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FortisBC Energy Inc.

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

Decision
and Order C-3-22

May 18, 2022

Before:

A. K. Fung, QC, Panel Chair
C. M. Brewer, Commissioner
D. M. Morton, Commissioner

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COMMISSION ORDER C-3-22

APPENDICES

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Executive summary

On February 11, 2021, FortisBC Energy Inc. (FEI) filed an application (Application) with the British Columbia Utilities Commission (BCUC) pursuant to sections 45 and 46 of the *Utilities Commission Act* (UCA) seeking a Certificate of Public Convenience and Necessity (CPCN) for FEI's Coastal Transmission System (CTS) Transmission Integrity Management Capabilities (TIMC) Project (CTS TIMC Project or the Project).¹ FEI is a wholly-owned subsidiary of FortisBC Holdings Inc., which in turn is a wholly-owned subsidiary of Fortis Inc. FEI provides sales and transportation services to more than one million natural gas customers throughout British Columbia.

The CTS TIMC Project is a pipeline integrity project that is required to enable FEI to inspect certain of its pipelines and ensure their continued safe operation. FEI has determined that 11 of its CTS pipelines are susceptible to cracking threats that can lead to failure by rupture. According to FEI, the only technically and financially feasible alternative to mitigate these cracking threats is to adopt electro-magnetic acoustic transducer (EMAT) in-line inspection (ILI) tools.²

The CTS TIMC Project, which is confined to existing FEI rights of way and facilities, consists of alterations to six CTS pipelines including replacement of 13 heavy wall segments and alterations to 13 facilities that are necessary to ready the pipelines for EMAT ILI. The Project will also include the installation of a pressure regulating station on a single segment of one of the pipelines where EMAT ILI is not technically possible.³

The estimated total cost of the CTS TIMC Project in as-spent dollars is \$137.8 million, which includes an Allowance for Funds Used During Construction (AFUDC).⁴

On March 11, 2021, the BCUC established a regulatory timetable for the review of the Application.⁵ Having reviewed the entirety of the evidence and submissions in this proceeding, the Panel finds that the Project to modify the CTS pipelines to allow for EMAT ILI is appropriately justified and costed, and is in the public interest, in order to mitigate the risk of rupture due to the credible threat of undetected cracking on the CTS pipelines.

Accordingly, for the reasons outlined in the attached Decision, the Panel:

1. Grants to FEI a CPCN for the CTS TIMC Project pursuant to sections 45 and 46 of the UCA; and
2. Approves the recovery of the balance of costs in the TIMC Development Cost Deferral Account associated with the development of the Project, estimated at \$13.2 million, pursuant to sections 59 to 61 of the UCA, by amortizing the December 31, 2022 actual balance of these actual costs over five years commencing January 1, 2023.

Additionally, the Panel directs various reporting requirements, which are set out in the Decision.

¹ Exhibit B-1, p. 1.

² Ibid.

³ Ibid.

⁴ Ibid.

⁵ BCUC Order G-74-21.

1.0 Introduction

On February 11, 2021, FortisBC Energy Inc. (FEI) filed an application with the British Columbia Utilities Commission (BCUC) for a Certificate of Public Convenience and Necessity (CPCN) pursuant to sections 45 and 46 of the *Utilities Commission Act* (UCA) for FEI's Coastal Transmission System (CTS) Transmission Integrity Management Capabilities (TIMC) Project (CTS TIMC Project or the Project).⁶

FEI is a wholly-owned subsidiary of FortisBC Holdings Inc., which in turn is a wholly-owned subsidiary of Fortis Inc. As the largest natural gas distribution utility in British Columbia, FEI provides sales and transportation services to more than one million residential, commercial, and industrial customers in more than 100 communities throughout British Columbia. FEI's distribution network provides more than 95 percent of the natural gas energy delivered to customers in the Province.⁷

According to FEI, the CTS TIMC Project is a pipeline integrity project that is required to enable FEI to inspect certain of its pipelines and ensure their continued safe operation. FEI has determined that 11 of its CTS pipelines are susceptible to cracking threats that can lead to failure by rupture. According to FEI, the only technically and financially feasible alternative to mitigate these cracking threats is to adopt electro-magnetic acoustic transducer (EMAT) in-line inspection (ILI) tools.⁸

The CTS TIMC Project, which is confined to existing FEI rights of way and facilities, consists of alterations to six CTS pipelines including replacement of 13 heavy wall segments and alterations to 13 facilities that are necessary to ready the pipelines for EMAT ILI. The Project will also include the installation of a pressure regulating station on a single segment of one of the pipelines where EMAT ILI is not technically possible.⁹

1.1 Approvals Sought

FEI seeks approval of a certificate of public convenience and necessity (CPCN) for its CTS TIMC Project, pursuant to sections 45 and 46 of the UCA.¹⁰

FEI also requests approval, pursuant to sections 59 to 61 of the UCA, to recover the balance of costs in the TIMC Development Cost deferral account associated with the development of the Application, estimated at \$13.2 million, by amortizing the December 31, 2022 actual balance of these costs over three years commencing in 2023.¹¹

⁶ Exhibit B-1, p. 1.

⁷ Ibid., p. 9.

⁸ Ibid., p. 1.

⁹ Ibid.1, p. 1.

¹⁰ Ibid., p. 2.

¹¹ Ibid., p. 3. Exhibit B-5, BCUC IR 26.2; FEI originally sought approval in the Application to amortize the deferral account commencing in 2022. However, as the request was based on an expectation that FEI would receive a decision on the CTS TIMC CPCN in 2021, FEI subsequently amended the amortization commencement date to January 1, 2023.

1.2 Regulatory Process

On March 11, 2021, the BCUC established a regulatory timetable for the review of the Application, which consisted of public notice, intervener registration and an FEI-led workshop.¹² On May 12, 2021, the BCUC issued a letter notifying parties that the BCUC had retained an independent consultant, Dynamic Risk Assessment Inc. (Dynamic Risk), to produce an expert report which would form part of the evidentiary record.¹³

On May 17, 2021, the BCUC issued a further regulatory timetable, which included the filing of Dynamic Risk's Independent Expert Report, one round of information requests (IRs) to FEI and one round of IRs to Dynamic Risk.¹⁴

On August 25, 2021, the BCUC established a further regulatory timetable, which included dates for a second round of IRs and final and reply arguments.¹⁵ The regulatory timetable was subsequently amended to provide, among other things, extensions to deadlines for Panel IRs and FEI's responses to same along with the parties' comments relating to those IRs.¹⁶

The following three intervener groups participated in the review of the Application:

- Residential Consumer Intervener Association (RCIA);
- British Columbia Old Age Pensioners' Organization et al. (BCOAPO); and
- Commercial Energy Consumers Association of British Columbia (the CEC).

One individual, D. Cline, registered as an interested party. The BCUC did not receive any letters of comment.

1.3 Legal and Regulatory Framework

Sections 45 and 46 of the UCA set out the legislative framework for the BCUC review of CPCN applications. Section 45(1) of the UCA states that except as otherwise provided, after September 11, 1980, a person must not begin the construction or operation of a public utility plant or system, or an extension of either, without first obtaining from the BCUC a certificate that public convenience and necessity require, or will require, the construction or operation of the plant or system.¹⁷

Section 46(3) states that the BCUC may issue or refuse to issue a CPCN or may issue a CPCN for the construction or operation of only a part of the proposed facility, line, plant, system or extension, and may attach terms and conditions to the CPCN.

¹² BCUC Order G-74-21.

¹³ Exhibit A-6.

¹⁴ BCUC Order G-149-21.

¹⁵ BCUC Order G-251-21.

¹⁶ BCUC Orders G-285-21, G-295-21, G-318-21, and G-337-21; Exhibit A-19; BCUC Order G-63-22.

¹⁷ *Utilities Commission Act*, RSBC 1996, c. 473, Section 45(1).

Section 46 (3.1) of the UCA requires that the BCUC consider the following in determining whether to issue a CPCN:

- a) the applicable of British Columbia's energy objectives,¹⁸
- b) the most recent long-term resource plan filed by the public utility under section 44.1, if any, and
- c) the extent to which the application for the CPCN is consistent with the applicable requirements under sections 6 and 19 of the *Clean Energy Act* (CEA).

The BCUC has jurisdiction to approve the establishment of deferral accounts, pursuant to sections 59 to 61 of the UCA.

The BCUC's CPCN Guidelines provide general guidance regarding the information that should be included in a CPCN application and the flexibility for an application to reflect the specific circumstances of the applicant, the size and nature of the project and the issues raised by the application.¹⁹

1.4 Decision Framework

The structure of this Decision largely follows that of the CPCN Application and the BCUC's CPCN Guidelines. Relevant evidence submitted by FEI and interveners is summarized in each section.

Section 2.0 addresses the Project need and its justification including the impact of the potential for hydrogen blending in the CTS on the Project.

Section 3.0 discusses the alternatives that FEI considered that are capable of meeting the overall Project objectives. This section also describes the Project alternatives evaluation and selection of the preferred alternative for the Project.

Section 4.0 describes the scope of the Project, while Section 5.0 outlines Project costing, accounting treatment, and rate impact.

Sections 6.0 through 8.0 address environmental permitting, stakeholder and First Nations consultation and engagement, as well as alignment with provincial energy objectives and FEI's internal long-term resource planning.

The Panel's overall CPCN determinations are provided in Section 9.0, as well as the Panel directives relating to detailed reporting requirements for the Project as set out in Appendix A to this Decision.

Section 10 provides guidance from the Panel to the parties, including guidance to FEI regarding future CPCN applications and guidance to interveners regarding intervenor evidence.

Section 11 summarizes the Panel's approvals and directives.

¹⁸ BC's energy objectives are defined in section 2 of the *Clean Energy Act*.

¹⁹ Order G-20-15, 2015 Certificate of Public Convenience and Necessity Application Guidelines.

2.0 Project Need and Justification

The objective of the Project is to mitigate the likelihood of rupture due to cracking threats on 11 of FEI's CTS pipelines.²⁰ These 11 CTS pipelines operate at or above 30 percent of specified minimum yield strength (SMYS) of the pipe²¹ and are currently not equipped to run ILI tools capable of detecting cracking threats.²² As a result, those pipelines are subject to potential rupture due to cracking threats such as stress corrosion cracking (SCC) and crack-like imperfections in seam welds, which are not always detectable using current pipeline integrity methods.²³

FEI states that a pipeline rupture on the CTS could have significant and unacceptable safety, reliability, environmental and regulatory consequences.²⁴ FEI's risk assessment has indicated that cracking is a credible threat to the CTS pipelines and is the greatest contributor to safety risk on the CTS.²⁵ FEI further states that EMAT ILI tools "are increasingly becoming the standard industry practice for mitigating cracking threats on pipelines and are the only technically and financially feasible alternative to mitigate such threats."²⁶ FEI asserts that the Project is necessary to address the emerging changes in industry practice and regulatory expectations for managing the safety risk posed by cracking threats on the 11 CTS pipelines.²⁷

FEI states that the BC Oil and Gas Commission (BCOGC) has provided written support for the CTS TIMC Project, recognizing that the Project is in alignment with FEI's regulatory and legal responsibilities as a BCOGC permit holder. The letter from the BCOGC to FEI, dated November 16, 2020, is attached as Appendix C to the Application.

2.1 Potential Rupture due to Cracking Threats on the CTS

The 11 CTS pipelines that FEI proposes to address in the Project are in urban areas of the Lower Mainland and serve large industrial and commercial customers, commercial customers as well as downstream district stations which supply gas to many municipalities in the Lower Mainland.²⁸ The CTS was predominantly constructed in the 1950s.²⁹ Figure 3-1 below shows a map of the CTS pipelines within the scope of the Project:³⁰

²⁰ FEI Final Argument, p. 1.

²¹ Exhibit B-1, p. 49.

²² Ibid., p. 22.

²³ Ibid., p. 26.

²⁴ Ibid., p. 50.

²⁵ Ibid., p. 55.

²⁶ FEI Final Argument, p. 1.

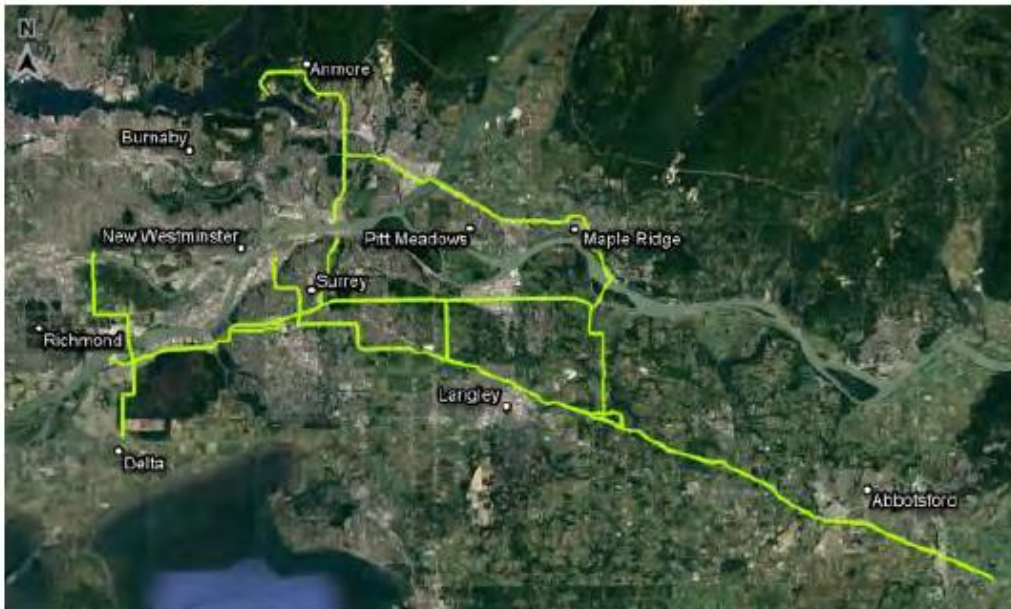
²⁷ Exhibit B-1, p. 11.

