembly, including a section shortly after the heavy-wall valve assembly where the tool traveled above the typical maximum velocity for data collection (7 m/s). If severe cracking is identified on the pipeline, FEI expects to operate the pipeline at a reduced pressure until it is able to inspect the blind spot and demonstrate that the pipeline is safe for operation.

Figure 5: Event 31 Heavy Wall Pipe and Speed Excursion





FEI has also identified the following reasons supporting the need to proactively replace the heavy-wall pipe segments at Events 29 and 31.

First, as outlined in Section 4.4.2.1 of the Application, FEI relies on the KIN PRI 323 and PRI OLI 323 pipelines to provide gas from TC Energy to the CTS. As explained in the response to CEC IR1 20.1, if these pipelines were operated at a reduced pressure, FEI would not be able to deliver up to a maximum of 105 MMSCFD of gas to the CTS and, depending on the time of year, would need to source additional supply in the open market at higher cost to replace the balance of the gas.

Second, as noted in the response to BCUC IR2 20.8, other options to mitigate cracking on the downstream impacted pipe, like PLE or PLR, are expected to be more impactful (e.g., more severe environmental and archaeological impacts) and potentially more expensive due to the significant length of pipe requiring exposure and recoat or replacement.

Third, if FEI could not mitigate cracking on the downstream impacted pipe prior to winter and a pressure reduction were required to remain in place through the winter, FEI would incur unplanned and much higher gas costs to secure the balance of supply for the CTS, which would be borne by customers. Based on current forward pricing for purchasing gas on the open market, incremental gas costs could be in the order of tens to hundreds of thousands of dollars per day, which would result in millions to tens of millions of dollars of incremental cost over a winter period.[10]

Ultimately, FEI has proposed the proactive replacement of these three heavy-wall pipe replacements to provide FEI with reasonable capabilities to manage its post-project activities within the limits of standard engineering practice, good utility management, and to ensure ongoing safe and reliable service to customers.

Q17: On page 21, REL states that FEI expects to use NPS 12 EMAT ILI tools with speed control when it inspects SAV VER 323 in 2026 and KIN PRI 323 in 2032. Can FEI be certain that it will use EMAT ILI with speed control when it inspects these pipelines?

A17: No. As explained in the response to RCIA IR1 18.1, FEI expects EMAT tools for NPS 12 pipelines with speed control to be *available* by 2026. However, FEI cannot be certain that it will use EMAT ILI with speed control when it inspects these pipelines. FEI's past practice has been to work with multiple vendors to undertake ILI runs on the ITS. As FEI is only aware of one vendor that is developing a speed control unit for NPS 12 EMAT ILI tools, FEI cannot commit to using EMAT tools with speed control for these runs. Moreover, FEI designs its system in a manner that enables it to adopt technology from multiple vendors and considers this approach to be prudent and in the best interest of its customers.

[10] Based on the price spread between the Sumas forward prices and the Station 2 full cost, which includes the Station 2 forward price, Westcoast 2022 tolls, and variable charges.

Q18: On page 21, REL identifies a number of benefits associated EMAT ILI tools with speed control based on the results of the pilot project on the CPH BUR 508, including returning their optimal velocity range more quickly than MFL-C tools, a reduction in the length of the blind spots and a reduction in peak velocity of the EMAT ILI tool. Does FEI consider REL's reliance on the availability and benefits associated with speed control, and the performance of the EMAT ILI tool on the CPH BUR 508, to support delaying the removal of heavy-wall segments to be correct?

A18: No. While FEI agrees that EMAT ILI tools with speed control performed better than MFL-C tools during the pilot project, including returning to their optimal velocity range more quickly than MFL-C tools (thus reducing the length of blind spots) and reaching a lower peak velocity, speed excursions still occurred despite running tools with speed control. This resulted in incomplete data collection and blind spots. As outlined below, REL's reliance on the results of the CTS pilot project on the CPH BUR 508 to support its conclusion that FEI should defer the replacement of the three heavy-wall segments within the scope of the ITS TIMC Project is problematic for a number of reasons.

First, the same heavy wall feature on the CPH BUR 508 pipeline caused a speed excursion exceeding the maximum tool velocity for data collection in both MFL-C and EMAT ILI tool runs. Moreover, even with speed control, the maximum velocity of the EMAT ILI tool reached a speed of 5.2 m/s, which was above the specified degraded specification range of 2 to 5 m/s and well-above the optimal tool velocity of 1-2 m/s. While the tool's maximum velocity using an EMAT tool with speed control was slower than that of the MFL-C tool (8.8 m/s), data loss ultimately occurred on both runs leading to blind spots on the pipeline.

