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April 20, 2023

Residential Consumer Intervener Association
c/o Midgard Consulting Inc.
Suite 828 – 1130 W Pender Street
Vancouver, B.C.
V6E 4A4

Attention: Peter Helland, Director

Dear Peter Helland:

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)

Response to the Residential Consumer Intervener Association (RCIA) Information Request (IR) No. 2

On September 20, 2022, FEI filed the Application referenced above. In accordance with the further regulatory timetable established in British Columbia Utilities Commission Order G-48-23, FEI respectfully submits the attached response to RCIA IR No. 2.

For convenience and efficiency, if FEI has provided an internet address for referenced reports instead of attaching the documents to its IR responses, FEI intends for the referenced documents to form part of its IR responses and the evidentiary record in this proceeding.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Sarah Walsh

Attachments

cc (email only): Commission Secretary
Registered Parties

18. Reference: Exhibit B-8, FEI Response to RCIA IR1, IR 4.1 EMAT ILI Tools with Speed Control

In its response to RCIA IR1 4.1, FEI states:

> "Speed control is not yet commercially available for any sizes of pipeline within the scope of the ITS TIMC Project (i.e., NPS 10 and NPS 12).
>
> FEI is aware that a speed control unit for NPS 12 ILI tools is under development by one vendor. As described on page 6 of Appendix F to the Application, FEI participated in a pilot project for the commercial development of this speed control unit in 2021. The development process is ongoing."

On page 98 of its application for a CPCN for the Coastal Transmission System Transmission Integrity Management Capabilities project, FEI states:

> "For EMAT ILI tools that come with built-in speed control, enabling them to manage their travel velocity, FEI found that such tools perform better when they are subjected to higher gas flowrates. Since current flowrates in the Project's pipelines allow for higher tool travel velocity, it was determined that a FCS [flow control station] will not be required for situations when an ILI tool with built-in speed control is utilized."

18.1 Please provide the vendor's expected availability for when an EMAT tool with speed control for NPS 12 pipelines will be available.

Response:

FEI and its vendor currently expect EMAT tools for NPS 12 pipelines with speed control to be available by 2026, when the first ITS EMAT ILI runs are scheduled to begin. However, as discussed on page 94 of the Application, the availability of speed control does not negate the need for flow control stations to assist in maintaining the EMAT ILI tool travel velocity within its optimal range, thus promoting conditions where quality data can be collected.

18.2 Considering the vendor performed development activities in 2021 with FEI, please provide FEI's views on the likelihood that the EMAT tool with speed control for NPS 12 pipelines will be available by 2026 when the first ITS EMAT ILIs are scheduled.

Response:

Please refer to the response to RCIA IR2 18.1.

18.3 If an EMAT tool with speed control for NPS 12 pipelines becomes available, please confirm whether flow control as proposed in the current CPCN application is required in order to conduct EMAT ILIs of the SAV PEN 323 pipeline.

18.3.1 If not confirmed, please reconcile with the statement from stations are still required.

Response:

Confirmed. Please refer to the response to RCIA IR2 18.1.

18.4 Please confirm whether FEI may use an NPS 12 EMAT ILI tool with speed control for any of the ITS ILIs if such a tool becomes available, even if FEI has installed the proposed flow control stations and equipment.

Response:

Yes, FEI expects to run speed control wherever available. Speed control provides a number of benefits, including:

- Expansion of the seasonal windows available to run the tool;
- More consistent tool velocities leading to better data;
- Expected reduction in lengths of pipe with speed excursions; and
- Expected reduction in the number of speed excursions.

19. Reference: Exhibit B-8, FEI Response to RCIA IR1, IR 7.5, 7.6; FEI CTS TIMC CPCN Proceeding, Exhibit B-8, FEI Response to RCIA IR1, IR 10.1
CTS EMAT Pilot Projects

In its response to RCIA IR1 7.5, FEI explains that it obtained high quality inspection data for the LIV PAT 457 and COQ NOO 508 pipelines for the following proportions of the pipelines:

Pipeline in EMAT Pilot Project	High Quality Data – Percentage
Livingston-Pattullo 457 mm	99.8%
Coquitlam-Noons Creek 508 mm	99.45%

In the CTS TIMC proceeding, in response to RCIA IR1 10.1, FEI stated:

> "High quality data was obtained for 91.4 percent of the LIV PAT 457 EMAT inspection and 97.9 percent of the CPH BUR 508 EMAT inspection."

19.1 Please explain the discrepancy in proportions of the pilot project pipelines for which high-quality data were obtained.

Response:

The discrepancy noted by RCIA is due to a difference in the scope of the data used in preparing each response. In particular, FEI's reference to "high quality" in the response to RCIA IR1 10.1 in the CTS TIMC proceeding was limited to data with no quality degradation. In contrast, in the response to RCIA IR1 7.5 in the ITS TIMC proceeding, the "high quality" data percentage was calculated using: (1) data with no quality degradation; and (2) degraded data where a degraded data specification was also available from the ILI vendor. Where data is degraded, and a degraded data specification is available, the data can be relied on for integrity management decision-making; therefore, FEI included it when preparing the table provided in the response to RCIA IR1 7.5.

FEI clarifies that "high quality" is a qualitative term that FEI does not generally use in its internal descriptions of ILI data quality, but rather, has been used in the IRs requested by RCIA in both the CTS and ITS CPCN proceedings. FEI instead uses the following quantifiable terms as part of its internal descriptions of ILI data:

- Optimal Velocity Range: 1-2 m/s
- Minimum Velocity: 0.1 m/s
- Maximum Velocity for Full Resolution Data: 2 m/s
- Degraded Specification Range: > 2 m/s and < 5 m/s
- Maximum Velocity for Data Collection: 5 m/s

19.2 Please explain what work or refinements were performed by i) the vendor and ii) FEI in order to increase the proportions of high-quality ILI data.

Response:

Please refer to the response to RCIA IR2 19.1. FEI clarifies that the discrepancy in the reported proportion of high-quality ILI data was due to a difference in the definition of the term "high quality" in the CTS and ITS TIMC proceedings. There is no change in the amounts or proportions of un-degraded, partially degraded or missing data.

In its response to RCIA IR1 7.6 FEI provides the lengths of missing data from the pilot EMAT ILIs:

Pipeline in EMAT Pilot Project	Missing Data – Maximum Segment Length (km)	Missing Data – Total Length (km), Sum of All Segments
Livingston-Pattullo 457 mm	0.024	0.060
Coquitlam-Noons Creek 508 mm	0.018	0.022

On page 6 of Appendix D of the Application, FEI states:

> "This speed excursion impacted approximately 310 metres of pipeline downstream of the heavy wall segment (shown in pink), resulting in compromised data quality through a residential neighbour of Coquitlam."