²⁸ Ibid., pp. 53-54.

²⁹ Ibid., p. 31.

³⁰ Ibid., Figure 3-1, p. 12.

Figure 3-1: 11 CTS Pipelines Requiring System-Level Cracking Mitigation



Cracking threats are planar defects that affect the strength of a pipeline by effectively reducing the wall thickness of the pipe. Due to a lack of measurable width, they cannot always be detected by FEI's current ILI tools. The two main types of cracking threats to FEI's system are SCC and crack-like imperfections in the seam weld of a pipeline. SCC and crack-like imperfections can also interact with other time-dependent integrity threats, such as external corrosion, resulting in compounded integrity issues on a pipeline.³¹

A rupture is an instantaneous and uncontrolled release of natural gas that could extend beyond the immediate area surrounding the pipeline potentially affecting public safety, environment and property. An ignited release of natural gas can result in potential harm due to any ensuing fire and resulting thermal effects on people and property.³² FEI states that since the CTS runs through highly urban areas, including much of the residential, commercial and industrial areas of the Lower Mainland, the potential consequences of a rupture are significant.³³

FEI states that a pipeline's potential to fail by rupture from cracking threats can be determined by comparing the pipeline's operating stress to the SMYS of the pipe. FEI explains that the Canadian pipeline industry generally accepts that a pipeline operating at or above 30 percent of SMYS has a potential to fail by rupture, whereas a pipeline operating below 30 percent of SMYS has a potential to leak.³⁴ The 11 CTS pipelines are all currently operating at a stress of 30 percent or more of SMYS.³⁵

FEI's current integrity management practices for managing cracking threats involve the inspection of its transmission pipelines for cracking during integrity digs, when the pipeline is exposed because of other pipe condition assessments. FEI estimates that the total amount of pipeline exposed to date as part of its integrity dig

³¹ Exhibit B-1, p. 23.

³² Ibid., p. 50.

³³ Ibid., p. 53.

³⁴ Ibid., p. 50.

³⁵ Ibid., p. 51.

program is less than one percent of the total length of pipe in FEI's transmission system.³⁶ FEI explains that "as such, these integrity digs are not expected to have identified all cases of cracking due to the limited lengths that have been exposed relative to the full length of buried pipelines."³⁷ Further, FEI submits that as cracking is highly localized and often unpredictable, it is not possible to use the analysis from integrity digs to determine where cracking may be occurring on other segments of FEI's pipelines.

2.2 Risk Assessment of Cracking Threats on the CTS

The need for the Project is founded on two related third-party studies conducted by JANA Corporation (JANA), an engineering consulting firm retained by FEI, that assess the threat of cracking on FEI's larger diameter transmission pipelines in the three transmission systems that FEI operates – the CTS, Interior Transmission System (ITS) and Vancouver Island Transmission System (VITS).³⁸ The first study comprised an assessment of the susceptibility of FEI's transmission system pipelines to cracking. The second study estimated contribution of cracking threats to overall frequency of failure based on a quantitative risk assessment (QRA) at a system level.³⁹

FEI's smaller diameter transmission pipelines were excluded from JANA's assessment as EMAT ILI tools are not yet generally commercially available for the smaller pipe diameters (nominal pipe size (NPS) 10 or smaller).⁴⁰ FEI states that it "is developing a risk assessment process that will be applicable to all of its transmission pipelines, and will, in time, be implemented for all of these assets."⁴¹

JANA's first report, titled "Analysis of Cracking Threats in FEI Mainline Transmission Pipelines,"⁴² assessed the susceptibility of each transmission pipeline to cracking threats based on pipeline properties, such as coating type and manufacturing process that are typically found to be associated with the formation of stress corrosion and seam weld cracking.⁴³ JANA concluded that 11 of the 13 CTS, nine of the 12 ITS, and none of the VITS mainline transmission pipelines were susceptible to cracking threats.⁴⁴ FEI submits that JANA's conclusions regarding the susceptibility of FEI's transmission pipeline to cracking threats are supported by evidence of cracking on FEI's system.⁴⁵

JANA, in conjunction with Dr. Weixing Chen of the University of Alberta, assessed the potential for cracks to grow to failure under FEI system operating conditions. The analysis considered a range of crack depths and lengths, which are reasonable approximations of what could be anticipated to be present in the FEI system. JANA confirms that the range of cracking lengths and depths used in Dr. Chen's analysis is a reasonable approximation of what could be anticipated to be present in the FEI system as it aligns with the cracking found to date on the FEI system.⁴⁶ JANA concluded that analysis of crack growth rates "indicates the potential for cracks to grow to failure and, with practical assumptions, in timeframes in the order of five years under the most

³⁶ Exhibit B-1, p. 27.

³⁷ Ibid.

³⁸ Exhibit B-1-1, Appendix B (filed confidentially).

³⁹ Exhibit B-1, p. 30.

⁴⁰ Exhibit B-5, BCUC IR 1.3.

⁴¹ Ibid., BCUC IR 5.3.

⁴² Exhibit B-1-1, Appendix B-1 (filed confidentially).

⁴³ Exhibit B-1, p. 32.

⁴⁴ Ibid., p. 34.

⁴⁵ Ibid., p. 38.

⁴⁶ Exhibit B-5, BCUC IR 2.3.

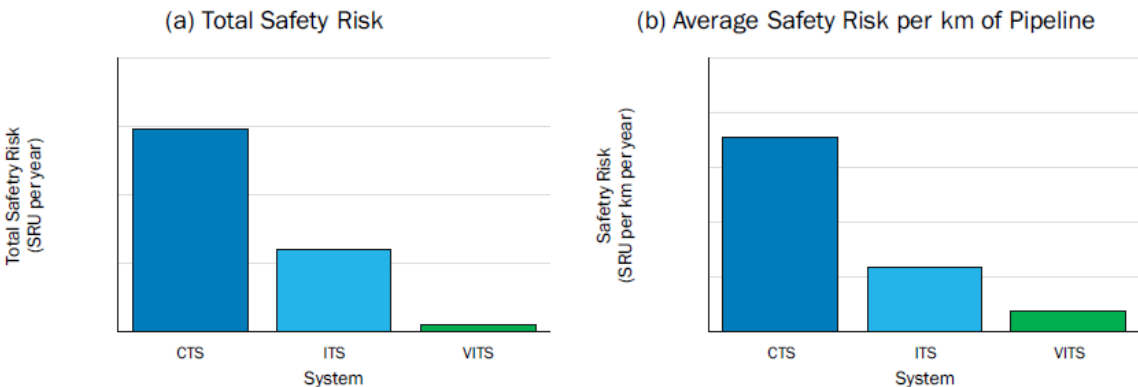
aggressive conditions.”⁴⁷ FEI explains that “while the lower bound timeframe of five years is considered highly unlikely (reflecting a combination of the longest, deepest crack with the lowest toughness pipeline), the analysis indicates that cracking is a credible integrity threat that needs to be managed in a timely manner.”⁴⁸

2.3 Prioritizing Work on the CTS

JANA’s second report, titled “Quantitative Safety Risk Assessment of FEI Mainline Transmission Pipelines,”⁴⁹ provides the results of a baseline, system-level, safety QRA of FEI’s transmissions systems quantifying the safety risk posed by cracking threats in comparison to other threats and hazards. This system-level QRA of FEI’s transmission systems determined the safety risk posed by cracking threats in comparison to other threats and hazards.⁵⁰ A QRA is a systematic approach to understanding the likelihood and consequences of hazardous scenarios and depicts the individual risk for people located near the hazard.⁵¹ QRAs are an accepted method for transmission operators to comply with the requirements of the Canadian Standards Association (CSA) Z662 standard.⁵²

FEI states that its decision to prioritize work on the CTS, through this Application, is supported by the results of the QRA performed by JANA. Figure 3-12 below shows that the CTS was assessed as having the highest risk, followed by the ITS and then the VITS. The higher assessed risk for the CTS was driven primarily by its proximity to populated areas. The VITS system has the lowest risk as it is a newer system in largely unpopulated areas.⁵³

Figure 3-12: Safety Risk Comparison between CTS, ITS, and VITS. Showing: (a) total safety risk and (b) average safety risk per km of pipeline



Further, results of the QRA conducted by JANA shown in Figure 3-13 below, found that cracking threats (SCC and pipe seam) are the greatest contributors to overall safety risk for the CTS at the system level.⁵⁴

⁴⁷ Exhibit B-1, p. 40.

⁴⁸ Ibid., p. 41.

⁴⁹ Exhibit B-1-1, Appendix B-2 (filed confidentially).

⁵⁰ Exhibit B-1-1, Appendix B (filed confidentially).

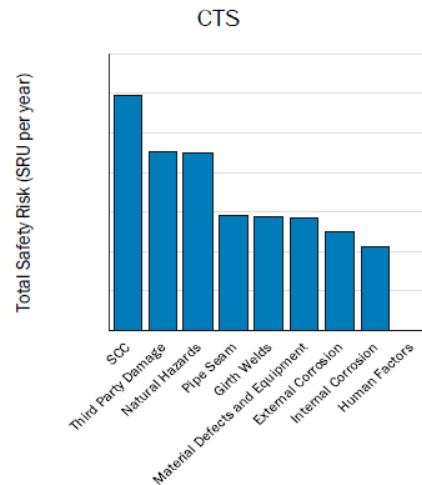
⁵¹ Exhibit B-1, p. 42.

⁵² Ibid.

⁵³ Ibid., p. 43.

⁵⁴ Exhibit B-1, p. 43.

Figure 3-13: Threat Contribution to Safety Risk for CTS Pipelines



FEI states that based on the results of JANA’s assessments, it has prioritized work on the CTS in this Application and is developing a further TIMC project for work on the ITS.⁵⁵ FEI explains that the decision to only include CTS pipelines in this Application enables FEI to mitigate a larger proportion of system risk in a shorter period of time.⁵⁶ FEI anticipates filing the ITS TIMC CPCN Application in 2022 following the receipt of a decision from the BCUC on the current Application.⁵⁷

2.4 Future Hydrogen Blending in the CTS Pipeline System

Following final and reply arguments by the parties, the Panel issued IRs to FEI on the topic of potential hydrogen blending in the CTS pipeline system. The Panel IRs sought an update regarding FEI’s evaluation of the impact of blending increasing concentrations of hydrogen into its transmission and distribution systems, as well an explanation regarding the long term continued usefulness of the existing CTS pipeline system, in light of the uncertain future adoption of hydrogen blending.

In response to the Panel IRs, FEI states that its CTS pipelines will continue to be used and useful as they are capable of safely transporting a blend of hydrogen and large-scale replacement of the CTS is neither expected nor cost-effective. As FEI has an obligation to provide safe service to its customers, FEI cannot defer the CTS TIMC Project due to the potential for hydrogen-related developments on its system.⁵⁸ FEI further states that it has completed preliminary analysis to understand the admissible limits for hydrogen blending in its existing natural gas infrastructure, and that these preliminary analyses indicate this infrastructure can transport a blend of natural gas and hydrogen in low concentrations.⁵⁹

FEI continues to develop its strategy with respect to the injection of hydrogen into its CTS system. By 2030, FEI expects that there will be minimal hydrogen in the gas flowing in the CTS pipelines. Looking further, FEI states

⁵⁵ *ibid.*, p. 30.

⁵⁶ Exhibit B-5, BCUC IR 4.3.

⁵⁷ Exhibit B-11, BCUC IR 34.5.

⁵⁸ Exhibit B-19, BCUC Panel IR 1.1.

⁵⁹ *Ibid.*

that it cannot know the precise percentage of hydrogen blended into the CTS system in the future. However, it expects that the concentration of hydrogen will be less than 20 percent for at least the next 20 years.⁶⁰

Despite the uncertainty with respect to the timing of hydrogen deployment, FEI does not currently envision that the CTS pipelines would need to be removed and replaced with new hydrogen-ready pipelines, as this would not be a cost-effective method to potentially support 100 percent hydrogen distribution. Instead, by 2030, FEI envisions that blending of hydrogen would expand across the low-pressure gas distribution system, and as demand grows between 2030 and 2050, the existing gas system pipeline corridors would be retrofitted, upgraded, and expanded to transport an increasing share of hydrogen.⁶¹

FEI further states that the information gathered by EMAT ILI will also directly factor into FEI's analysis of determining what concentration of hydrogen each pipeline can safely accommodate in the future. In turn, this will allow FEI to determine a safe and cost-effective plan for transitioning to increased hydrogen distribution in the future.⁶²

2.5 Independent Consultant's Report

As already noted, the BCUC retained Dynamic Risk as an external independent pipeline integrity expert consultant to review the Application and submit a report on FEI's pipeline integrity management planning with respect to the threat of SCC.⁶³ Dynamic Risk's view is that cracking is a credible threat for FEI's transmission system that, if left unmitigated, could lead to pipeline rupture. Further, Dynamic Risk states:

Currently, there is a gap in the existing FEI integrity management practices to address the threat of SCC, as opportunistic excavations alone are not sufficient to fully characterize, detect and manage the threat. The results of the quantitative risk assessment (QRA) demonstrate the risk of SCC to be highest on the CTS pipeline segments and it is the independent pipeline integrity expert panel's view that EMAT ILI is the most appropriate response and mitigation action to reduce risk and strengthen the overall integrity management program.⁶⁴

Positions of Parties

The CEC submits that "the risk of rupture caused by cracking threats is unacceptable and should be mitigated to the extent possible, and in accordance with industry standards and regulatory expectations."⁶⁵ The CEC recommends that the BCUC find the Project to be needed and adequately justified by FEI.⁶⁶ In response to the Panel IRs to FEI concerning the potential for future blending of hydrogen in FEI's pipelines and its impact on the estimated useful life of its existing pipelines including the need, if any, to change its current depreciation rates, the CEC notes:⁶⁷

⁶⁰ Ibid., BCUC Panel IR 1.2.