Second, while REL relies on the typical velocity ranges provided by FEI in Appendix F to the Application, it does not account for variation in the velocity ranges (i.e., optimal, maximum, and degraded data specifications) which vary by the ILI vendor and/or the specific tool that is run, assuming a degraded data specification is available at all. In particular, while REL states that results of the EMAT ILI tool with speed control as part of the CPH BUR 508 pilot project were "only 0.2 m/s above the limit for data collection (assuming a degraded specification)", the degree to which the tool velocity exceeds a degraded data specification is irrelevant as any velocity above the maximum velocity for data collection will be unusable.

Third, REL's reliance on how the EMAT ILI tool performed with speed control on part of the pilot project on the CPH BUR 508 is not necessarily indicative of how a tool will perform on the SAV VER 323 and KIN PRI 323 pipelines. While FEI determined that the proactive replacement of these three heavy wall segments was warranted in part based on the results of the pilot project, as explained in A16 above, the particular severity and length of speed excursions that occurred when running MFL-C tools on these pipelines differentiated them from other areas on the ITS where speed excursions have occurred – resulting in a high confidence that data will be lost. Further, ILI tools behave differently between smaller diameters (e.g., NPS 12) and larger diameters (e.g., NPS 20). This is

because smaller diameter tools are longer and, therefore, are subject to increased tool friction. In addition, as explained in the responses to CEC IR1 7.2 and RCIA IR1 12.6, the CTS and ITS have fundamentally different characteristics which contribute to differences in tool behavior, which may also lead to different tool performance.

Fourth, REL's conclusion with respect to the SAV VER 323 and KIN PRI 323 is predicated on a number of factors that FEI many not be able to control, namely: (1) a tool being used with speed control; (2) the ILI vendor providing a degraded specification; and (3) the tool run conforming to the typical velocities (i.e., the optimal and maximum velocities, as well as degraded specification) identified by FEI in the Application.

Ultimately, the benefits associated with an EMAT ILI tool with speed control do not change the underlying need to proactively replace the three heavy-wall pipe segments within the Project scope, namely, that FEI has a high confidence that these heavy-wall segments will cause a speed excursion, resulting in unusable data and blind spots. Further, waiting to address these three sites until after the EMAT ILI inspections exposes FEI and its customers to unwarranted and reasonably avoidable risks, including financial and supply risks.

Q19: Citing Exhibit B-1, Appendix F, p. 6 and RCIA IR1 11.2.1, on page 21, REL states: "FEI explains that its decision to defer some heavy-wall removals while proceeding with the three segments on the KIN PRI 323 and SAV VER 323 pipelines is based on the fact that speed control was not expected to be available for NPS 12 pipelines." Is REL's characterization of FEI's evidence with respect to the deferral of other heavy-wall pipe segment replacements correct?

A19: No. FEI did not base its decision to defer the heavy-wall segments on the assumption that speed control would not be available. FEI generally determined which heavy-wall segments warranted proactive replacement based on the severity and length of prior MFL-C speed excursions.

Q20: On page 23, REL states that the cost to remove heavy-wall segments will not be substantially different whether completed before or after the initial EMAT ILI. Is REL correct?

A20: No. FEI expects that the cost of removing these heavy-wall pipe segments after the baseline EMAT ILI run has been completed will result in additional costs.

First, while REL advocates for FEI to re-inspect these pipelines during the next scheduled EMAT ILI run to eliminate areas of missing data, planning system modifications based on the assumption that re-inspection would never be warranted would hinder FEI's ability to implement an effective crack management program and its ability to ensure and demonstrate the ongoing safe operation of these pipelines. Therefore, assuming FEI re-inspects the pipeline ahead of the proposed re-inspection period, FEI would incur the

additional expense of an additional EMAT ILI run, in the range of $1.5 to 2.5 million (inclusive of both FEI's costs and contractor costs).

Second, inflation could result in higher material and labour costs, resulting in higher costs for these heavy-wall replacements.