19.3 Please provide the reasons for the EMAT ILI tool not capturing data for these inspections.

Response:

In preparing responses to this series of questions, FEI identified that the maximum segment length of missing data on the Coquitlam-Noons Creek 508 mm pipeline was incorrectly stated in the table provided in the response to RCIA IR1 7.6 in this proceeding. A corrected table is set out below:

Pipeline in EMAT Pilot Project	Missing Data – Maximum Segment Length (km)	Missing Data – Total Length (km), Sum of All Segments
Livingston-Pattullo 457 mm	0.024	0.060
Coquitlam-Noons Creek 508 mm	~~0.018~~ 0.005	0.022

FEI attributes the EMAT ILI tool not capturing data to:

- The EMAT tool exceeding the maximum velocity for data collection (when the tool travels above 5 m/s, in accordance with the response to ITS TIMC BCUC IR1 9.1); and
- Signal interference of EMAT ILI tool sensors interacting with the pipe wall (e.g., debris in the pipeline).

19.4 Please confirm whether the EMAT ILI tools used for the pilot project had speed control.

Response:

Confirmed, the EMAT ILI tools used for the pilot project had speed control.

19.5 Please reconcile the 310 metres of pipeline affected by the speed excursion with the 22 metres of total missing data for this pipeline. Was FEI able to use degraded data? How much of the affected 310 metres was FEI able to use?

Response:

Approximately 5 metres of EMAT ILI data was missing within this particular 310 metre section identified by an MFL-C run. FEI was able to use degraded data or non-degraded data for the remaining 305 metres.

FEI provides the following clarification with respect to the above response:

1. The 310 metres referenced on page 6 of Appendix D to the Application refers to an MFL-C tool run, as referenced in the paragraph reproduced below, which immediately precedes the excerpt in the preamble:

As shown in Figure 5, the MFL-C tool experienced a speed excursion as a result of an approximate 110 metre heavy wall segment (shown in blue), reaching an average tool velocity of 8.8 m/s and exceeding the maximum velocity for data collection.

2. In the response to RCIA IR2 19.3, FEI corrected an error in the table provided in the response to RCIA IR1 7.6 in this proceeding. The error relates to the maximum segment length of missing data on the Coquitlam-Noons Creek 508 mm pipeline, as shown in the table reproduced below:

Pipeline in EMAT Pilot Project	Missing Data – Maximum Segment Length (km)	Missing Data – Total Length (km), Sum of All Segments
Livingston-Pattullo 457 mm	0.024	0.060
Coquitlam-Noons Creek 508 mm	~~0.018~~ 0.005	0.022

The remaining approximate length of 17 metres (i.e., 5 metres + 17 metres = 22 metres) of missing data occurred elsewhere along the Coquitlam-Noons Creek 508 mm pipeline.

19.6 Considering 100% coverage of the pilot project pipelines was not achieved, please explain FEI's planned actions to address the integrity and the risk of cracking of pipelines in the blind spots.

Response:

As per the ILI Activities listed in Table 5-7 of the Application (page 114), FEI is planning to address the integrity and risk of cracking of pipelines in blind spots as described under the In-Ditch Inspection of EMAT ILI Tool Blind Spots activity. The steps that FEI will follow are described in the response to BCUC IR1 8.4.

19.6.1 Please confirm whether FEI has excavated and inspected or replaced the lengths for which FEI did not capture EMAT ILI data, or whether FEI has plans to do so in advance of the re-run of the EMAT ILIs.

Response:

FEI anticipates that it will address blind spots on the pilot project pipelines in advance of the re-run of the EMAT ILIs.

20. Reference: Exhibit B-4, FEI Response to BCUC IR1, IR, IR 8.4 Addressing EMAT ILI Tool Blind Spots

In its response to BCUC IR1 8.4, FEI explains:

> 3. Based on the available information, integrity management methods to address the blind spot will be evaluated to select the most cost-effective solution (while still ensuring it is technically effective);

20.1 Please identify the integrity management methods that FEI will implement to address areas where EMAT data cannot be relied upon (i.e., blind spots), and how soon these methods are likely to be implemented following the EMAT ILI (same year, next year, etc.).

Response:

FEI will undertake a site-specific assessment of any areas where EMAT data cannot be relied upon (i.e., blind spots or where degraded data with no quality specification is provided by the EMAT ILI tool) and will follow the steps set out in the response to BCUC IR1 8.4.

FEI expects that these methods are likely to be implemented following receipt of a Final Report for EMAT ILI runs, and prior to the re-run of EMAT ILIs. As per the timing of activities provided in Table 5-7 of the Application (page 114), the Final Report for the EMAT ILI run is expected to be available two to three years following a tool run.

20.2 Please confirm whether FEI has implemented these integrity management methods to address blind spots following prior ILIs.

20.2.1 If not confirmed, please explain why FEI has not implemented these methods in the past but will potentially implement them following the EMAT ILIs.

Response:

Not confirmed. Please refer to Section 5.3 of the Application, page 90, lines 15-24 (inclusive) which describes how FEI manages integrity where prior ILIs have blind spots by:

- Relying on data from a complementary technology previously run successfully in the line, with additional conservatism applied, where available;
- Relying on data from a prior successful run(s) of the same technology, with additional conservatism applied, where available; and

- Undertaking an analysis that adds conservatism for those segments where a degraded data specification is available from the vendor. If a vendor does not provide assurance of the degree of accuracy of ILI data (i.e., through a data specification), the information is not suitable for integrity decision-making.

Importantly, the above methods used by FEI to manage integrity in these circumstances are not appropriate for managing cracking threats on a permanent basis following EMAT ILIs because, in particular:

- Complementary technologies cannot be fully relied upon for crack analysis (i.e., MFL-C data is not a substitute for MFL-C and EMAT data); and
- In the case of the ITS, FEI is running EMAT tools for the first time; therefore, no successful prior run data is available.

21. Reference: Exhibit B-4, FEI Response to BCUC IR1, IR, IR 9.1; Exhibit B- 8, FEI Response to RCIA IR1, IR 11.5; Exhibit B-1, Application, p.90 EMAT ILI Run Criteria, ILI Tool Speed Profiles

In its response to BCUC IR1 9.1, FEI explains:

> "As the acceptability of an EMAT ILI tool run is determined by whether the tool run has collected the intended data, FEI's acceptance of an EMAT ILI tool run is dependent on the presence of blind spots13 and/or partially degraded data. FEI's criteria for an acceptable tool run are set out in the table below."

Criteria for an Acceptable EMAT ILI Tool Run	Metrics
Tool velocity	From Section 3 of Appendix F to the Application, typical velocities for EMAT ILI tools are: • Optimal Velocity Range: 1-2 m/s • Minimum Velocity: 0.1 m/s • Maximum Velocity for Full Resolution Data: 2 m/s • Degraded Specification Range: > 2 m/s and < 5 m/s • Maximum Velocity for Data Collection: 5 m/s Note: Actual velocity metrics will depend on the EMAT ILI tool vendor. Impact on data completeness and quality, if any, would require vendor's assessment upon completion of an EMAT ILI tool run.