⁶¹ Ibid., BCUC Panel IR 1.6.

⁶² Ibid.

⁶³ Exhibit A2-1.

⁶⁴ Exhibit A2-1, p. 2.

⁶⁵ CEC Final Argument, p. 4.

⁶⁶ Ibid., p. 5.

⁶⁷ Exhibit C2-12, pp. 2-3.

FEI goes on to point out that the need for EMAT ILI Project is independent of future activities in that it is required now, and will facilitate long-term operation of the pipes. The CTS TIMC Project can serve to mitigate expenses related to future hydrogen blending by isolating issues for targeted upgrades, and can also be instrumental in determining what concentration of hydrogen can be safely accommodated. The CEC recommends that the Commission provide significant weight to FEI's evidence as to the minimal potential impact of hydrogen blending on the need for the CTS TIMC Project, and its specific declaration that to the greatest extent known, the assets being evaluated will continue to be used and useful, with no need at this time for a change in depreciation rates.

BCOAPO takes the position that the Application should be approved.⁶⁸ However, BCOAPO expresses concern that, while FEI has confirmed that the Project will reduce the risk of failure, there is no quantification of that risk. BCOAPO submits that "[t]he cost of improved safety and reliability is an exponential curve. As a utility gets closer to "perfect," the cost of each unit of improvement is more expensive than the last unit. Thus, the cost of going from 98 percent reliability to 99 percent reliability will likely be much more than the cost of going from 88 percent to 89 percent. There should be a sweet spot, where the cost and risk are balanced. In a competitive business, management routinely makes that assessment. BCOAPO is not advocating against 100 percent reliability, but notes that costs must be balanced and considered in CPCN applications."⁶⁹

Further, BCOAPO suggests the BCUC develop a robust process to assess the value of incremental improvements in risk to fully assess the cost and benefit to ratepayers.⁷⁰ However, BCOAPO accepts JANA's evidence on the quantum and nature of the risk to FEI's CTS pipelines as presented in its report, at the workshop, and indirectly through FEI's evidence in this matter.⁷¹

As for the issue of hydrogen blending, BCOAPO confirms:

Because BCOAPO accepts the Utility's evidence regarding the quantum of risk its current assets pose and the urgency of taking action, barring any solution the Commission might order the Utility to examine should this Panel decline to approve this CPCN, its position on this matter remains unchanged.⁷²

RCIA agrees with FEI that there is a gap in FEI's integrity management program with respect to the threat of cracking on the CTS pipelines. RCIA submits that "a program to inspect the CTS pipelines which are susceptible to SCC and seam weld cracking is required, and that EMAT ILI tools should be used on the CTS pipelines as proposed by FEI."⁷³ As for the issue of potential hydrogen blending raised by the Panel IRs, RCIA submits:⁷⁴

RCIA agrees with FEI that the CTS system will continue to be used and useful when hydrogen is injected at the concentrations contemplated by FEI. FEI states that industry experience shows steel pipelines can accommodate blends of up to 10% hydrogen.

⁶⁸ BCOAPO Final Argument, p. 6.

⁶⁹ Ibid, pp. 6-7.

⁷⁰ Ibid., p. 7.

⁷¹ Ibid., p. 26.

⁷² Exhibit C3-11, p. 2.

⁷³ RCIA Final Argument, p. 27.

⁷⁴ Exhibit C1-9, p. 2.

RCIA goes on to say:⁷⁵

RCIA agrees with FEI's statement that EMAT ILI will be useful in monitoring for pipeline cracking due to the risk of hydrogen embrittlement (and consequent cracking) as hydrogen concentrations in the gas stream increase. As EMAT ILI is useful for detecting axially-oriented cracking, the ability to use this tool may become even more important in monitoring the CTS pipelines for cracking through mechanisms other than SCC. Therefore, most of the project assets will be used and useful as the hydrogen concentration increases. RCIA adds the qualifier of "most" when referring to the project assets that will remain useful as RCIA maintains that not all project assets are required, as stated in RCIA's Final Argument.

Panel Determination

We find that there is a need to mitigate the risk of undetected cracks that FEI's existing tools and techniques are insufficient in addressing. The risk of rupture caused by undetected cracking, as identified in the evidence, is described as "unacceptable" by the CEC and we agree. We also note that the BCOGC, the safety regulator for the CTS, concurs with that assessment as does the BCUC's independent engineering consultant, Dynamic Risk.

In making this determination, we considered the potential threat to the pipeline system from cracks that are undetectable using the technology and tools currently employed by FEI. We do not agree with BCOAPO that there is no quantification of that risk. FEI's consultant, JANA, has provided a confidential QRA which has been filed as part of the evidentiary record in this proceeding.⁷⁶

The QRA's basis for quantification is the following formula:

$$\text{Safety Risk} = \text{Likelihood of a Failure} * \text{Safety Consequence of a Failure}$$

FEI states that the likelihood of a failure is based on the type of threat and the potential consequence of a failure is based on the size of a gas release and the potential for the gas to ignite.⁷⁷ FEI further submits that "a QRA is an accepted method for transmission operators to comply with the CSA Z662 standard".⁷⁸

This quantification is useful as a comparison - to prioritize work on different projects, as can be seen in Figure 3-12 above. It is also helpful in ranking specific threats on a given pipeline. However, it does not provide the economic cost associated with specific risks. That said, it can be difficult to provide an economic analysis of some consequences of failure – for example human life or well-being.

We are satisfied that the quantification of risk provided in the confidential JANA reports and the additional evidence of consequence of failure is adequate for the purpose of assessing the need to mitigate the risk of undetected cracks in the CTS.

⁷⁵ Ibid, p. 3.

⁷⁶ Exhibit B-1-1, Appendix B-2, (filed confidentially).

⁷⁷ Exhibit B-1, p. 42.

⁷⁸ FEI Final Argument, p. 9.

In addition, the Panel is persuaded by the report of the BCUC’s independent expert, Dynamic Risk, which confirms that cracking is a credible threat for FEI’s transmission system and that, if left unmitigated, could lead to pipeline rupture. In particular, Dynamic Risk draws attention to the following:

The results of the quantitative risk assessment (QRA) demonstrate the risk of SCC to be highest on the CTS pipeline segments and it is the independent pipeline integrity expert panel’s view that EMAT ILI is the most appropriate response and mitigation action to reduce risk and strengthen the overall integrity management program.⁷⁹

In light of the evidence, the Panel finds that it would be unacceptable from a safety and reliability perspective to expose the public to any undetected cracking risk, which can be avoided through proactive measures. This is particularly the case in respect of the 11 CTS pipelines that FEI proposes to address in the Project, all of which are situated and operate in proximity to densely populated urban areas of the Lower Mainland and serve large industrial customers, commercial customers and downstream district stations which supply gas to many municipalities. As recognized by Dynamic Risk, the location of the CTS in a populated area means that there is a “high societal risk and high consequence of rupture” and any extended delay will increase the likelihood for pipeline failure to occur.⁸⁰ Furthermore, the Panel notes that none of the interveners challenged the need for the Project itself, despite concerns on the part of some about the scope and cost of certain elements of the Project. We will review these concerns later in this Decision.

While we have raised concerns around the impact of the potential for future hydrogen blending in the CTS on the need for the Project, on balance, we are persuaded that the information gleaned through the running of EMAT ILI tools will allow FEI to prioritize crack repairs to prevent ruptures on the CTS. We also note that no intervener disagreed on this point. As for the issue of hydrogen blending and the potential for stranded assets, the Panel will review this issue in its discussion of depreciation rates in Section 5 of this Decision.

We find BCOAPO’s suggestion that the BCUC develop a robust process to assess the value of incremental improvements in risk to fully assess the cost and benefit to ratepayers of a proposed project to be interesting and worthy of future consideration. Accordingly, **the Panel requests FEI to provide suggestions in terms of timing for the preparation and review of such a proposal in a compliance filing within 30 days of the issuance of this Decision.**

3.0 Description and Evaluation of Alternatives

Having determined that there is a need for the Project, we must go on to consider whether FEI has appropriately assessed the alternatives for achieving the objectives of the Project as well as the reasonableness of its selection of the preferred alternative. Specifically, section 2(ii) of the BCUC’s CPCN Guidelines states that a CPCN application should contain: “A comparison of the costs, benefits and associated risks of the project and feasible alternatives, including estimates of the value of all of the costs and benefits of each alternative or, where these costs and benefits are not quantifiable, identification of cost area or benefit that cannot be quantified.”

⁷⁹ Exhibit A2-1, p. 2.

⁸⁰ Exhibit A2-2, BCUC IR1 4.3.

FEI identified the following six alternatives to achieve the objectives of the Project:⁸¹

1. Stress Corrosion Cracking Direct Assessment (SCCDA);
2. Pressure Regulating Station (PRS);
3. Hydrostatic Test Program (HSTP);
4. Electro-Magnetic Acoustic Transducer In-Line Inspection Program (EMAT ILI);
5. Pipeline Replacement (PLR); and
6. Pipeline Exposure and Recoat (PLE).

A description of each alternative and the evaluation methodology used by FEI to select its preferred alternative is provided below, followed by a summary of the parties' positions and the Panel's determination.

3.1 Description of Alternatives

Alternative 1: Stress Corrosion Cracking Direct Assessment (SCCDA)

FEI states that SCCDA is an integrity management approach developed by the National Association of Corrosion Engineers International.⁸² This approach includes pre-assessment and indirect inspection steps which lead to the selection of excavation sites to directly examine the pipeline. Data from the direct examination, as well as the preceding pre-assessment and indirect inspections steps, is analysed to confirm pipeline integrity objectives have been met, to refine predictive models for where SCC is suspected to be present, to establish any further investigation and to establish re-inspection intervals.⁸³

FEI states that the integrity of sections of the pipeline that were not exposed during the integrity digs is inferred based on the SCCDA process and that the number of excavations depends on the characteristics of the pipeline, as well as the severity and amount of SCC that is found.⁸⁴

Alternative 2: Pressure Regulating Station (PRS)

To mitigate the identified SCC threat to CTS pipeline integrity, FEI considered as an alternative the installation of PRS to permanently lower the pipeline operating pressure to below 30 percent of the pipeline's SMYS. FEI states that a pipeline operating below 30 percent of SMYS only has a potential to leak, rather than rupture.⁸⁵ FEI further states that this approach satisfies its obligations under CSA Z662 and the *Pipeline Regulation*.⁸⁶

Alternative 3: Hydrostatic Testing Program (HSTP)

An HSTP involves periodically taking a segment of pipeline out of service and subjecting it to a hydrostatic test. FEI states that this testing approach is complex and involves multiple steps, including the isolation of the selected pipeline segment, the evacuation of residents within a pre-determined radius of the test segment,

⁸¹ Exhibit B-1, p. 57.

⁸² Ibid.

⁸³ Ibid., p. 58.

⁸⁴ Ibid.

⁸⁵ Ibid., p. 59.

⁸⁶ Ibid.

filling the pipeline with water and increasing the pressure of the water to the required level for the specified period of time.⁸⁷

HSTP has been used historically on pipelines where SCC failures have occurred or where near-critical cracking has been detected.⁸⁸ However, FEI states that an HSTP does not identify the presence or absence of sub-critical cracks and that any SCC or crack-like flaws that did not fail during the hydrostatic test can be expected to grow over time.⁸⁹ Therefore, periodic re-testing at an interval determined by engineering assessment would be required.

Alternative 4: EMAT ILI Program

This alternative involves the periodic running of ILI tools equipped with specialized sensors through the pipelines to detect anomalies or defects.⁹⁰ The pipeline condition data resulting from the ILI tool runs is analysed and integrity digs are then performed to expose the pipeline to allow for EMAT ILI data validation and for the removal of pipeline defects.⁹¹ FEI states that although EMAT ILI tools operate similarly to conventional ILI tools, the former is able to identify cracking in the pipeline wall due to its measurement of the interruption in sound waves generated by the ILI tool.⁹²

FEI states that EMAT ILI tools are available to be employed in pipelines down to a nominal pipe size of 10 inches.⁹³ To implement the EMAT ILI Program, FEI states the following pipeline and facility alterations would be required:⁹⁴

- **Pipeline alterations:** The EMAT ILI tool is propelled by the flow of gas in the pipeline. At points where the inside diameter of the pipeline segments varies (for example, due to changes in pipeline wall thickness), the velocity of the tool downstream of the restriction would exceed the optimum velocity range set by the ILI vendor. FEI states that the pipeline sections which cause such speed excursions would need to be cut out and replaced.
- **Facility alterations**
 - **Launchers & Receivers:** FEI states that to use the EMAT ILI tools, it would need to modify the launching and receiving assemblies for the tool, which are located at the upstream and downstream ends of a pipeline.
 - **Flow control stations:** FEI states that the use of flow control stations is required to ensure the ILI tool travels within its specified range.
 - **Pressure regulating stations:** FEI states pressure regulating stations are required to allow for immediate pressure reduction in the event that significant cracking is found after inspection of the pipeline by the EMAT ILI tool.

⁸⁷ Ibid., p. 60.

⁸⁸ Ibid.

⁸⁹ Ibid.

⁹⁰ Ibid., p. 61.

⁹¹ Ibid.

⁹² Ibid.

⁹³ Ibid.

⁹⁴ Ibid., pp. 61-64.