Third, delaying the replacement of these heavy-wall pipe segments as proposed by REL would lose the benefits associated with a planned project, including ensuring resources are planned to be allocated to this work (and not being re-allocated from other important ongoing work) and, ultimately, that there is a sufficient planning horizon to ensure cost efficiencies are available and realized.

Finally, there are financial risks to FEI and its customers in the event that FEI cannot complete required work prior to winter.

Q21: On page 25, REL notes that FEI stated it would potentially incur the additional expense of an additional EMAT ILI run ahead of the proposed re-inspection period where it has removed a heavy-wall segment after a previous EMAT ILI run did not return valid data, but that FEI does not plan to employ this approach on the CTS pilot pipelines prior to the scheduled re-inspections in 2026. How does FEI respond?

A21: FEI's decision not to undertake an additional EMAT ILI re-inspection ahead of the regularly scheduled (non-pilot) post-CTS TIMC EMAT inspections was informed by the results of the EMAT ILI results, which did not indicate any particularly concerning features on the pipelines warranting an acceleration of the planned inspections on the CTS TIMC pipelines. FEI will be addressing cracking on the CTS TIMC pipelines from 2024 to 2028, including addressing any blind spots cost-effectively and over a defensible timeframe established by its analysis at the time, using its best judgment and incorporating its understanding of its system, industry experience and potential constraints.

Q22: On page 18, REL states that FEI should ensure its ILI vendors provide a degraded data specification. Please explain whether this is feasible.

A22: This is not feasible as not all vendors provide a degraded data specification. At the time of filing this Rebuttal Evidence, only one of FEI's current vendors offers a degraded data specification for EMAT ILI tools. There are also a number of disadvantages if FEI were to ensure all of its vendors can provide a degraded data specification:

- First, as not all vendors have tools in all of the sizes necessary for the CTS TIMC and ITS TIMC pipelines, FEI would have a more limited pool of potential vendors to select to conduct these runs. At this time, this would necessitate sole-sourcing to a single vendor.

- Second, prioritizing whether a vendor provides a degraded data specification would limit FEI's ability to consider their other technical capabilities (e.g., detection and sizing capabilities, speed control capabilities, etc.) when awarding work.

- Third, limiting the number of vendors that could undertake EMAT ILI runs would create other sole-sourcing risks, including increased run costs, scheduling limitations, etc.

Q23: On page 26, REL states that the MFL-C ILI runs on the SAV VER 323 and KIN PRI 323 pipelines and the EMAT ILI pilot runs on the CTS resulted in "proportionally similar blind spots" and will be "relatively small". Therefore, according to REL, delaying the removal of the heavy-wall segments within the Project scope until after initial EMAT ILI runs have been completed does not introduce unacceptable risk. Is this correct?

A23: No. At a high level, the assessment of whether a blind spot introduces an unacceptable risk is not determined based on the proportional length of that blind spot or total proportion of all blind spots. It is standard engineering practice in the Canadian pipeline industry to examine and respond to sources of uncertainty during integrity decision-making. Response to uncertainty becomes particularly key if an operator has experienced a pipeline failure, but also if near-failure conditions are identified (e.g., potentially injurious cracking reported by an EMAT ILI run). As such, rather than relying on an assumption that a certain proportion of blind spots on a given pipeline can be summarily dismissed in an operator's assessment of the continued safe and reliable operation of the remainder of a pipeline, FEI evaluates and makes its determinations on a case-by-case basis.

Q24: On page 27, REL concludes that the location of SAV VER 323 and KIN PRI 323 pipelines in Class 1 areas lowers their respective risk profiles. How is the risk profile of the pipeline relevant to the determination to replace the heavy-wall segments?

A24: Class location can be an indicator of potential life safety risks of a rupture. However, as explained in Section 3.5.3.2 of the Application, there are other reasons FEI undertakes mitigation of its pipelines to prevent ruptures. For example, regardless of the class location, a rupture anywhere on SAV VER 323 on a peak day, could result in reliability consequences with end-use customers losing supply. This could lead to economic consequences for commercial and industrial customers, and depending on what time of year the rupture occurs, there could be potential life safety consequences to residential customers who rely on gas to heat their homes.

Q25: On page 29, REL states on page 29 that it is recommending that FEI defer removal of the heavy-wall segments until FEI has confirmed that the EMAT ILI tool is unable to provide valid inspection data for these segments. In the response to BCOAPO-RCIA IR1 2.8, REL also states that "it is an acceptable risk to continue operating the

SAV VER 323 and KIN PRI 323 pipelines for a period of 7 years (the reinspection period) with three blind spots." Based on REL's proposal, for how long would FEI be blind to potential cracking on the ITS pipelines, and would this be acceptable?