Criteria for an Acceptable EMAT ILI Tool Run	Metrics
Pipeline cleanliness	Subjective evaluation in the field. The objective is to achieve clean pipelines for optimal sensor performance so that crack-like features can be detected and sized to the best of tool capability. There is no numeric specification for this.
Tool performance (e.g., sensor malfunction, battery failure)	Impact on data completeness and quality, if any, would require vendor's assessment upon completion of an EMAT ILI tool run.

21.1 Please confirm whether FEI is deferring to the vendor the decision whether sufficient coverage of the pipeline (i.e., absence of blind spots) was achieved.

21.1.1 If not confirmed, provide FEI's quantified metrics defining a successful EMAT ILI.

Response:

Not confirmed. FEI determines whether sufficient coverage of the pipeline has been achieved by an EMAT ILI run.

FEI does not have quantified metrics defining a successful EMAT ILI, but instead, evaluates each run on a case-by-case basis. Please refer to the response to BCUC IR1 9.3.

21.2 Please explain whether FEI requires 100% successful data capture for an ILI (MFL, geometry, etc.) to be accepted.

Response:

No, FEI does not require 100 percent successful data capture for an ILI (MFL, geometry, etc.) to be accepted.

Rather, as explained in the response to BCUC IR1 8.1:

> FEI requires full coverage for crack mitigation of the eight ITS pipelines. This is because a rupture of one of FEI's transmission pipelines at any location could cause unacceptable consequences as described in Section 3.5.3.2 of the Application and further in the response to CEC IR1 14.1. Thus, if the EMAT ILI tool experiences a speed excursion and cannot rely upon the data collected to make integrity decisions, then FEI will perform a site-specific assessment to determine a cost-effective mitigation.

An example of this is provided within the responses to BCUC IR1 9.3 and 9.3.1.

As explained in Section 5.3 of the Application, page 90, lines 15-24 (inclusive), FEI manages integrity for non-EMAT ILIs by:

- Relying on data from a complementary technology previously run successfully in the line, with additional conservatism applied, where available;
- Relying on data from a prior successful run(s) of the same technology, with additional conservatism applied, where available; and
- Undertaking an analysis that adds conservatism for those segments where a degraded data specification is available from the vendor. If a vendor does not provide assurance of the degree of accuracy of ILI data (i.e., through a data specification), the information is not suitable for integrity decision-making.

Importantly, the above methods used by FEI to manage integrity in these circumstances are not appropriate for managing cracking threats on a permanent basis following EMAT ILIs because, in particular:

1. Complementary technologies cannot be fully relied upon for crack analysis (i.e., MFL-C data is not a substitute for MFL-C <u>and</u> EMAT data); and
2. In the case of the ITS, FEI is running EMAT tools for the first time and, therefore, no successful prior run data is available.

21.2.1 Please explain whether FEI requires 100% successful data capture for an EMAT ILI to be accepted.

Response:

Please refer to the responses to RCIA IR2 20.1 and 21.2. FEI expects to achieve full coverage for crack mitigation through a combination of EMAT ILI and other cost-effective integrity management methods.

In its response to RCIA IR1 11.5.1, FEI explains:

> "FEI notes that the extent to which data is compromised depends on the actual tool velocities observed. If the EMAT ILI tool travels between 2 and 5 metres per second, data will be degraded. Degraded data can be relied upon for integrity management decision-making if a degraded data specification is available from the ILI vendor. If the EMAT ILI tool travels above 5 metres per second, reliable inspection data is not collected, meaning the integrity of the pipeline at these locations cannot be determined. As such, FEI cannot provide with high confidence a length/percentage for each pipeline where inspection data may be compromised for any reason during the EMAT ILI run."

In its Application on page 90, FEI states:

> "Therefore, to reduce speed excursions that compromise FEI's ability to collect quality data as much as practicably possible, the Project will replace heavy-wall pipe that is known to have caused speed excursions in the past when undertaking MFL-C ILI runs. FEI determined that it could use historical MFL-C tool data to anticipate EMAT ILI tool behaviour through its EMAT ILI Pilot Project, which is further described in Appendix D. FEI is confident that speed excursions will also occur at these locations with the EMAT ILI tools."

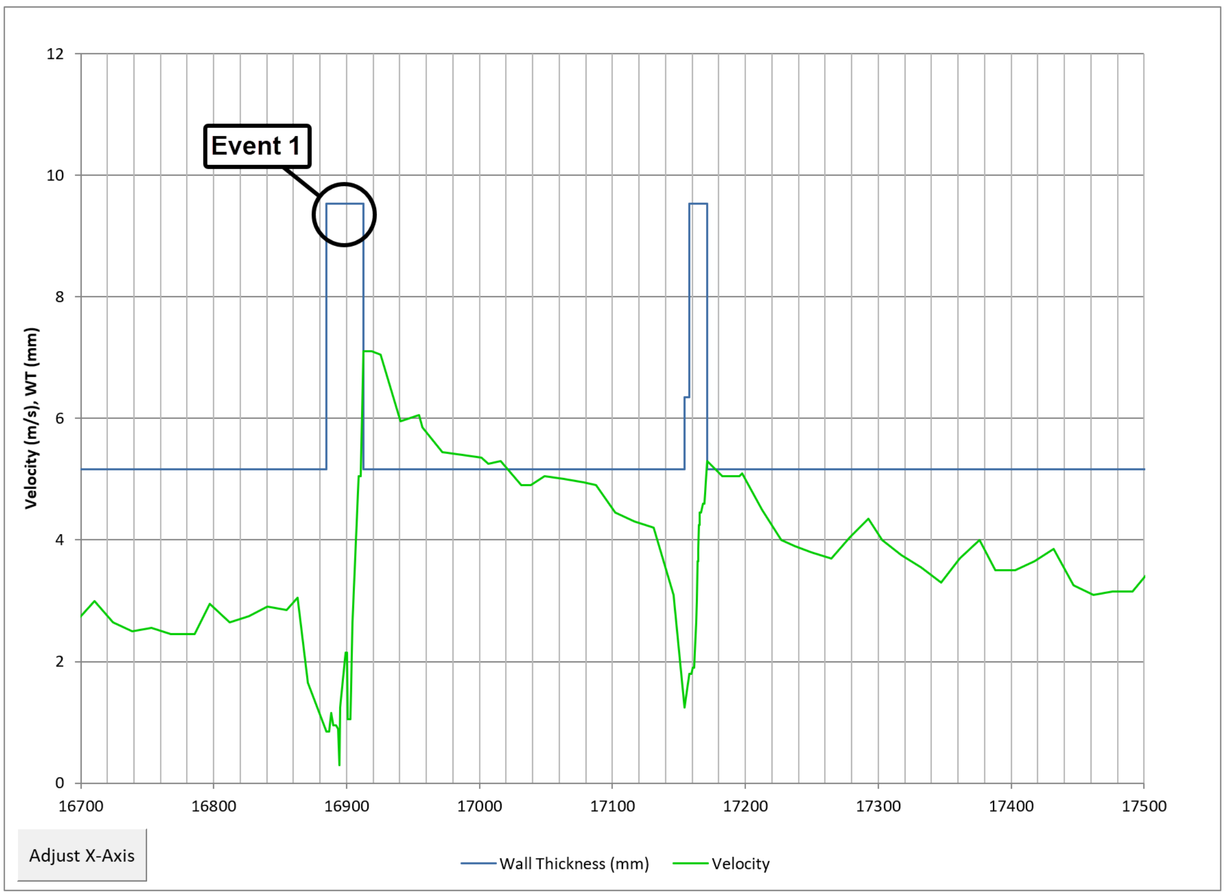
21.3 Provide the speed profiles of the previously run MFL-C tools showing their speeds as they pass the heavy wall sections proposed for removal (i.e., Events 1, 29, and 31) until a point downstream where the tool speed has returned to its optimal velocity range.