Alternative 5: Pipeline Replacement (PLR)

Project objectives could be achieved by replacing the existing pipeline in its entirety with a new pipeline coated with a high integrity coating that is not conducive to the formation of SCC.⁹⁵ FEI states that modern steel manufacturing practices and quality control programs also greatly reduce the likelihood of seam weld flaws on newly constructed pipelines, resulting in a pipeline that is less susceptible to cracking.⁹⁶

Alternative 6: Pipeline Exposure and Recoat (PLE)

FEI states the PLE alternative involves exposing the entire length of a pipeline, removing the coating, inspecting 100 percent of the surface using non-destructive examinations, repairing any cracking or other anomalies discovered, and recoating the entire pipeline with a high integrity coating.⁹⁷ FEI further states that the excavation required to complete the PLE alternative would be greater than for the pipeline replacement alternative, as space is required for the coating removal, pipeline inspection, repair and recoating.⁹⁸ During the PLE process, the pipeline may need to be taken out of service or operate at a reduced pressure.

3.2 Project Alternatives Evaluation

FEI applied a “Good-Acceptable-Poor Choice” rating system in evaluating the identified alternatives against three non-financial criteria and one financial criterion. The criteria are described below:

- Non-financial
 1. Method Effectiveness: alternatives that can identify and locate cracking, or eliminate cracking, are rated highest.
 2. Implementation Complexity: alternatives with minimal impact on system operation, as well as minimal land and workspace requirements, are rated highest.
 3. Community and Environmental Impacts: alternatives which minimize, for example, impacts to private property, businesses, traffic, and the environment, are rated highest.
- Financial
 1. Net Present Value of Total Capital and Operations & Maintenance (O&M) Costs: considers one time costs associated with implementation, as well as on-going capital or O&M costs.

Only the three alternatives which FEI determined were technically feasible (alternatives 4, 5 and 6) when evaluated against the non-financial criteria, were carried forward for assessment against the financial criterion.⁹⁹ Only one of the remaining three alternatives, alternative 4 – EMAT ILI, was determined to meet the financial criterion based on FEI’s net present value assessment.

⁹⁵ Ibid., p. 65.

⁹⁶ Ibid.

⁹⁷ Ibid.

⁹⁸ Ibid.

⁹⁹ Ibid., p. 66.

The results of FEI's assessment of the six alternatives are summarized in Table 4-3 below:¹⁰⁰

Table 4-3: Summary of Alternatives Assessment

	Non-Financial			Financial
	Method Effectiveness	Implementation Complexity	Community and Environmental Impacts	Net Present Value
Alternative 1: SCCDA	x	✓	-	n/a
Alternative 2: PRS	✓	x	✓	n/a
Alternative 3: HSTP	-	-	x	n/a
Alternative 4: EMAT ILI	✓	✓	✓	✓
Alternative 5: PLR	✓	x	x	x
Alternative 6: PLE	✓	-	x	x

3.2.1 Three Project Alternatives Rejected as Not Technically Feasible

SCCDA

FEI states that due to the random nature of crack initiation, which is heavily influenced by localized residual stresses, coating disbondment and the environment around the pipeline, a dig program is not capable of reliably identifying where SCC is likely to occur or identify areas that are most likely to have significant cracking.¹⁰¹ FEI further states that on its own SCCDA is not considered an effective approach to SCC integrity management, and that the National Association of Corrosion Engineers International states that the SCCDA approach should be complimentary to other inspection methods such as ILI or hydrostatic testing.¹⁰² Accordingly, FEI did not consider SCCDA further in the evaluation process.

PRS

Although PRS can be highly effective at reducing the risk of rupture due to SCC, FEI states that the required pressure reduction would cause significant operational challenges when applied to the CTS.¹⁰³ FEI states that the majority of pipelines in the CTS operate at pressures which equate to 45 to 50 percent of SMYS and therefore, the maximum operating pressure of the CTS would need to be reduced by approximately 40 percent to achieve the desired stress levels.¹⁰⁴ At these reduced operating pressures, the current peak day demand cannot be met and significant system expansion would be required to meet current future gas supply needs.¹⁰⁵

With the exception of the pipeline segment connecting the Noon's Creek Valve Assembly to Burrard Thermal Plant, PRS was not considered further by FEI in the evaluation process. The proposed PRS implementation for the Noon's Creek to Burrard Thermal pipeline segment is discussed in greater detail below.

¹⁰⁰ Ibid., p. 68.

¹⁰¹ Ibid., p. 71.

¹⁰² Ibid.

¹⁰³ Ibid., p. 72.

¹⁰⁴ Ibid.

¹⁰⁵ Ibid.

HSTP

FEI states that HSTP is not considered an effective method for managing SCC since the approach does not provide any information on crack growth rates, nor does it identify the development of sub-critical SCC.¹⁰⁶ In addition, FEI states that published studies have indicated that there is the potential for sub-critical SCC cracks, which have not otherwise failed during a hydrostatic test, to be made more severe during the testing process.¹⁰⁷ FEI also considered the impact of the HSTP alternative on the communities and urban environment in proximity to the CTS, in terms of, for example, the potential for service disruptions, the need for public notice and potential evacuation and the potential for uncontrolled release of hydrostatic testing water.¹⁰⁸ Due to these factors, FEI did not consider HSTP further in the evaluation process.

3.2.2 Two Project Alternatives Rejected as Not Financially Feasible

FEI determined the net present value (NPV) for the remaining three technically feasible alternatives (EMAT ILI, PLR and PLE). The NPV for each alternative assessed was based on a 70-year analysis period and included both capital and ongoing O&M costs.¹⁰⁹ FEI estimated capital costs for the EMAT ILI alternative at an Association for the Advancement of Cost Engineering International (AACE) Class 3 level, and the capital costs for PLR and PLE alternatives at an AACE Class 5 level. FEI states that due to the early indications that both the costs for the latter two alternatives would be prohibitive, it did not further refine those two cost estimates.¹¹⁰

Table 4-4 summarizes the financial analysis for each of the three technically feasible alternatives below:¹¹¹

Table 4-4: NPV Cost Comparison of Three Remaining Alternatives (2020\$)

	Alternative 4: EMAT ILI (\$ millions)	Alternative 5: PLR (\$ millions)	Alternative 6: PLE (\$ millions)
NPV of Capital Cost	\$225	\$1,818	\$1,909
NPV of O&M Costs (Savings)	\$82	\$(7)	\$(7)
NPV of Total Capital and O&M Costs	\$307	\$1,811	\$1,902

Based on the above financial analysis, FEI did not further pursue either the PLR or PLE alternatives.

3.3 Selection of Preferred Alternative for the Project

FEI states that the EMAT ILI option is the only technically and financially feasible alternative to achieve the

¹⁰⁶ Ibid., p. 73.

¹⁰⁷ Ibid., p. 72.

¹⁰⁸ Ibid., p. 74.

¹⁰⁹ Ibid., p. 75; Table 4-4, p. 76.

¹¹⁰ Ibid., p. 75.

¹¹¹ Ibid., p. 76.

Project objectives.¹¹² FEI notes the following advantages of the EMAT ILI option:¹¹³

- capability to identify, locate, and measure cracking defects;
- ability to provide insight into imperfections and defects that would not fail a hydrostatic pressure test;
- ability to identify specific sites on the pipeline that have critical, as well as larger sub-critical, cracking; and
- ability to actively monitor and manage cracking threats in the most cost-effective manner, by prioritizing mitigation of those cracks posing significant threats.

FEI notes that its selection of the EMAT ILI approach to mitigate cracking threats aligns with the approaches taken by its industry peers and that the use of EMAT ILI is rapidly becoming the industry standard for managing cracking threats on transmission pipelines.¹¹⁴

Noon's Creek to Burrard Pipeline Segment – PRS Proposed

As mentioned above, FEI states its preference to pursue a different approach to mitigating the threat of SCC on the 8km Noon's Creek to Burrard pipeline segment (NOO BUR 508). This pipeline segment terminates at British Columbia Hydro and Power Authority's (BC Hydro) Burrard Thermal natural gas-fired generating station, which at one point was the largest demand source on this lateral, but which has ceased operation since 2016.¹¹⁵ As a result, there is insufficient gas flow on this pipeline segment with which to propel an ILI tool. FEI proposed to implement the PRS alternative upstream of the NOO BUR 508 pipeline segment. FEI states individual application of the PRS alternative on this pipeline segment is viable due to its location at the tail-end of the CTS.¹¹⁶ At its reduced pressure, the NOO BUR 508 segment will no longer be considered a transmission pipeline and FEI states data regarding cracking is not then required.¹¹⁷

Positions of Parties

RCIA agrees with FEI's proposed use of EMAT ILI tools to inspect the 11 CTS pipelines identified as in-scope for the CTS TIMC Project.¹¹⁸

The CEC finds both the non-financial criteria and financial criteria to be acceptable.¹¹⁹ The CEC finds the evidence related to the technical evaluation and selection of EMAT ILI to be persuasive.¹²⁰

BCOAPO agrees with FEI on its evaluation of the six alternatives and its assessment that EMAT ILI is the only viable option from the alternatives assessed.¹²¹

¹¹² Ibid.

¹¹³ Ibid.

¹¹⁴ Exhibit B-1, p. 77.

¹¹⁵ Ibid., p. 78.

¹¹⁶ Ibid., p. 79.

¹¹⁷ Ibid.

¹¹⁸ RCIA Final Argument, p. 6.

¹¹⁹ CEC Final Argument, para. 46.

¹²⁰ Ibid., para. 57.

¹²¹ BCOAPO Final Argument, p. 10.

Panel Discussion

The Panel is satisfied that FEI has appropriately and adequately assessed the identified alternatives for meeting the objectives of mitigating the risk of cracking on the CTS pipelines leading to rupture. Pursuant to that analysis, the Panel finds FEI's preferred alternative, to modify the 11 CTS pipelines to allow for the use of EMAT ILI tools, to be reasonable on the basis of technical and financial feasibility. FEI has demonstrated that, of the six available alternatives for meeting the objectives of the Project, at this time, only three are technically feasible and of the latter, only the EMAT ILI alternative is financially feasible, as both the PLR and PLE alternatives are prohibitively expensive. Furthermore, interveners all agree with FEI's alternatives analysis, and the selection of EMAT ILI as the preferred solution.¹²² As recognized by Dynamic Risk, the location of the CTS in a populated area means that there is a "high societal risk and high consequence of rupture" and any extended delay will increase the likelihood for pipeline failure to occur.

4.0 Project Scope

Having determined that the use of EMAT ILI tools to inspect the CTS pipelines is the appropriate alternative to meet the objectives of the Project, we must now assess whether the scope of the Project is reasonable and cost-effective. The Project consists of certain alterations to CTS pipelines and facilities to allow the use of EMAT ILI tools to manage the threat of SCC. The Project consists of the following components:

- Project development activities, including a quantitative risk assessment (QRA) and EMAT ILI pilot project;
- Pipeline alterations, including replacement of 13 heavy wall pipeline segments; and
- Facility alterations, modifications to ILI launching and receiving barrels and installation of pressure regulating and flow control stations.¹²³

Figures 5-4 and 5-5 below show the locations of the proposed pipeline and facility alterations, respectively:

¹²² FEI Reply Argument, p. 27.

¹²³ Exhibit B-1, p. 82.

Figure 5-4: Project Overview Map Showing Pipeline Alteration Locations

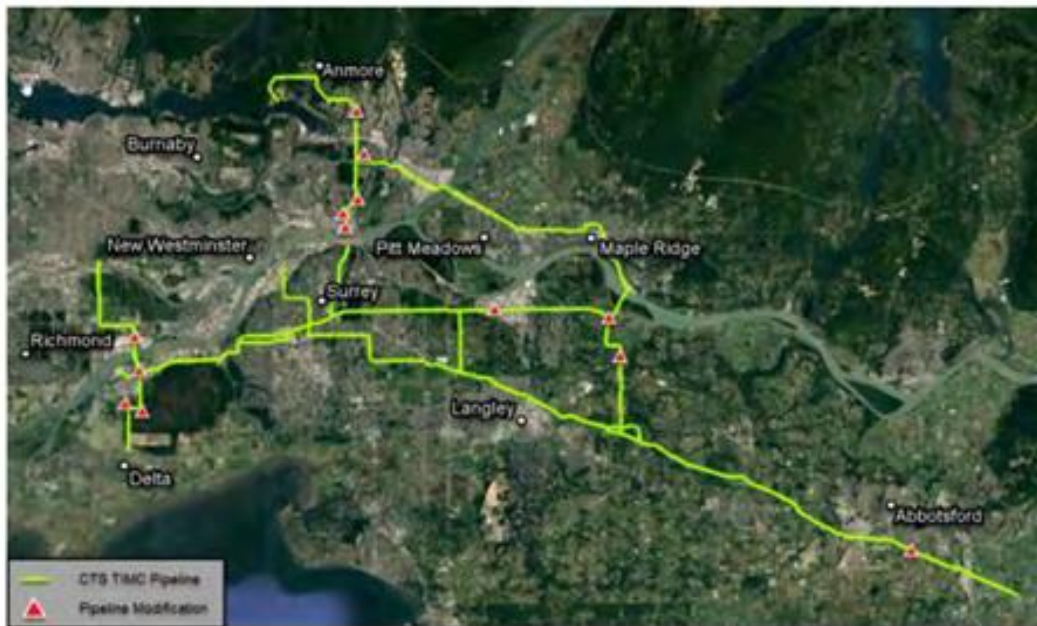
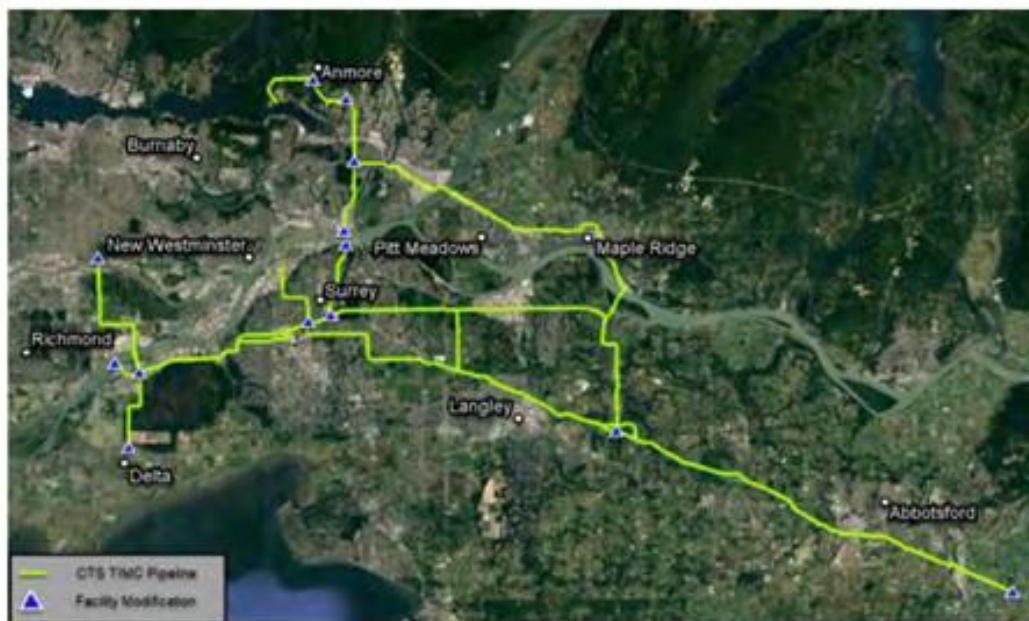


Figure 5-5: Project Overview Map Showing Facilities Alteration Locations



In the following sections, we review the evidence relating to the history of FEI's development of the Project along with its components and conclude with our determinations on Project scope.