A25: FEI is proposing to inspect the SAV VER 323 in 2026 and KIN PRI 323 in 2032. Under REL's proposed approach of deferring the replacement of heavy-wall segments and not re-running the EMAT ILI tool, FEI would not have cracking information until the next EMAT ILI run in 2033 for the SAV VER 323 and 2039 for the KIN PRI 323, assuming a re-inspection period of 7 years. FEI notes that it is unable to establish EMAT ILI re-inspection periods for the ITS pipelines until it has baseline EMAT information and other post-ILI information. As FEI does not yet have EMAT ILI data for these pipelines, FEI cannot assume that a delay of this duration would be acceptable.

Q26: In the response to BCUC-RCIA IR1 1.1, REL states that "in REL's experience with other types of ILI's, pipeline operators do not modify every single characteristic of their pipelines that has the potential of degrading the data as this becomes cost prohibitive." Is this correct?

A26: Yes. However, FEI is not proposing to modify every single characteristic of the 8 ITS pipelines within the Project scope. As explained in Appendix D to the Application, FEI refined the scope of the ITS TIMC Project based on its observations of EMAT ILI tool behavior during the pilot project on two segments of the CTS, including deferring a decision on whether to replace heavy wall segments that caused a total of 62 speed excursion events affecting 2,867 metres of pipe during previous MFL ILI runs, until after a baseline EMAT ILI run is completed.

Q27: In the response to BCOAPO-RCIA IR1 2.5, REL states that Pipeline Operators Forums publishes a standard practice of specification for inline inspections titled "Specifications and Requirements for In-line Inspection of Pipelines – Standard Practice POF 100" and that "POF 100 provides acceptable data loss criteria". REL also states that other guidelines do not explicitly recommend the removal of heavy wall pipe. Please comment on REL's reference to this guideline.

A27: FEI is subject to the *Pipeline Act*, *Oil and Gas Activities Act* (OGAA) and *Pipeline Regulations*, which incorporate CSA Z662, not the Pipeline Operators Forum (POF) specifications or requirements. FEI is not aware of any Canadian operators who use or rely on these POF guidelines.

Specifically, FEI has certain obligations to maintain its pipeline infrastructure to accord with legislative, regulatory and code requirements, including:

***Oil and Gas Activities Act*, [SBC 2008], c. 36**

37(1) A permit holder, an authorization holder and a person carrying out an oil and gas activity must

(a) Prevent spillage, and

…

CSA Z662:19 Oil and gas pipeline systems (excerpts only)

10.3.2.2

Where an engineering assessment, the operating company's integrity management program, or observation indicates that portions of the pipeline system are susceptible to failure, the operating company shall either implement measures preventing such failures or operate the system under conditions that are determined by an engineering assessment to be acceptable.

As explained further in Section 3.5.2 of the Application, together, the statutory and regulatory obligations FEI is subject to align with its efforts to take additional measures to mitigate the risk of failure on the 8 ITS pipelines due to cracking threats. Importantly, these obligations do not prescribe *how* FEI must eliminate or mitigate cracking threats or, indeed, whether heavy wall segments ought to be removed before undertaking an EMAT ILI. They are instead goal-oriented, leaving it to operators, like FEI, to determine the most effective and prudent approach to achieve full coverage for crack mitigation on the 8 ITS pipelines within the Project scope. Consistent with FEI's statutory and regulatory obligations, FEI has considered the impact of heavy wall segments on ILI performance, and FEI's post-EMAT integrity decision-making and response, and is proposing to remove only 3 of 65 heavy wall segments on the 8 ITS pipelines.

Q28: In the response to BCOAPO-RCIA IR1 2.5, REL concludes that "Risk management based on very high, but not complete, levels of information will be expected to still provide sufficient results." Does FEI consider this to be the correct approach?

A28: No. To the contrary, risk management based on very high, but not complete, levels of information can produce insufficient results. The following three examples illustrate how relying on very high, but incomplete, levels of information can be insufficient.

Susceptibility of the VAN MAN 323 Pipeline to Cracking Threats

In July 2023, FEI discovered that the VAN MAN 323 pipeline has occurrences of coating types that are susceptible to cracking threats. Prior to this, FEI considered its understanding of the coatings on this pipeline to be very high, if not complete.