Response:

Please refer to the figures below showing the velocity (or speed) profiles of previously run MFL-C tools as they pass the heavy-wall sections proposed for removal until a point downstream where the tool speed has returned to its optimal velocity range (1-3 m/s as per Section 3 of Appendix F to the Application).

FEI notes that when quantifying the lengths of downstream pipe impacted provided in Table 5-4 of the Application, it focused on segments where the MFL-C tool was traveling above the maximum velocity for full resolution data (5 m/s as per Section 3 of Appendix F to the Application).

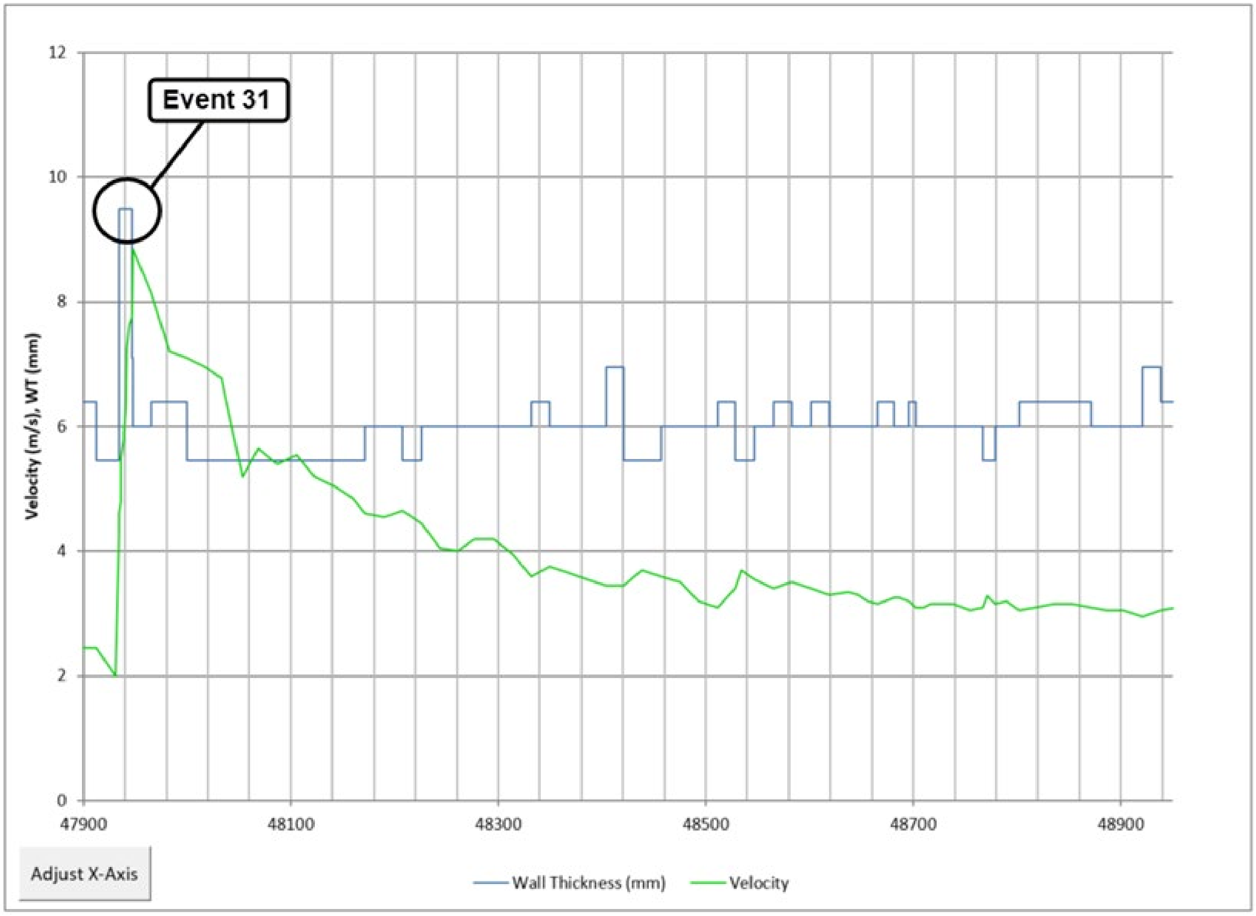
Figure 1: Event 1 – SAV VER 323



1 **Figure 2: Event 29 – KIN PRI 323**

2

1 **Figure 3: Event 31 – KIN PRI 323**



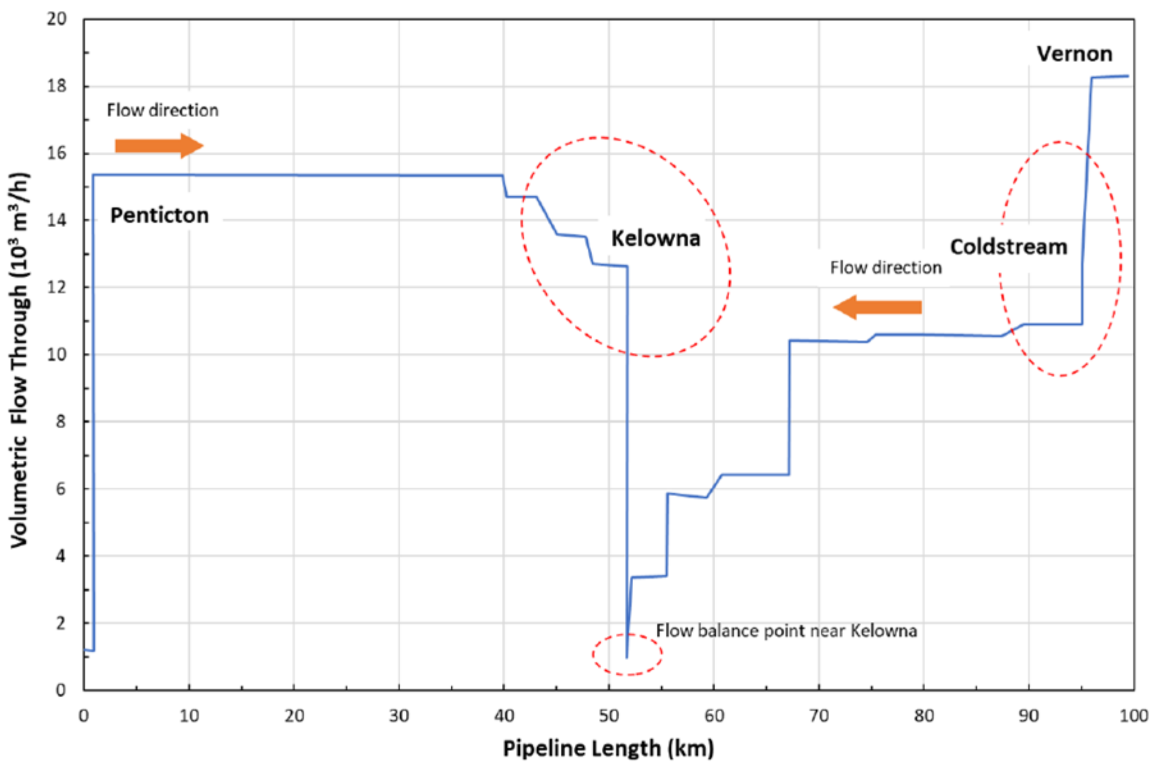
2

3

22. Reference: Exhibit B-8, FEI Response to RCIA IR1, IR 12.3 Flow Control Stations

In its response to RCIA IR1 12.3, FEI provides the following graph of flow rate versus pipeline length.

(ii) VER PEN 323



22.1 Please explain how FEI will maintain the EMAT tool within its optimal velocity range as it travels between Kelowna and Vernon and encounters the null flow point.

<u>Response:</u>

As explained in the response to RCIA IR1 12.3, the graph provided in the preamble represents flow conditions on the VER PEN 323 pipeline for a typical cool summer day. However, during in-line inspections, FEI plans to adjust gas pressure and flow conditions in an effort to keep the ILI tool within its optimal velocity range. On the VER PEN 323 pipeline, ILI tools are typically launched at Penticton and travel towards Vernon to the receiver barrel.

FEI plans to maintain the EMAT tool within its optimal velocity range during the inspection of the VER PEN 323 pipeline using the bidirectional flow control stations (FCS) proposed to be installed at Penticton Gate and SN-7 (Vernon), in coordination with existing pressure control facilities. FEI also provided an explanation of how the FCS will operate in the response to RCIA IR1 12.1.

FEI may use the following strategies for each leg of the ILI run:

1. **Between Penticton and Kelowna:** Initially, existing pressure control facilities will be adjusted to maintain a higher pressure at the tool launcher (Penticton) and a lower pressure at the tool receiver (Vernon) to ensure the tool can be launched and travel in the north direction.
2. **At Kelowna (Flow Balance Point):** To help maintain the ILI tool within its optimal velocity range throughout the EMAT ILI tool run, FEI may need to shift the flow balance point slightly towards Penticton or Vernon using the flow and pressure control facilities. Shifting the flow balance point closer to Penticton would work to slow down the ILI tool, whereas shifting the flow balance point towards Vernon would work to speed up the ILI tool. As the ILI tool approaches the flow balance point near Kelowna, the two FCS may have to be used simultaneously to increase the flow rate at Penticton Gate and decrease the flow rate at SN-7 (Vernon) to guide the tool past the flow balance point shown on the figure.