4.1 History of the Project Development

FEI states that it has been running magnetic flux leakage-axial (MFL-A) and magnetic flux leakage-circumferential (MFL-C) tools in the CTS pipelines for many years, but the EMAT ILI tools have different operating and geometric criteria. Specifically, the EMAT ILI tools tend to be longer than other ILI tools and require longer launching and

receiving facilities. The facilities were originally fabricated for the use of MFL-A and MFL-C ILI tools, which are shorter than EMAT ILI tools.¹²⁴

Navigation of EMAT ILI tools within its optimal velocity range is critical for collection of good quality data which is impacted by the conditions in which the tool is operating (e.g. gas flow rates, heavy-wall pipe, etc.). If an integrity concern is detected by the EMAT ILI run, the FEI system is not currently able to ensure safe continued operation while meeting FEI's obligation to provide gas to its customers.¹²⁵

QRA Undertaken by JANA

As described in Sections 2.2 and 2.3 above, FEI contracted JANA to undertake a QRA on its pipeline assets. The QRA assessed safety risks to the 13 CTS, 12 ITS and 10 VITS pipelines.¹²⁶ FEI states that the cost of these activities has been recorded in the approved TIMC Project Development deferral account. The costs are a combination of capital expenditures to be added to rate base, and one-time expenses supporting the development that FEI is proposing to amortize into rates over a three-year period.¹²⁷ This work was required to meet previous commitments to the BCOGC to support the development of a segment-by-segment risk assessment process, as well as to confirm that SCC and cracking threats present a credible risk to FEI's transmission pipelines in order to confirm the detailed scope and prioritization of work to be included in the CTS TIMC Project versus future TIMC projects.¹²⁸

The total Project development costs, including the costs of the QRA, were recorded in the TIMC Project Development deferral account, discussed further in Section 5.3.1 below.

Pilot Project

FEI initiated a pilot project to inform its development of the Project. The CTS pipelines selected for the pilot project were Livingston-Pattullo 18" (LIV PAT 457) and Cape Horn-Burrard 20" (CPH BUR 508) pipeline segments as the necessary modifications were achievable in a timeframe such that results could be used to inform development of the Project.¹²⁹

FEI explains these pipelines were selected for the pilot program for the following reasons:

- Both pipelines have experienced SCC which had been found when conducting routine pipeline exposure activities, unrelated to investigating SCC;
- Analysis of the behavior of geometry, MFL-A, and MFL-C tools indicated that the EMAT ILI tool would have no issues traveling through the pipelines, with only a minor likelihood of data loss; and

¹²⁴ Ibid., p. 82.

¹²⁵ Ibid., p. 83.

¹²⁶ Ibid., p. 41.

¹²⁷ Ibid., p. 85.

¹²⁸ Ibid., Table 5-3, p. 86.

¹²⁹ Ibid., p. 87.

- The pipelines could be configured for flow control and to operate at a reduced pressure, with relatively minor upgrades.¹³⁰

FEI submits that it was able to refine the scope of pipeline modifications based on the data collected by the EMAT ILI pilot runs.¹³¹ FEI notes that following assessment of the EMAT ILI tool behavior observed during the pilot runs, it was able to not include modifications at some locations which recorded minor or moderate speed excursions during historical MFL ILI runs.¹³² If following baseline EMAT ILI runs, FEI observes occurrences of speed excursions, then it will evaluate the most cost-effective method to mitigate SCC risks at these locations on a case-by-case basis.¹³³ We discuss FEI's proposal to perform pipeline alterations for EMAT ILI tool runs to minimize speed excursions in Section 4.2 below.

4.2 Pipeline Alterations Required for EMAT ILI Tool Runs

FEI has identified the need to replace 13 heavy wall segments located on six of its CTS pipelines to ensure ILI tools inspecting these pipelines travel within the optimal velocity range of the tool.¹³⁴ The occurrence of a tool traveling at a speed which exceeds its optimal velocity range is referred to as a speed excursion. FEI states that speed excursions frequently happen downstream of heavy wall segments of pipe.¹³⁵ These segments of pipe can be categorized into three categories: heavy-wall forged elbows, heavy-wall crossings pipe and heavy-wall stations pipe.

FEI further elaborates on the causes of speed excursions:¹³⁶

When the tool meets a restriction in the form of heavy wall pipe (which translates to a reduced internal diameter), increased force is required in order to squeeze the tool through the restriction. This causes the tool to slow down, and an increased pressure differential is required to overcome the additional magnetic drag and friction forces. When the ILI tool transitions from the heavy wall pipe back to the thinner wall pipe (i.e. from small internal diameter to a larger internal diameter), the pressure differential built up while moving through the heavy wall pipe is more than what is required for passage in the thinner wall pipe, causing the tool to rapidly pick up speed and travel at elevated speeds resulting in a speed excursion.

A speed excursion impacts the quality of the data collected by the EMAT ILI tool, which impacts the ability to assess the integrity of the pipeline. FEI states that the maximum velocity above which data quality is compromised for EMAT tools is two metres per second, and that no viable data is collected if the EMAT tool travels above five metres per second.¹³⁷ The external independent expert Dynamic Risks similarly states that EMAT tool velocities between two and five metres per second will result in degraded data and states that speed excursion areas need to be considered as blind spots potentially requiring other pipeline integrity assessments, such as excavation.¹³⁸

¹³⁰ Ibid., p. 87.

¹³¹ Ibid., p. 90.

¹³² Exhibit B-5, BCUC IR 13.1.

¹³³ Ibid.

¹³⁴ Exhibit B-1, p. 91.

¹³⁵ Ibid., p. 92.

¹³⁶ Exhibit B-5, BCUC IR 14.3.

¹³⁷ Exhibit B-1, p. 92; Exhibit B-5, BCUC IR 14.4.

¹³⁸ Exhibit A2-2, BCUC IR 3.1.1.

FEI states that it identified the 13 heavy wall segments requiring alterations based on a detailed review of historical ILI reports, as-built information, discussions with ILI vendors, and learnings from the pilot EMAT ILI runs.¹³⁹ The table below provides information on the historical ILI tool speeds downstream of the 13 locations identified for alteration in the CTS TIMC Project:¹⁴⁰

Historical ILI Tool Speeds Downstream

Pipeline ID	Pipeline Length (km)	Event #	Average tool velocity (m/s)	Length of speed excursion (m) / % of total pipeline length
TIL BEN 323	5.9	3	7.2	170 / 2.9%
		5 (Note 1)	N/A	N/A
LIV COQ 323	34.9	9	7.2	420 / 1.2%
CPH BUR 508	17	1	6.4	459 / 2.7%
		4/5	9.4	558 / 3.3%
		9	7.6	785 / 4.6%
		14	7.6	387 / 2.3%
		20	8.8	310 / 1.8%
TIL FRA 508	9.6	1	7.9	373 / 3.8%
		6	8.2	425 / 4.4%
HUN NIC 762	56.4	36	6.5	221 / 0.4%
		41	7.4	910 / 1.6%
HUN ROE 1067	55.7	12	7.9	80 / 0.14%
Note: 1. A review of data collected at this location and based on its similarities with Event 3 indicated that there is a high probability that future ILI runs may experience blinding speed excursions at this location				

FEI submits that it was able to refine the scope of pipeline modifications based on the data collected by the EMAT ILI pilot runs. As noted earlier, FEI confirms that following assessment of the EMAT ILI tool behavior observed during the pilot runs, it was able to forego modifications at some locations which recorded minor or moderate speed excursions during historical MFL ILI runs.¹⁴¹ If subsequent baseline EMAT ILI runs reveal speed excursions at these locations, FEI will evaluate the most cost-effective method to mitigate SCC risks on a case-by-case basis.¹⁴²

The ultimate scope of pipeline alterations proposed as part of the Project is listed in the table below:¹⁴³

¹³⁹ Ibid., p. 92.

¹⁴⁰ Exhibit B-5, BCUC IR 14.3.

¹⁴¹ Ibid., BCUC IR 13.1.

¹⁴² Ibid.

¹⁴³ Exhibit B-1, p. 91.

Table 5-4: Pipelines Part of Project Scope

Pipeline	Length (km)	Number of alterations	Summary of alterations
HUN ROE 1067	55.7	1	Replacement of heavy wall valve assembly
HUN NIC 762	56.4	2	Replacement of heavy wall valve assemblies
LIV COQ 323	34.9	1	Replacement of heavy wall crossing pipe
CPH BUR 508	17	5	Replacement of heavy wall valve assembly, station pipe, crossing pipe and forged elbow
TIL FRA 508	9.6	2	Replacement of heavy wall valve assembly, station pipe and crossing pipe
TIL BEN 323	5.9	2	Replacement of heavy wall forged elbows
LIV PAT 457	29.8	None	Not applicable
NIC FRA 610	24.3	None	Not applicable
ROE TIL 914	12.8	None	Not applicable
NIC PMA 610	4.9	None	Not applicable
TIL LNG 323	1.7	None	Not applicable

Modifications to the 13 heavy wall segments included in the proposed Project scope are estimated to cost \$56.9 million.¹⁴⁴

In a hypothetical scenario, wherein FEI does not proceed with the proposed modifications to the 13 segments of heavy wall pipeline, FEI states there would be no changes to the overall Project schedule.¹⁴⁵ The pipeline modifications and facilities construction are currently scheduled to be undertaken concurrently by separate crews; however, the scope of the facilities construction is considerably larger and more complex than that of the pipeline modifications. As the facilities construction schedule is on the critical path, FEI states the removal of the modifications to the 13 heavy wall segments from the Project scope would not advance the schedule.¹⁴⁶

4.3 Facility Alterations Required for EMAT ILI Tool Runs

The Project consists of the alterations to CTS pipeline assets to allow the use of EMAT ILI tools to manage the threat of cracking. The facility alterations include:

- Modification of 18 ILI launching and receiving barrels (collectively known as pig barrels);
- Modifications to four facilities to accommodate the use of a Flow Control Station (FCS);
- Installation of four pressure regulating stations to support EMAT ILI activities; and
- Installation of one pressure regulating station to reduce operating pressure at Noons Creek station.¹⁴⁷

¹⁴⁴ Exhibit B-8, RCIA IR 15.1.

¹⁴⁵ Ibid., RCIA IR 14.1.

¹⁴⁶ Ibid.

¹⁴⁷ Exhibit B-1, p. 96.

A summary of the facilities requiring alterations is provided by FEI in the table below:¹⁴⁸

Table 5-8: Facilities Part of Project Scope

Facilities	Associated Pipelines	Scope of Modifications
Huntingdon Control Station	HUN ROE 1067 HUN NIC 762	Modification to pig barrels, station piping and upgrades to pressure regulating capability
Livingstone Regulating Station	LIV PAT 457 LIV COQ 323	Modification to pig barrel, station piping and equipment
Nichol Valve Station	HUN NIC 762 NIC PMA 610 NIC FRA 610	Modification to pig barrels, station piping and addition of pressure and flow regulating capability, including backflow prevention
Roebuck Valve Station	LIV PAT 457 ROE TIL 914	Modification to pig barrels, station piping and addition of pressure regulating capability
Port Mann Valve Station	NIC PMA 610	Modification to pig barrel, station piping and addition of flow control capability
Tilbury Regulating Station	TIL FRA 508 TIL LNG 168 TIL BEN 323 ROE TIL 914	Modification to pig barrels, station piping and addition of flow control capability
Tilbury LNG Plant Station	TIL LNG 168	Modifications to pig barrel and station piping
Benson Regulating Station	TIL BEN 323	Modification to pig barrel and station piping
Fraser Gate Station	TIL FRA 508 NIC FRA 610	Modification to pig barrels, station piping and addition of flow control capability
Cape Horn Valve Station	CPH BUR 508	Modification to pig barrel and station piping
Coquitlam Gate Station	CPH BUR 508 LIV COQ 323	Modification to pig barrels, station piping and addition of pressure regulating capability
Noons Creek Valve Station	CPH BUR 508	Modification to station piping and addition of pressure regulating capability
Anmore Regulating Station	CPH BUR 508	Upgrades to pressure regulating capability
Pattullo Regulating Station	LIV PAT 457	None required
Burrard Thermal Regulating Station	CPH BUR 508	None required
Belcara Regulating Station	CPH BUR 508	None required
loco Regulating Station	CPH BUR 508	None required

¹⁴⁸ Exhibit B-1, pp. 95-96.