The VAN MAN 323 pipeline on the Vancouver Island Transmission System (VITS) was included in the quantitative risk assessment (QRA) of FEI's transmission pipeline assets, provided as Appendix B-2 to the Application. Like other pipelines on the VITS, the VAN MAN 323 pipeline was assessed as having a low susceptibility to SCC based on FEI's understanding that the pipeline was coated with low-susceptible coatings, thus contributing to a lower total safety risk on the VITS than other portions of FEI's system. However, while undertaking an integrity dig assessing potential external corrosion, FEI discovered coatings that are susceptible to cracking threats. Upon further inspection of the pipe at this site, FEI further determined the presence of non-severe SCC which was able to be repaired by grinding.

While FEI is currently assessing this information and establishing next steps, FEI expects to conclude that its prior assessment of coating types on this pipeline (and potentially other pipelines on the VITS) was insufficient. Although decisions have not yet been made, FEI expects that it will plan EMAT inspection of this line as part of its appropriate management of the recently identified cracking threat.

Rupture of Pacific Gas and Electric Company's Transmission Pipeline

In 2010, a 30-inch diameter transmission pressure pipeline on Pacific Gas and Electric Company (PG&E)'s system located in the San Bruno, California area ruptured. The incident created a large crater, propelled the ruptured pipe section approximately 30 metres and ignited, causing a fire that destroyed or damaged 108 homes. Eight people were killed and, many were injured, and many more were evacuated from the area. The National Transportation Safety Board (NTSB) investigated the incident[11] and concluded that the utility's pipeline integrity management program was deficient and ineffective. In particular, the NTSB determined that PG&E did not ensure the safety of its system by relying on "incomplete and inaccurate pipeline information" and internal assessments of its integrity management program that were "superficial and resulted in no improvements".

Rupture of Kinder Morgan, Inc. Transmission Pipeline

On August 15, 2021, a 30-inch-diameter natural gas transmission pipeline owned and operated by Kinder Morgan, Inc., ruptured in a rural (Class 1) area of Coolidge, Arizona. The explosion and gas-fed fire destroyed a farmhouse, killing two of the three occupants and seriously injuring the other. The National Transportation Safety Board determined that the probable cause of the August 15, 2021, pipeline rupture in Coolidge, Arizona, was tented tape wrap leading to stress corrosion cracking, a fracture at a longitudinal seam weld, and subsequent rupture of the pipe. Contributing to the rupture was Kinder Morgan's failure to record the correct coating type used for this segment of pipeline, leading to a risk assessment that did not fully identify the risk of stress corrosion cracking.[12]

The above examples evidence the risk of summarily dismissing the potential for gaps or errors in information. Continual improvement is foundational to integrity management, and

[11] https://www.ntsb.gov/investigations/accidentreports/reports/par1101.pdf.
[12] https://www.ntsb.gov/investigations/Pages/PLD21FR003.aspx.

FEI strives to instill and maintain a safety culture that drives appropriate levels of questioning of the status quo. Indeed, the Canada Energy Regulator's Statement on Safety Culture (2021)[13] confirms this, as evidenced by this excerpt:

> *"Where an organization is strongly in tune with establishing and maintaining a positive safety culture, it scrutinizes, as a normal business function, every decision to ensure that risk is considered and managed appropriately."*

While it is not feasible for FEI or any operator to expect integrity-related decisions based on complete information, it would likewise be contrary to industry safety culture to operate based on the assumption that continual improvement of information and decisions is not a worthwhile pursuit.

As part of this Application, FEI has determined that there is a high probability that EMAT tool speed excursions will occur at the three heavy-wall segment locations within the Project scope which will prevent it from obtaining complete EMAT ILI data in the affected areas, and for which a post-EMAT response is expected to be more costly and impactful. FEI is not seeking perfect information, but rather has prudently and cost-effectively planned to address only these three locations to appropriately facilitate and inform its post-EMAT integrity decision-making and response.

4. CONCLUSION

Q29: Does this conclude your rebuttal to REL?

A29: Yes.

[13] https://www.cer-rec.gc.ca/en/safety-environment/safety-culture/statement-safety-culture/#s1_1. Excerpt is taken from the concluding paragraph to the Section entitled "What is Safety Culture and Why is it Important?".