3. **Between Kelowna and Vernon:** Once past the flow balance point, the SN-7 (Vernon) FCS and an existing pressure control facility near Kelowna would be adjusted to direct more flow north and complete the pigging process. The result of this would be a temporary situation where the flow balance point moves continuously closer to Vernon, drawing the tool north. When the tool reaches Vernon, the flow-balance point would be at, or north of, the tool receiver location.

22.2 Please explain how FEI has previously run pigs through this segment of pipeline without flow control equipment at the Vernon and Penticton stations, and why similar strategies to control the ILI tool speed cannot be used for the EMAT ILI without the addition of new flow control equipment at SN-7 and Penticton Gate Station.

Response:

FEI previously ran pigs through this pipeline relying on its existing control infrastructure and optimally timing the runs based on expected flow rates. However, the MFL-C tools previously run had a higher tolerance for velocity changes than EMAT ILI tools and, therefore, could be run in the range of flow rates achievable using only the existing means of control. This approach nonetheless has downsides; namely because flow control is largely influenced by seasonal weather conditions, the opportunities to effectively execute these ILI runs was limited.

FEI has not previously run EMAT ILI tools through these segments. As discussed in the response to RCIA IR1 12.1, the use of EMAT tools introduces additional challenges in that their acceptable travel velocity range through the pipe is narrower than tools FEI has previously run. The installation of the flow control equipment will allow FEI to achieve and maintain the required velocities for the EMAT tools. Flow control equipment will also increase the seasonal windows in which FEI can run ILI tools by reducing the dependency on optimal demand conditions throughout the system.

23. Reference: Exhibit B-8, FEI Response to RCIA IR1, IR 13.1, 14.4; Exhibit B-4, FEI Response to BCUC IR1, IR 1.2

Pressure Reducing Stations

In its response to RCIA IR1 13.1, FEI states:

> "As such, using this control valve to implement a pressure reduction on the YAH TRA 323 pipeline would also reduce pressure on the YAH OLI 610 pipeline, causing an otherwise unnecessary capacity shortfall on the YAH OLI 610 pipeline. In peak winter conditions, if the YAH OLI 610 is operated with a pressure reduction, it would not be capable of delivering the gas projected to be needed to the Oliver Y Control Station to support demand in the Okanagan or delivering gas to Kingsvale and via the Enbridge's pipeline to support customers in the Lower Mainland."

In its response to RCIA IR1 14.4, FEI states:

> "Installation of the new pressure safety valves and pressure switches and modifications to the control systems will be completed after an EMAT ILI run identifies severe crack indications requiring sustained pressure reduction. However, the new pressure safety valves will need to be procured ahead of time so that they can be installed concurrently with the planned pressure reduction, thus avoiding a significant delay to the mitigation strategy."