4.3.1 Modifications to Launching and Receiving Barrels

Launching and receiving barrels, also referred to as “launchers” and “receivers,” respectively (and collectively as “pig barrels”), are required to facilitate the insertion and retrieval of ILI tools into a pipeline. All 11 pipelines included as part of the Project’s scope already have pig barrels installed that have been used in the past for in-line inspections. However, these pig barrels are not capable of accommodating EMAT ILI tools which are longer than the ILI tools FEI uses currently.

To ensure that FEI can launch and retrieve EMAT ILI tools, the pig barrels on the Project’s pipelines were analysed for compliance with EMAT ILI tool specifications and the following necessary modifications were proposed:¹⁴⁹

- Extend the nominal and/or oversize portions of the launchers to ensure that the ILI tool is fully within the barrel to allow for the barrel door to be shut closed before launch;
- Extend the nominal and/or oversize portions of the receivers to ensure that the ILI tool has completely cleared the barrel isolation valve to allow for ILI tool retrieval;
- Install pull-in mechanisms in the launchers that will allow the insertion of these tools far enough into the pig barrel to enable launch; and
- Install new concrete supports under the extended portions of 1 the pig barrels along with the installation of new and longer pigging slabs that will facilitate the ILI tool launch trays to be positioned in place for launch and receipt.

Following a review of 22 pig barrels on the Project pipelines, FEI determined that 18 pig barrels will require modification to meet the requirements described above. The pig barrels requiring modification are spread across 11 facilities.¹⁵⁰

4.3.2 Flow Control Stations

To ensure that the ILI tools are traveling as close as possible to their optimum travel velocity, a Flow Control Station (FCS) will be installed on the downstream end of the pipeline in order to control the gas flowrate in the pipeline subjected to EMAT inspection.¹⁵¹

FEI states that it does not currently have the ability to adjust gas flows on individual pipelines in the CTS.¹⁵² In addition to maintaining consistent gas velocity, FEI notes that the installation of FCS will also widen the seasonal window within which ILI tools can be launched as tool velocity will not be dictated to the same extent by system demand. FEI states this will help mitigate potential scheduling issues for tool availability or operational support which may be imposed by a narrow run window.¹⁵³

¹⁴⁹ Exhibit B-1, pp. 97-98.

¹⁵⁰ Ibid., p. 97.

¹⁵¹ Exhibit B-1, p. 98.

¹⁵² Exhibit B-5, BCUC IR 18.1.

¹⁵³ Ibid.

Permanent piping and foundations will be installed at Nichol Valve, Port Mann Valve, Tilbury Regulating and Fraser Gate stations to allow connection to an FCS which can itself be relocated as required.¹⁵⁴

4.3.3 Pressure Regulating Stations

FEI notes that the number of pipeline integrity features identified by the first EMAT ILI runs to be completed on the CTS system is not known. As such, it may not be possible to complete all repairs in a timely manner. Should this be the case, FEI states that the integrity risk of having unrepaired features on those pipelines can be mitigated by a 20 percent reduction in operating pressure until all repairs are complete.¹⁵⁵

Currently, FEI is only able to reduce pressure on a pipeline within the CTS by reducing the pressure across the entire system at its Huntingdon station. FEI proposes to install permanent control valve assemblies at four facilities: Nichol, Roebuck, Livingstone and Coquitlam Gate. Modifications of the existing pressure regulating station at Huntingdon are also required to enable 20 percent pressure reduction on the Huntingdon-Roebuck 42" (HUN ROE 1067) and Huntingdon-Nichol 30" (HUN NIC 762) pipelines. FEI notes the four new pressure regulating stations, and the modifications at Huntingdon, will expand its operational and maintenance capabilities.¹⁵⁶ The estimated cost to install the four new pressure regulating stations is \$20.1 million.¹⁵⁷

The Project also includes installation of a pressure regulating station at Noon's Creek. Installation of new PRS at Noon's Creek Valve Station will give FEI the ability to reduce the operating pressure below 30 percent SMYS. Traditional ILI tools rely on gas flow, which is dependent on gas demand, for propulsion. The issue of inadequate gas flow only arises in the second half of the CPH BUR 508 (NPS20) pipeline. The demand in this section of the NPS20 pipeline is too low to generate enough flow to propel the ILI tool.¹⁵⁸

FEI is proposing to permanently reduce the pressure in the second half of the pipeline from transmission pressure to intermediate pressure. This will be accomplished by adding a PRS at Noon's Creek Valve Station in Port Moody that will get its intake from the first half of the NPS20 pipeline and reduce the pressure before feeding it to the downstream half of the NPS20 pipeline. A heater will also be added to heat the gas to maintain the same gas volume resulting from the significant pressure drop which will precipitate a corresponding temperature drop.¹⁵⁹

Positions of Parties

BCOAPO accepts FEI's general position that integrity management is a very important process and, in particular, integrity management focusing on pipelines.¹⁶⁰

The CEC states it has reviewed the evidence related to FEI's required alterations and finds it to be acceptable.¹⁶¹

¹⁵⁴ Exhibit B-1, p. 99.

¹⁵⁵ Ibid.

¹⁵⁶ Exhibit B-1, p. 101.

¹⁵⁷ Exhibit B-8, RCIA IR 12.9.

¹⁵⁸ Exhibit B-1, p. 102.

¹⁵⁹ Ibid.

¹⁶⁰ BCOAPO Final Argument, p. 4.

¹⁶¹ CEC Final Argument, para. 101.

RCIA submits that it believes FEI is justified in proceeding with the CTS TIMC Project and that EMAT ILI tools should be used on the CTS pipelines as proposed by FEI.¹⁶² However, RCIA does not support the extensive scope and magnitude of the Project. RCIA submits FEI has not sufficiently justified the expenditures associated with specific components of the Project.¹⁶³ Specifically, the RCIA recommends FEI not proceeding with the removal of heavy wall segments of the pipelines, installation of pressure reducing facilities at four stations, and installation of flow control capabilities. Not proceeding with these additions and modifications will reduce the Project capital expenditures by approximately \$77 million, from \$137.8 million to approximately \$60.8 million.

With respect FEI's proposal to remove the heavy wall segments of the pipelines, RCIA recommends that FEI not proceed with this at least at the present time and instead defer this work until after the completion of the first successful EMAT ILI run. In making this recommendation, RCIA is aware that FEI may give up the ability to obtain quality EMAT ILI data for a small proportion of the affected pipelines if it does not remove the heavy wall segments.¹⁶⁴ RCIA states that FEI anticipates obtaining degraded data for 2.84 percent of the subject CTS pipelines as a result of the speed excursions. In RCIA's view, modifying the pipelines to remove heavy wall segments is an expensive way to obtain additional valid data for this small proportion of the CTS.¹⁶⁵

RCIA further submits:¹⁶⁶

Following the initial EMAT ILI runs, if FEI can demonstrate that the heavy wall segments prevented the collection of valid ILI data and that SCC and seam weld cracking are prevalent and remain a significant risk on the subject pipeline, then the BCUC can consider whether to approve expenditures to remove the heavy wall segments.

In RCIA's view, the opportunity to save \$56.9 million by not replacing the 13 heavy wall segments is worth the risk of not collecting valid inspection data for such a small portion of the CTS pipelines. RCIA also submits that it may be acceptable to remain permanently blind to small portions of the in-scope CTS pipelines, if the vast majority of pipeline is found to have limited amounts and severity of SCC or seam weld cracking.¹⁶⁷

In Reply, FEI submits that it has only proposed the removal of those heavy wall segments where it is certain there will be speed excursions, and therefore there is no reason to delay taking action to remove these segments.¹⁶⁸ FEI further submits that, as a prudent pipeline operator, it would be unacceptable to leave over five kilometres of CTS pipeline in proximity to populated areas untested by EMAT ILI.¹⁶⁹

FEI further submits that replacing the 13 heavy wall segments is cost-effective. The speed excursions caused by these segments create blind spots where FEI will not be able to assess the condition of the pipeline. The risk of failure due to cracking increases over time, and poses a significant risk to the public, customers and FEI. FEI states that while it recognizes that there is a cost to this scope of work, the public interest is not served by cutting corners as RCIA has suggested.

¹⁶² RCIA Final Argument, p. 27.

¹⁶³ *Ibid.*, p. 12.

¹⁶⁴ *Ibid.*, p. 17.

¹⁶⁵ *Ibid.*, p. 18.

¹⁶⁶ *Ibid.*, p. 22.

¹⁶⁷ *Ibid.*, p. 21.

¹⁶⁸ FEI Reply Argument, para. 49.

¹⁶⁹ *Ibid.*, para. 50.

With respect to FEI's proposal to install a pressure regulating station at Noon's Creek, RCIA takes no exception to this proposal for Noon's Creek.¹⁷⁰

However, RCIA submits that FEI is being exceedingly conservative with its proposal to install four pressure reducing stations and modify the Huntingdon station to allow individual CTS pipelines to operate at reduced pressure. RCIA considers the pressure regulating stations are not required for several reasons, including:¹⁷¹

- FEI has no evidence to suggest its CTS pipelines have so many severe SCC and seam weld cracking issues that it cannot address them in one season;
- FEI has the capacity to investigate severe cracking in one season;
- FEI will reduce the pressure in its pipelines only for severe instances of cracking; and
- FEI is inspecting only a few CTS pipelines each year, which allows it to space out its ILI validation and repair activities.

In Reply, FEI submits that it is taking a prudent approach to managing the risk posed by cracking and that RCIA's approach of not installing any pressure reduction capabilities imposes unjustifiable risk on FEI and its customers and should be rejected.¹⁷²

FEI notes that it has been clear that it is not speculating about the extent of cracking on the CTS, and that not knowing the extent of cracking is the primary reason for adopting EMAT ILI technology. FEI submits that RCIA's submission that there is "no evidence of severe cracking" is misleading. In rebuttal, FEI states that there is conversely no evidence that there will not be severe cracking. FEI states that JANA has conducted a quantitative risk analysis which identified SCC as the top driver of safety risk for the CTS at a system level, and therefore, FEI must prepare for the risk that severe cracking may be found.¹⁷³

FEI further submits that RCIA's recommendation not to install pressure reduction capabilities is a high-risk approach from a public safety perspective based on unfounded inferences and mischaracterizations of FEI's evidence. RCIA's recommendations are directly contrary to the recommendations of FEI, and yet RCIA has not filed any engineering or other evidence to support that its approach is reasonable from a safety and reliability perspective.¹⁷⁴

With respect to FEI's proposal to include flow control stations (FCS), RCIA supports the construction of FCSs in instances where an EMAT ILI tool with built-in speed control is unavailable from any vendor for the pipeline size. However, based on the availability of Rosen EMAT tools with built-in speed control for all of the in-scope CTS pipeline sizes, RCIA does not support FEI's proposal to construct flow control stations as part of the CTS TIMC Project.¹⁷⁵

¹⁷⁰ RCIA Final Argument, p. 8.

¹⁷¹ *Ibid.*, p. 12.

¹⁷² FEI Reply Argument, para. 15.

¹⁷³ *Ibid.*, para. 21.

¹⁷⁴ *Ibid.*, para. 41.

¹⁷⁵ *Ibid.*, para. 4.

FEI submits that without FCS, it would be limited to using products from a single vendor, Rosen, which is inherently undesirable as FEI would be subject to higher costs due to a lack of competition and subject to the ILI tool availability from this single vendor. FEI further submits that given the expense of ILI tools runs (between \$1.5 and \$2.5 million), and the need to ensure that FEI can meet the scheduled number of ILI tool runs, it is not in the interest of ratepayers for FEI to be a captive customer of a single ILI tool vendor if this can be avoided.¹⁷⁶

Panel Determination

While we share RCIA's concern about the large amount of capital costs associated with the size and various components of this Project (\$137.8 million), we are not persuaded that RCIA's recommendation for FEI to forego specific elements of the Project (i.e., the removal of heavy wall segments of the pipelines, installation of pressure reducing facilities at four stations, and installation of flow control capabilities) is reasonable, notwithstanding that this would reduce total Project costs approximately by half, down to \$60.8 million. While costs are a valid consideration in the determination of project scope of any capital project, they must be weighed against the risk, which the Project seeks to mitigate, namely, pipeline rupture due to undetected transmission pipeline cracking. This is particularly so in the case of the CTS pipelines, which are located and operate in proximity to populated areas of the Lower Mainland. Should these pipelines rupture due to failure to adequately address the risk of undetected cracking, there is potential for serious consequences, including resulting interruptions to service, or damage to lives, property and the environment. These facts warrant a more conservative approach to risk than may be appropriate in other circumstances.

In this regard, **the Panel finds that FEI has provided sufficient evidence in this proceeding to satisfy the Panel that on balance:**¹⁷⁷

- (i) The addition of flow control capability provides important benefits and is cost effective;**
- (ii) The installation of pressure reduction facilities is necessary to ensure that FEI can mitigate the significant safety risk to the public due to cracking threats while maintaining service to customers over the winter, will provide ongoing benefits and is cost effective;**
- (iii) The removal of the 13 heavy wall segments is necessary for successful EMAT ILI tools runs to mitigate the significant safety risk to the public due to the potential for cracking on over 5 kilometres of the CTS in proximity to populated areas.**

While the Panel appreciates RCIA's suggestions to reduce the scope of the Project to reduce its overall costs, we find that RCIA has not adduced any evidence on the record in this proceeding to support its reductions in scope of the Project, as proposed in its Final Argument. Had RCIA done so during the IR process or filed intervener evidence, parties would have had the opportunity to consider and test the validity of the specifics of RCIA's proposal. However, absent such evidentiary basis, we are unable to give weight to RCIA's proposal, advanced in its Final Argument, to reduce the total cost of the Project by eliminating or deferring specific components in

¹⁷⁶ Ibid., para. 10.