23.1 Please confirm whether FEI could procure the pressure reducing station equipment for the Yahk station in advance, but hold off on installing it until after the EMAT ILI is completed, similar to the proposed approach for the pressure safety valves and control systems to be installed at the compressor stations following the EMAT ILI runs.

23.1.1 If not confirmed, please explain why not.

<u>Response:</u>

Not confirmed. As previously discussed in the response to RCIA IR1 13.5, FEI requires independent pressure control on the YAH TRA 323 pipeline and has proposed a permanent PRS at EKE. Pressure control capabilities at this location are required on a year-round and ongoing basis for the following reasons:

1. To provide the maintenance flexibility required to complete an increased number of integrity digs and repairs resulting from ILI runs;
2. To allow for implementation of a pressure reduction of up to 20 percent of the Established Operating Pressure (EOP), which could be required following initial or subsequent EMAT ILI runs; and

3. To provide the operational flexibility to sustain gas supply to customers.

In contrast, the pressure safety valves and control systems to be installed at compressor stations following the EMAT ILI runs are only required if the implementation of a pressure reduction of up to 20 percent of the EOP is required. Such a pressure reduction could be in place for a longer term (e.g., months) and through peak winter periods, requiring these modifications to prevent unintended over pressure situations.

As shown in the detailed schedule provided in Appendix G-2 to the Application, site activities to prepare and install the permanent PRS would take approximately 35 days. Delaying the installation of the permanent PRS at the Yahk Station until after the EMAT ILI is completed could impact the response time to effectively assess and manage integrity threats to the YAH TRA 323 pipeline without causing a capacity shortfall on the YAH OLI 610 pipeline.

23.2 Please identify the cost savings related to the avoided construction labour to install the pressure reducing equipment at the Yahk station.

<u>Response:</u>

As discussed in the response to RCIA IR2 23.1, FEI requires independent pressure control on the YAH TRA 323 pipeline and has proposed a permanent PRS at EKE. As such, the construction labour costs would not be avoided, but rather, deferred until after the EMAT ILI run. These construction labour costs are approximately $1,363,000, including: excavation & backfill; stopples & bypass; civil/structural; piping demolition; on-field construction; commissioning; and field supervision specific to PRS installation scope.

23.3 Please identify the salvage value of the uninstalled equipment if a long- term pressure reduction is not required at Yahk (i.e. a short-term pressure reduction is effected using the existing equipment).

<u>Response:</u>

As discussed in the response to RCIA IR2 23.1, FEI requires independent pressure control on the YAH TRA 323 pipeline and has proposed a permanent PRS at EKE. As such, equipment costs would not be avoided. The salvageable equipment costs for the permanent PRS are approximately $607 thousand, including large bore ball valves, control valves, power gas panel and controlling equipment.

In its response to BCUC IR1 1.2.1, FEI provides a schedule for the EMAT ILI of the SAV PEN 323 mainline:

Table 2: Schedule for Baseline EMAT ILI on the Savona to Penticton 323 Mainline (2023 to 2027)

ITS TIMC	2023				2024				2025				2026				2027			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Savona to Penticton 323	BCUC reviews and approves ITS TIMC CPCN Application			Detailed Design / Fabrication / Construction (Phase 1)								MFL-A Run[2]	EMAT Run	Reduce pressure & perform priority pipeline repairs (100 km)		Restore pressure (100 km)		Perform remainder of pipeline repairs (142 km)		Restore pressure (242 km)

23.4 Please confirm whether FEI could but hold off on installing the temporary pressure reducing equipment at SN-4 until after the EMAT ILI is completed, similar to the proposed approach for the pressure safety valves and control systems to be installed at the compressor stations following the EMAT ILI runs, considering FEI is relocating an existing pressure reducing station and FEI has two calendar quarters to install the temporary station before needing to restore pressure on the Savona to SN-4 segment.

23.4.1 If not confirmed, please explain why not.

Response:

While responding to this IR, FEI noted a typographical error in Table 2 included in the preamble to the question above which originated in the response to BCUC IR1 1.2.1. The table references MFL-**A** Run in Q4 of 2025. However, this should be MFL-**C** and the footnote should read "The magnetic flux leakage – circumferential (MFL-C) tool run must occur prior to the EMAT ILI run. Data from the MFL-C tool informs the interpretation of EMAT ILI run results." The Corrected Table 2 is provided below and will be corrected in a separate errata to BCUC IR1 (Exhibit B-4) filed concurrent with these IR responses.

Revised Table 2: Schedule for Baseline EMAT ILI on the Savona to Penticton 323 Mainline (2023 to 2027)

ITS TIMC	2023				2024				2025				2026				2027			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Savona to Penticton 323	BCUC reviews and approves ITS TIMC CPCN Application			Detailed Design / Fabrication / Construction (Phase 1)								MFL-C Run[1]	EMAT Run	Reduce pressure & perform priority pipeline repairs (100 km)		Restore pressure (100 km)		Perform remainder of pipeline repairs (142 km)		Restore pressure (242 km)

While FEI could delay installing the proposed temporary PRS at the SN-4 Valve Assembly until after the baseline EMAT ILI run is completed, as discussed below, there would be adverse impacts resulting from such a delay.

First, as explained in the response to BCUC IR1 1.2.1, the PRS at the SN-4 Valve Assembly is part of an operational strategy to maintain capacity in a pressure reduced scenario without the OCU Project in-service. Should the OCU Project not be in-service prior to winter 2026, FEI must be prepared to implement the operational strategy outlined in the response to BCUC IR1 1.2.1, including use of the PRS at the SN-4 Valve Assembly. In particular, as discussed in Section 5.4.4 of the Application, the extent of cracking threats on a pipeline is unknown until after a successful EMAT ILI run and initial data analysis has been completed. As such, if significant cracking is identified on the Savona to Penticton 323 mainline, FEI must be able to reduce the pressure east of the SN-4 Valve Assembly.

Second, delaying the installation of the PRS until after the EMAT ILI run would divert critical labour resources from completing prioritized repairs on the approximately 100 km of pipeline, which are necessary to ensure the operational strategy can be executed. FEI considers the potential digs and repairs on this pipeline to be a significant undertaking within the required timelines and requires the availability of these critical resources. If the repairs on this pipeline are not completed, FEI may not be able to restore pressure on the required segments prior to winter and may encounter a capacity shortfall on the Savona to Penticton 323 mainline.

Ultimately, while there would be negative consequences from delaying the installation of the temporary PRS at the SN-4 Valve Assembly, FEI emphasizes that if the OCU is placed in-service prior to winter 2026, the temporary SN-4 PRS may not be needed and, as a result, could be removed from the Project scope. FEI would identify this change to the BCUC as part of future compliance and regulatory reporting (as set out in the response to BCOAPO IR1 5.1).

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[1] The magnetic flux leakage – circumferential (MFL-C) tool run must occur prior to the EMAT ILI run. Data from the MFL-C tool informs the interpretation of EMAT ILI run results.

23.5 Please identify the cost savings related to the avoided construction labour to install the pressure reducing equipment at the SN-4 station.

Response:

The cost savings to avoid construction labour to install the PRS at the SN-4 Valve Assembly is approximately $1,528,000, including: excavation & backfill; stopples & bypass; civil/structural; piping demolition; on-field construction; commissioning; and field supervision specific to PRS installation scope.

Please refer to the response to RCIA IR2 23.4 which describes the disadvantages of delaying the installation of the temporary PRS at the SN-4 Valve Assembly as proposed in the Application.

24. Reference: Exhibit B-8, FEI Response to RCIA IR1, IR 13.1; Exhibit B-4, FEI Response to BCUC IR1, IR, 1.2.1

Pressure Reducing Strategy Without Okanagan Capacity Upgrade

In its response to RCIA IR1 13.1, FEI states:

> "The SCP-01C control valve provides the only pressure regulating capability at the East Kootenay Control Station and is located on the common feed to the YAH OLI 610 and YAH TRA 323 pipelines. As such, using this control valve to implement a pressure reduction on the YAH TRA 323 pipeline would also reduce pressure on the YAH OLI 610 pipeline, causing an otherwise unnecessary capacity shortfall on the YAH OLI 610 pipeline. In peak winter conditions, if the YAH OLI 610 is operated with a pressure reduction, it would not be capable of delivering the gas projected to be needed to the Oliver Y Control Station to support demand in the Okanagan or delivering gas to Kingsvale and via the Enbridge's pipeline to support customers in the Lower Mainland."

In its response to BCUC IR1 1.2.1, FEI states:

- "If significant cracking1 is identified by EMAT ILI, FEI will conduct integrity digs and perform crack repairs on the Savona to Penticton 323 mainline in two stages, as it is possible that there will be too many repairs for FEI to complete prior to the winter.
  - o Prior to winter 2026, FEI will prioritize integrity digs and performing crack repairs on 100 km of the Savona to Penticton 323 mainline nearest to the supply points into the mainline at Savona and Penticton, as listed in Table 1 and shown in Figure 1 below."

24.1 Please provide the length of the YAH TRA 323 pipeline.

Response:

As provided in Table 3-5 of the Application, the approximate length of the YAH TRA 323 is 163 km. Please also refer to Figure 3-12 of the Application for a map depicting where the pipeline is located on the ITS.

24.2 Please confirm whether FEI considered a similar strategy as proposed for the SAV PEN 323 mainline for the YAH TRA 323 pipeline, where FEI:

- reduces the pressure on this pipeline using the existing pressure control equipment at Yahk,

- prioritizes repairs to the pipeline between the Yahk station and the Warfield compressor station for completion prior to winter, and
- restores full pressure on the Yahk to Warfield segment (and to the YAH OLI 610 line) and if a pressure reduction is still required due to ILI indications west of Warfield adjusts the Warfield compressor to achieve the pressure reduction to the downstream Warfield to Oliver segment.

24.2.1 Please explain whether such an approach is feasible and if not, explain why not.

Response:

Not confirmed. FEI does not consider this approach feasible for the following reasons:

1. FEI requires independent pressure control on the YAH TRA 323 pipeline and has proposed a permanent PRS for the reasons provided in the response to RCIA IR2 23.1. The approach proposed by RCIA does not allow for independent pressure control of the YAH TRA 323 pipeline.
2. The segment between Yahk and the Warfield Compressor comprises approximately 99 percent of the YAH TRA 323 pipeline length (approximately 162 km out of the total pipeline length of 163 km). FEI proposes to prioritize integrity digs and repairs on approximately 100 km of pipeline in its operational strategy for the Savona to Penticton 323 mainline. FEI already considers this length to be a significant undertaking within the required timelines (i.e., prior to winter following the baseline EMAT ILI run). An additional 62 km of digs and repairs is significant, and should FEI not complete this work, there would be unnecessary capacity impacts to the Southern Crossing 610 pipeline through winter when its capacity is critical for supporting demand in the Okanagan and delivering gas to Kingsvale and via the Enbridge's T-South pipeline to support customers in the Lower Mainland.

25. Reference: Exhibit B-8, FEI Response to RCIA IR1, IR 16.1; Exhibit B-6, FEI Response to BCOAPO IR1, IR 3.2

Project Costs

In the response to RCIA IR1 16.1, FEI provides the capital costs of specific portions of the ITS TIMC project:

Table 1: Capital Cost (as-spent $) for the Three Heavy Wall Segment Replacements ($000s)

Line	Particular	As-Spent$	AFUDC	Total
1	**Heavy wall pipe segments**			
2	Cherry Creek (Event 1)	2,945	110	3,055
3	KIN PRI 323 kP 39.4 (Event 29)	2,306	86	2,393
4	KIN PRI 323 kP 47.7 (Event 31)	1,714	64	1,778
5	**Total**	**6,965**	**261**	**7,226**

Table 2: Capital Cost (as-spent $) for the Two New Pressure Reducing Stations ($000s)

Line	Particular	As-Spent$	AFUDC	Total
1	**Pressure Reducing Stations**			
2	SN-4 Valve Assembly	3,755	162	3,917
3	East Kootenay Exchange Station	3,782	164	3,945
4	**Total**	**7,536**	**326**	**7,862**

In the response to BCOAPO IR1 3.2, FEI provides a breakdown of the capital costs of the ITS TIMC project:

Amended Table 5-2: Pipelines Within Project Scope

Pipeline	Approximate Length (km)	Number of Alterations	Summary of Alterations	Capital Cost Estimate ($ millions)
Savona Vernon 323	143	1	Replacement of one approximately 80 metre heavy wall pipe segment and bends on either side of the crossing at Cherry Creek (kP 16.9).[4] Replacement pipe and fittings to match upstream and downstream line pipe wall thickness. **(Event 1)**	3.774
Vernon Penticton 323	99	N/A	No mitigations required.	
Penticton Oliver 273	30	N/A	No mitigations required.	
Oliver Grand Forks 273	95	N/A	No mitigations required.	
Grand Forks Trail 273	60	N/A	No mitigations required.	
Kingsvale Princeton 323	67	2	Replacement of two 2.5 metre heavy wall pipe segments at kP 39.4. Replacement pipe to match upstream and downstream line pipe wall thickness. **(Event 29)** Replacement of one heavy wall above ground valve assembly at block valve assembly KO-3[5] (kP 47.7). Replacement to match upstream and downstream line pipe wall thickness. This includes replacement of bends, fittings and other heavy wall features. **(Event 31)**	2.995 2.217
Princeton Oliver 323	95	N/A	No mitigations required.	
East Kootenay Link 323	163	N/A	No mitigations required.	
Total Pipeline Alterations Cost Estimate ($ millions)				**8.986**

Amended Table 5-3: Facilities Within Project Scope

Facility	Associated Pipelines	Summary of Alterations	Capital Cost Estimate ($ millions)
Savona Compressor Station	SAV VER 323	Modification to one pig barrel.	1.760
SN-3 (Kamloops)	SAV VER 323	Addition of clamp-on ultrasonic flowmeter, power and telemetry.	3.919
SN-4 (Kamloops)	SAV VER 323	Addition of temporary pressure regulating capability (PRS)	3.015

25.1 Please reconcile the capital costs of the heavy wall segment replacements shown in the response to RCIA IR1 16.1 with the capital costs shown in the response to BCOAPO IR1 3.2.