¹⁷⁷ Ibid., para. 3.

favour of less costly measures. Accordingly, in the face of the credible threat of undetected cracking on the CTS pipelines and to ensure their continued safety and reliability, we find that the scope of the Project as proposed by FEI to address this risk is reasonable and is the least costly alternative available.¹⁷⁸

4.4 Project Schedule

The preliminary Project schedule is based on receiving BCUC Project approvals by the first quarter of 2022 and an assumed construction start in the first quarter of 2024. The schedule contemplates performance of the site work between the months of April and October 2022. Until BCUC Project approval is received, FEI plans to utilize this time to complete all permitting and consultation activities. FEI, in conjunction with the Project front end engineering design consultant (Stantec), developed the Project construction schedule. The basis of schedule can be found in Appendix D-3 of the Application. The Project activities will be subdivided into six main groups as follows:

1. Project Services;
2. Permitting;
3. Engineering detailed design;
4. Contract Award / Procurement / Manufacturing;
5. Pipeline Construction; and
6. Facilities Construction.

FEI provides details of its Project schedule in the table below:¹⁷⁹

¹⁷⁸ Exhibit B-1, Table 4-4, p. 76.

¹⁷⁹ Ibid., p. 104.

Table 5-9: Project Schedule

Activity	Date
CPCN Preparation	Jun 2020 to Jan 2021
CPCN Filing	Feb 2021
CPCN Approval	Q1 2022
Contractor Selection and Award	
Engineering Services Contractor Selection and ContractorNegotiation	Sep 2021 to Dec 2021
Construction Contractor Selection and Contract Negotiation	Apr 2023 to Aug 2023
Permitting for CTS TIMC	
Municipal and Community Consultation	Nov 2020 to Nov 2024
Indigenous Communities Consultation	Nov 2020 to Dec 2023
OGC Permits	Jul 2022 to Jan 2024
ALC Permits	Jun 2022 to Jan 2024
Activity	Date
Federal Permits (Vancouver Fraser Port Authority, TransportCanada, Department of Fisheries and Oceans)	Jun 2022 to Jan 2024
Railway Crossing Permits	Jun 2022 to Jan 2024
Ministry of Transportation and Infrastructure Permits	Jun 2022 to Jan 2024
Municipal and Regional District Permits	Jun 2022 to Jan 2024
Utility Permits & Approvals	Jun 2022 to Jan 2024
Environmental and Archaeological Permits	Jul 2022 to Jan 2024
CTS TIMC CONSTRUCTION	
Land Owner consultation	Apr 2023 to Aug 2023
Secure Detail Design Engineering Consultant	Feb 2022
Engineering Detailed Design	Mar 2022 to Jan 2023
Procurement and Manufacturing	
Long Lead Items	Jun 2022 to Mar 2023
Facilities, Electrical, and Instrumentation	Mar 2023 to Aug 2023
Fabrication	Oct 2023 to Jul 2024
Mobilization to Site	Feb 2024
Site Installation	
Construction	Mar 2024 to Nov 2024
Restoration and Demobilization	Mar 2024 to May 2025
Project Close Out	Dec 2024 to Nov 2025

Panel Discussion

No intervener has raised any issues with respect to the preliminary Project schedule proposed by FEI, which appears reasonable to the Panel in the absence of any evidence to the contrary.

5.0 Project Costs, Accounting Treatment and Rate Impact

5.1 Project Costs

The estimated total cost of the CTS TIMC Project in as-spent¹⁸⁰ dollars is \$137.8 million, which includes an Allowance for Funds Used During Construction (AFUDC).¹⁸¹¹⁸² The majority of the construction activities for the CTS TIMC Project entail replacement or modification of existing infrastructure.¹⁸³ The estimated project capital budget is provided in the table below:¹⁸⁴

Table 5-14: Project Capital Budget

Line	Item	Amount
1	Construction Cost Estimate (Contractor)	\$ 72.4
2	Owners Costs (FEI)	\$ 15.2
3	Sub-Total Construction Base Cost Estimate (\$2020)	\$ 87.6
5	Pre-Construction Development Costs	\$ 30.7
6	Contingency	\$ 14.7
7	Sub-Total Cost Estimate (\$2020)	\$ 133.0
8	Cost Escalation Estimate	\$ 7.8
9	Sub-Total Cost Estimate (As-Spent)	\$ 140.8
10	AFUDC	\$ 6.1
11	Tax Offset	\$ (9.1)
12	Total Project Cost Estimate (As-Spent)	\$ 137.8

FEI, in conjunction with its Project engineering and cost estimation consultant, Stantec, developed the cost estimate for the Project using AACE International Recommended Practices.¹⁸⁵ FEI established a Class 3 level cost estimate for the CTS TIMC Project. The accuracy range for the current Project cost estimate is +16 to -14 percent at an 80 percent confidence level.¹⁸⁶

For the contingency estimate of \$14.7 million, FEI used a risk analysis to establish a contingency percentage of 10 percent that aligns with the P50 confidence level, based on the Project's risk profile, discrete risks, and to account for possible scope changes or unknown future events which cannot be anticipated and which were not quantified in the risk register.¹⁸⁷ FEI also included a management reserve based on the contingency analysis and recommendation from Validation Estimating LLC, USA (Validation Estimating).¹⁸⁸

¹⁸⁰ "As-spent dollars" refers to both dollars that have been spent (and not escalated) as well as future expenditures that need to be escalated to represent nominal dollars that are forecasted to be spent

¹⁸¹ Exhibit B-1, Ibid., p. 1

¹⁸² AFUDC (or Allowance for Funds Used During Construction) is the cost of financing the project during the period of construction, before the project's costs are recovered through utility rates after a project is "used and useful", and it does not include financing costs incurred after the energy asset comes online

¹⁸³ FEI Final Argument, p. 35.

¹⁸⁴ Exhibit B-1, p. 114.

¹⁸⁵ Ibid., p. 112.

¹⁸⁶ FEI Final Argument, p. 33.

¹⁸⁷ Exhibit B-1, p. 114; FEI Final Argument, p. 33.

¹⁸⁸ FEI Final Argument, p. 35.

For the escalation value of \$7.8 million, a probabilistic assessment of escalation was completed by independent expert Validation Estimating which facilitated a series of risk workshops to evaluate the systemic and project-specific risks with the extended project team.¹⁸⁹ The escalation was established at 5.4 percent of the total base cost plus contingency that aligns with the P50 confidence level.¹⁹⁰ All cost estimates, including material supply and construction contracts, were developed based on 2020 market prices.¹⁹¹ The escalation analysis was based on price indices forecasted by economic consulting firm IHS Markit forecasted global and regional capital spending market conditions, and Monte Carlo simulation.¹⁹²

FEI's 2021 AFUDC rate is 5.47 percent, which is equal to the after-tax weighted average cost of capital.¹⁹³

Basis of Estimate

The AACE Class 3 cost estimate is based on quantities developed from designs and material take-offs completed by Stantec and includes:¹⁹⁴

- Pipeline and stations direct construction costs;
- Pipeline and stations indirect construction costs;
- Materials;
- Construction sub-contracts;
- Environmental and archaeological costs;
- Construction support services; and
- Engineering services.

FEI completed the portion of the Project cost estimate related to owner's costs which includes the following:¹⁹⁵

- Project Management;
- Project Services;
- External Relations (Community Relations, Indigenous Relations, Communications);
- Environmental / Archaeological;
- Regulatory / Permitting;
- Property Services;
- Legal;
- Procurement;

¹⁸⁹ Exhibit B-1, p. 115.

¹⁹⁰ Ibid.

¹⁹¹ Ibid.

¹⁹² Ibid.

¹⁹³ Ibid., p. 124.

¹⁹⁴ Ibid., p. 112.

¹⁹⁵ Ibid., pp. 112-113.

- Operations Support;
- Health & Safety;
- Engineering; and
- Construction Management.

Validation of Cost Estimate

The cost estimate was subject to quality assurance and validation through:¹⁹⁶

- Internal Stantec reviews that included peer reviews, document quality checks, and independent review;
- Validation reviews involving both Stantec and FEI team members throughout the estimate development process to confirm that the estimate assumptions were valid;
- External independent review to verify that the estimate criteria and requirements were met and a documented, reasonable estimate was developed; and
- Independent external reviews of the Class 3 cost estimate which were done by Universal Pegasus International.

Risk Analysis and Contingency Determination

FEI engaged Yohannes Project Consulting Inc. (YPCI) to conduct a qualitative risk analysis to identify risks associated with the Project.¹⁹⁷ YPCI conducted multiple workshops with impacted stakeholders to develop a risk register¹⁹⁸ and as the engineering advanced on the Project, the probability or the consequence of several risks which were initially identified were either mitigated or reduced.¹⁹⁹

FEI also retained Validation Estimating to complete an escalation estimate and a quantitative analysis using an integrated parametric and expected value methodology.²⁰⁰ Validation Estimating facilitated a series of risk workshops to evaluate the systemic and project specific risks with the extended project team.²⁰¹ Validation Estimating quantified the contingency to address project risks over a multi-year execution timeframe applying a hybrid approach in accordance with AACE that combined a parametric model analysis for systemic risks based on empirical knowledge, and an expected value analysis for project specific risks, which assesses probability of occurrence and integrates anticipated cost and schedule impacts.²⁰²

5.1.1 Sustainment Capital

Sustainment Capital involves the periodic refresh of capital assets and includes costs related to the measuring and regulating equipment and telemetry over the life of the Project assets. Telemetry equipment provides

¹⁹⁶ Exhibit B-1, pp. 114-115.

¹⁹⁷ Ibid., p. 115.

¹⁹⁸ Ibid.

¹⁹⁹ Ibid.

²⁰⁰ Ibid.

²⁰¹ Ibid.

²⁰² Ibid.

remote monitoring and control of station devices from FEI's Gas Control and is used to ensure safe and reliable operation of the gas system. Measurement equipment is used to record gas flows, pressures, and other parameters over a period of time and this information is critical for peak demand forecasting, asset management, and system operations. FEI explains that much of this equipment uses electronic or computer technology that has a relatively short lifespan and requires periodic replacement.²⁰³ The currently approved depreciation rates for measuring and regulating equipment and telemetry equipment are 2.21 percent (approximately 47 years) and 8.97 percent (approximately 11 years), respectively.²⁰⁴

FEI estimates \$84.983 million in Sustainment Capital will be required over the life of the Project. This amount is not included in the estimated total Project cost of \$137.8 million. FEI will request BCUC approval for this cost either in the Multi-year Rate Plan (MRP) Capital Forecast Update filed as part of its 2023 Annual Review, or in the next MRP or revenue requirement application filing, depending on the timing of the work.²⁰⁵

5.1.2 EMAT ILI Tool Runs

The CTS TIMC Project consists of work necessary to ready the CTS pipelines for EMAT ILI tool runs. FEI explains that future costs for EMAT ILI runs are not included in the estimated total Project cost of \$137.8 million and that it will request BCUC approval for an incremental increase in Sustainment Capital for the EMAT ILI tool runs through future rate application filings, depending on the timing of these runs.²⁰⁶

FEI explains that the frequency of EMAT ILI tool runs in FEI's CTS system is commonly set at every seven years, but may be shorter if required. The frequency of tool runs is determined on a pipeline-by-pipeline basis by analysis of the run results and other factors including operating history, pipeline availability (i.e., scheduling factors), and industry practice.²⁰⁷ FEI expects to run the EMAT ILI tools eight to ten times over the 65-year post-project analysis period, whereby each session will take approximately 3 years to complete.²⁰⁸

FEI forecasts the cost for each EMAT ILI tool run can range from \$1.5 to \$2.5 million (inclusive of both FEI and contractor costs).²⁰⁹ FEI was approved to capitalize major pipeline inspections costs in accordance with BCUC Order G-141-09.²¹⁰

Positions of Parties

FEI submits that it has reasonably and cost-effectively scoped the Project to ensure that it can prudently manage the significant safety risk to the public and reliability risk to customers posed by cracking threats and the cost estimate meets the BCUC CPCN Guidelines and is both reasonable and robust.²¹¹

²⁰³ Exhibit B-5, BCUC IR 25.1.1.

²⁰⁴ Ibid., BCUC IR 25.1.

²⁰⁵ Exhibit B-1, p. 118.

²⁰⁶ Exhibit B-5, BCUC IR 28.2.

²⁰⁷ Exhibit B-1, p. 61.

²⁰⁸ Exhibit B-11, BCUC IR 48.1.

²⁰⁹ Exhibit B-5, BCUC IR 28.2.

²¹⁰ Terasen Utilities Terasen Gas Inc. 2010 and 2011 Revenue Requirements and Delivery Rates Application, Order G-141-09 dated November 26, 2009, Appendix A, p. 15.

²¹¹ FEI Final Argument, pp.26, 36.

As noted in Sections 4.2 and 4.3 above, RCIA supports the CTS TIMC Project in principle, but recommends not proceeding with the removal of heavy wall segments of the pipelines, installation of pressure reducing facilities at four stations, and installation of flow control capabilities arguing that this will reduce the capital expenditures by approximately \$77 million, from \$137.8 million to approximately \$60.8 million.²¹²

In response to RCIA, FEI states that it has refined the scope of flow control work to the minimum required to ensure it can effectively use EMAT ILI tools from multiple vendors where possible and has already reduced the Project scope to exclude items that may not reduce the quality of EMAT ILI tool runs.²¹³ FEI submits that the further reduction in scope recommended by RCIA will come with increased safety risks to the public and increased reliability risks to customers that are not justifiable.²¹⁴ See Sections 4.2 and 4.3 for more detail.