Response:

As RCIA IR1 16.1 requested the costs for the three heavy-wall segment replacements, FEI provided only the capital costs that were specifically for that work and did not include amounts that are shared or allocated to the Project as a whole. For example, FEI did not include capital costs such as construction management, owner's costs, and land rights.

In contrast, BCOAPO IR1 3.2 requested a breakdown of the ITS TIMC Project total estimated capital costs (with contingency) of $71.894 million by the three proposed pipeline alterations and 13 proposed facility alterations (in the format presented in Tables 5-2 and Table 5-3 of the Application). As such, FEI included the shared or allocated costs mentioned above.

Please refer to Table 1 below for the reconciliation of the heavy-wall segment replacements between the $6.965 million, excluding AFUDC, shown in the response to RCIA IR1 16.1 and the $8.986 million, excluding AFUDC, shown in the response to BCOAPO IR1 3.2. As the costs in BCOAPO IR1 3.2 were without AFUDC, the reconciliation in Table 1 below is between the capital costs before AFUDC.

Table 1: Reconciliation of Heavy Wall Segments Replacement Capital Costs with Pipeline Alterations Cost Estimate

Line	Particular	Total ($000s)	Reference
1	**Pipeline Construction costs w/Escalation and Contingency**	**$6,965**	**RCIA IR1 16.1, Table 1**
2	Construction Management allocated to Pipeline Construction	898	
3	Owner's Costs allocated to Pipeline Construction	1,100	
4	Transmission Land Rights allocated to Pipeline	20	
5	Contingency on Pipeline Transmission Land Rights	2	
6	**Total Pipeline Alteration Cost Estimate**	**$8,986**	**BCOAPO IR1 3.2, Amended Table 5-2**

25.2 Please reconcile the capital costs of the SN-4 temporary pressure regulation station shown in the response to RCIA IR1 16.1 ($3.755 million) with the capital costs shown in the response to BCOAPO IR1 3.2 ($3.015 million).

Response:

While responding to this information request, FEI discovered that some of the capital cost estimates provided in the Amended Table 5-3 of BCOAPO IR1 3.2 were inadvertently placed in the incorrect rows. Thus, while the costs were correct and the total capital cost of $62.908 million shown at the bottom of Amended Table 5-3 was correct, some of the costs in the table were not tied to the correct facility alterations listed in the table. Specifically, the capital cost estimates for SN-4 (Kamloops), SN-6-1 (Vernon), Salmon Arm Tap, and SN-7 (Vernon) had the incorrect order of capital cost estimates shown in the response to BCOAPO IR1 3.2. Please refer to Table 1 below for the revised Table 5-3 from BCOAPO IR1 3.2 with the correct order of capital costs.

Table 1: Revised Table 5-3 from BCOAPO IR1 3.2 for Cost Estimate of Facilities Within Project Scope

Facility	Associated Pipelines	Summary of Alterations	Capital Cost Estimate ($ millions)
Savona Compressor Station	SAV VER 323	Modification to one pig barrel.	1.760
SN-3 (Kamloops)	SAV VER 323	Addition of clamp-on ultrasonic flowmeter, power and telemetry.	3.919
SN-4 (Kamloops)	SAV VER 323	Addition of temporary pressure regulating capability (PRS)	5.259
SN-6-1 (Vernon)	SAV VER 323	Replace existing insertion meter with clamp-on ultrasonic flowmeter, power and telemetry (by others).	3.015
Salmon Arm Tap	SAV VER 323	Replace existing insertion flowmeter with clamp-on ultrasonic flowmeter.	2.515
SN-7 (Vernon)	SAV VER 323 VER PEN 323	Modification on two pig barrels, addition of flow control station (FCS), including power and telemetry.	7.226
Penticton Gate Station	VER PEN 323 PEN OLI 273	Modification to two pig barrels, addition of flow control station (FCS).	5.673
Oliver Y Station	PEN OLI 273 PRI OLI 323 OLI GRF 273	Modification to three pig barrels.	8.253
Princeton Crossover Control Station	PRI OLI 323 KIN PRI 323	Modification to two pig barrels, addition of flow control capability (FCS), telemetry and power.	6.598
Kingsvale Control Station	KIN PRI 323	Modification to one pig barrel.	1.412
SN-15 (Grand Forks)	OLI GRF 273 GRF TRA 273	Modification to two pig barrels, addition of flow control capability (FCS), telemetry and power.	6.929
SN-17 (Trail)	GRF TRA 273 YAH TRA 323	Modification to two pig barrels.	3.721
East Kootenay Exchange	YAH TRA 323	Modification to one pig barrel and addition of permanent pressure regulating system (PRS).	6.629
Total Facility Alterations Cost Estimate ($ millions)			**62.908**

Due to the correction to the table in the response to BCOAPO IR1 3.2 discussed above, the requested reconciliation of the costs for the SN-4 temporary PRS should be between the $3.755 million from RCIA IR1 16.1 and the $5.259 million shown in Table 1 above.

Please refer to Table 2 below for the reconciliation of the SN-4 temporary PRS between the $3.755 million, excluding AFUDC, and the $5.259 million, excluding AFUDC, shown in Table 1 above. As noted in the response to RCIA IR2 25.1, costs in the response to RCIA IR1 16.1 did not include shared or allocated costs, such as construction management costs and owner's costs, whereas the capital costs shown in BCOAPO IR1 3.2 included the shared or allocated costs required for the overall Project.

Table 2: Reconciliation of SN-4 Valve Assembly PRS Capital Cost with Facilities Cost Estimate

Line	Particular	Total ($000s)	Reference
1	**SN-4 Valve Assembly PRS**	**$3,755**	**RCIA IR1 16.1, Table 2**
2	Development and Construction Management allocated to SN-4	375	
3	Owner's Costs allocated to SN-4	1,129	
4	**Total SN-4 Facilities Cost Estimate**	**$5,259**	**RCIA IR2 25.2 Table 1**