The CEC submits it would not be unreasonable for FEI to instead use five rather than seven years as the expected interval for conducting EMAT ILI runs.²¹⁵ The CEC finds that it is reasonably likely that FEI will run EMAT ILI more frequently than once every seven years, and accordingly the related run and analysis costs could be higher than anticipated over the service life of the pipeline²¹⁶ and under-represent costs, and thus present an overly optimistic Net Present Value (NPV). The CEC references:

- i) Canadian Energy Pipeline Association Metal Loss Inline Inspection Tool Validation Guidance which states that “a lengthy Interval (e.g. more than 5 years) between ILI inspections or the use of different technologies can make matching [of costs and benefits] difficult if not impossible,”
- ii) six years for a re-inspection interval was established for Westcoast Energy Inc., and
- iii) the maximum of seven years was established by the United States Code of Federal Regulations.²¹⁷ However, the CEC notes that even doubling O&M costs from \$82 million NPV to \$164 million would not alter the selection of EMAT ILI from a financial point of view.²¹⁸

In reply to the CEC regarding EMAT ILI run intervals, FEI submits that it has appropriately analyzed costs on its expectation to run an EMAT ILI tool eight to ten times per pipeline over the 65-year post Project analysis period.²¹⁹ Further, FEI agrees with the CEC that even if O&M costs were to double the alternative selected remains more cost effective than other alternatives.²²⁰

Additionally, if EMAT ILI inspection runs are done more frequently at five-year intervals, the CEC views that the increased O&M costs could be capitalized in a rate base deferral account with amortization over the term of the run, and successively over Project life to match costs with benefits and avoid intergenerational inequities.²²¹ Similarly, the CEC recommends that the incremental costs related to data collection for EMAT ILI runs be

²¹² RCIA Final Argument, p. 5.

²¹³ FEI Reply Argument, p. 26.

²¹⁴ *Ibid.*, p. 26.

²¹⁵ CEC Final Argument, p. 12.

²¹⁶ *Ibid.*, p. 1.

²¹⁷ *Ibid.*, p. 11.

²¹⁸ *Ibid.*, p. 13.

²¹⁹ FEI Reply Argument, p. 28.

²²⁰ *Ibid.*, p. 28.

²²¹ CEC Final Argument, p. 20.

included in the rate base deferral account as well, to be amortized over the extended life for the pipeline, in order to match costs with benefits of avoided replacement costs.²²²

In response to the CEC's submissions regarding O&M for EMAT ILI runs, FEI states that it does not oppose O&M costs being capitalized in a rate base deferral account with amortization occurring over the term of the run, and successively over the life of the Project.²²³ However, FEI does not agree with the CEC's proposal for costs associated with data collection from EMAT ILI runs to be captured in a rate base deferral account. FEI notes that linking such deferrals to the pipeline asset would result in an unusually long amortization period.²²⁴ FEI further submits that future annual review or revenue requirement proceedings would be the proper forum for a determination of the treatment of these costs when these costs arise.²²⁵

Panel Determination

The Panel accepts FEI's total Project cost estimate of \$137.8 million in as-spent dollars, including contingency, escalation and AFUDC.

The Panel is satisfied with FEI's approach to cost estimating, specifically, that FEI worked with Stantec, its consultant, in developing the cost estimate; that the cost estimate was independently reviewed by Universal Pegasus International; that the risk analysis was prepared by YPCI, an independent, external party; and that the contingency estimate and escalation estimate were prepared by Validation Estimating, an independent external party. The Panel also considers the choice of a P50 level of confidence, a 10 percent allowance for contingencies, to be appropriate.

As noted in Section 4, the Panel does not agree with RCIA's suggestion regarding its proposed reductions in scope of the Project, even if that were to result in a reduction in capital expenditures from \$137.8 million to approximately \$60.8 million.

The Panel considers it reasonable for FEI to base its financial analysis of the incremental increase in Sustainment Capital resulting from the Project on eight to ten EMAT ILI tool runs over the 65-year analysis period. Ultimately, the Panel understands that FEI will determine, as a BCOGC permit holder, the necessary frequency of EMAT ILI test runs. The frequency of EMAT ILI tool runs is expected to comply with regulatory and legal requirements, as well as FEI's own integrity management planning. That frequency may also need to be adjusted taking into account any anomalies observed as a result of FEI's most recent EMAT ILI tool run.

The Panel notes the CEC's concern about the impact increased EMAT ILI test run frequency has on the financial analysis of the Project. However, the Panel agrees with the CEC's and FEI's positions that the proposed Project continues to be the most cost effective even assuming a doubling of O&M costs. Therefore, the Panel remains satisfied with FEI's financial analysis as it relates to EMAT ILI test runs over the Project analysis period.

²²² Ibid., p. 2.

²²³ FEI Reply Argument, pp. 28–29.

²²⁴ Ibid.

²²⁵ Ibid., p. 29.

As for the CEC's recommendations regarding O&M and incremental costs related to data collection from EMAT ILI data runs, the Panel does not share the CEC's views that such costs should be included in the rate base deferral account. As noted above, FEI was previously approved to capitalize major inspections costs in accordance with Order G-141-09. This Panel concurs with the BCUC finding in that proceeding: "Wherever there is an available option to capitalize costs to plant rather than putting them into deferral accounts, the former is preferred over the latter since capitalization has the benefit of providing the same relief against lumpy and volatile expenses."²²⁶ The Panel sees no reason to deviate from that earlier finding and supports EMAT ILI inspection costs to continue to be reported under FEI's Regular Sustainment Capital and to be capitalized rather than included in the rate base deferral account.

5.2 Accounting Treatment

Capital Costs

Consistent with FEI's typical treatment of CPCN costs, the capital costs of the Project will be held in Capital Work In Progress, attracting AFUDC. As construction is completed on the various assets included in the Project, the assets will be commissioned and placed into service. The assets will enter rate base on January 1 of the year following their in-service date by adding the capital cost of the assets into the appropriate plant asset accounts. Depreciation of the assets included in FEI's rate base will begin the year that they enter rate base.²²⁷

Positions of Parties

Intervenors made no comment regarding FEI's proposed accounting treatment related to capital costs of the Project.

Panel Determination

The Panel accepts FEI's proposed treatment for the capital costs of the Project to be held in Capital Work In Progress, attracting AFUDC, is consistent with its past practice as previously approved by the BCUC for projects of this nature.

Accelerated Depreciation

On March 4, 2022, the Panel amended the regulatory timetable to provide all parties the opportunity to make submissions on the topic of hydrogen blending in the CTS pipeline system and the potential impact this may have on the useful life of the pipeline assets. Prior to receiving participant submissions on this topic, the Panel directed FEI to discuss whether it should adjust the useful life of its Project assets and/or accelerate its depreciation rates in order to mitigate the risk of stranded assets.²²⁸ This risk of stranded assets stems from the uncertainty of how hydrogen blending will impact FEI's use of its existing CTS.

In response, FEI states it understands the Panel's concern with respect to the uncertainty of the impacts of hydrogen blending. However, it submits there is no evidence to indicate a change in depreciation rates is

²²⁶ PNG 2018-2019 RRA Reasons for Decision and Order G-151-18 dated August 15, 2018, p. 25.

²²⁷ Exhibit B-1, Section 6.5.1, p. 124.

²²⁸ Exhibit A-20, Order G-62-22, p. 2.

required.²²⁹ As the cracking threat remains with or without hydrogen blending, the EMAT ILI tools will need to be used on the CTS pipelines to mitigate this threat regardless of whether any hydrogen is blended into the system.²³⁰

FEI submits that the most current information is that the CTS TIMC Project assets will not be affected by hydrogen blending and that the existing CTS pipelines will continue to be used and useful.²³¹ FEI further submits that the best approach to the uncertainty created by the potential for hydrogen blending in the future is to continue its current practice of regularly updating its depreciation rates.²³²

Positions of Parties

Intervenors generally agree with FEI's submissions that there is no need for the accelerated depreciation of the Project assets due to the uncertainties surrounding hydrogen blending.

RCIA agrees that EMAT ILI tools will need to be used on the CTS pipelines to identify cracking threats regardless of whether hydrogen blends are introduced into the pipelines.²³³ RCIA also agrees that the CTS pipelines will continue to be used and useful as hydrogen is increasingly blended into the pipelines, and that the EMAT ILI tool may become even more important in monitoring the integrity of the CTS pipelines during this period.²³⁴

Similarly, the CEC agrees that, based on the current level of knowledge and understanding, there should be no change to the depreciation rates of the proposed Project assets and that the assets will continue to be used and useful following the blending of hydrogen into the system.²³⁵

BCOAPPO continues to support approval of the CPCN, in large part due to the risk of cracking on the existing system and the need to mitigate this risk. However, BCOAPPO does note its expectation that FEI will develop any future projects, and present evidence regarding future project costs, with consideration to the prevailing view that hydrogen is (or will be) a key part of the province's energy future. Accordingly, review of similar projects should take into account the impact that hydrogen blending may have on the need to retrofit existing assets.²³⁶

Panel Discussion

As is evident by the Panel's IRs, the Panel is concerned about the uncertain impact of hydrogen blending on the used and useful life of FEI's pipeline assets specifically and more generally, the continued viability of natural gas as an energy source which gives rise to potential increased risk of stranded assets. As more and more costly additions and modifications are made to aging assets, the consequences of stranding of assets become more severe.

²²⁹ Exhibit B-20, p. 4.

²³⁰ *Ibid.*, p. 2.

²³¹ Exhibit B-20, p. 4.

²³² *Ibid.*, p. 5.

²³³ Exhibit C1-9, p. 1.

²³⁴ *Ibid.*, p. 3.

²³⁵ Exhibit C2-12, p. 2.

²³⁶ Exhibit C3-11, p. 2 of 2.

FEI has alleviated some of our concerns through its responses and we are persuaded that, overall, this Project is justified. However, FEI must proactively address these risks when developing future projects, including consideration of the need to adopt appropriate measures, such as accelerating depreciation on existing pipeline assets, as a means of mitigating these risks. It may not be prudent for FEI to fail to do so.

5.3 Deferral Accounts

The BCUC has previously approved the creation of the non-rate base TIMC Development Cost deferral account, attracting a weighted average cost of capital (WACC) return, with disposition to be determined in a future application.²³⁷ FEI submits that transferring from non-rate base to rate base upon BCUC approval is consistent with past CPCN applications approved by the BCUC, reflecting that assets in service are included in FEI's rate base (including any associated deferral accounts).²³⁸

FEI forecasts actual and projected development costs of \$30.824 million for the CTS TIMC Project.²³⁹ As shown in the table below, this results in \$26.5 million in development costs (after tax and AFUDC).²⁴⁰ The \$26.5 million is all related to CTS TIMC which will be split into two portions, with \$13.2 million to be capitalized and the remainder to be included in the TIMC development cost deferral account for amortization. We discuss FEI's specific proposals regarding treatment of these amounts below. Additional to this are the ITS TIMC Project costs which are tracked separately.²⁴¹

Table 6-1: TIMC Development and Deferral Costs (\$000s)

Line	Particular	Actual Costs ending December 31, 2020			2021 - Estimated Costs			Total Column 3 + 6 (7)
		Preliminary Stage Development Costs (1)	Pre- Construction Development Costs (2)	Total Pre-2021 Costs (3)	Pre- Construction Development Costs (4)	CPCN Application Costs (5)	Total 2021 Estimated Costs (6)	
1	Pre-Tax Costs ¹	14,641	9,100	23,741	6,573	510	7,083	30,824
2	Contingency ²				2,900	41	2,941	2,941
3	Subtotal: Development Costs	14,641	9,100	23,741	9,473	551	10,024	33,765
4	Income Tax Recovery	(3,953)	(2,457)	(6,410)	(2,558)	(149)	(2,707)	(9,117)
5	Financing, WACC after tax	1,004	240	1,244	587	11	598	1,842
6	Subtotal: Costs after tax and AFUDC	11,691	6,883	18,574	7,503	413	7,916	26,490
7	Cost Capitalized ³		(9,340)	(9,340)	(3,907)	-	(3,907)	(13,247)
8	Total Deferral Costs	11,691	(2,457)	9,234	3,596	413	4,009	13,243

Notes:

1 Column 7 agrees to Table 5-3.

2 A portion of total project contingency seen in row 5 in table 6-2 has been allocated to the forecast development costs.

3 Cost Capitalized include Pre-Tax Costs, Contingency, and Financing WACC.

The costs captured in the TIMC deferral account include:²⁴²

- Preliminary Stage Development Costs, which consist of the development of a QRA, records and data refinement, and EMAT ILI Pilot project costs;

²³⁷ Exhibit B-1, p. 120; Order G-237-18.

²³⁸ Exhibit B-11, BCUC IR 47.2.

²³⁹ Exhibit B-1, p. 86.

²⁴⁰ Ibid., p. 121.

²⁴¹ Ibid.

²⁴² Ibid., p. 120.

- Pre-Construction Development Costs, which include the costs related to front-end engineering and design, CPCN development costs including environmental assessments, Indigenous engagement, and stakeholder consultation; and
- Application Costs, which include CPCN proceeding costs, which were estimated based on a written process with two rounds of IRs and one workshop.

FEI provided the following table showing the details of the \$30.824 million projected development costs for the CTS TIMC Project:²⁴³

Table 6-2: Summary of Forecast Capital and Deferred Costs (\$millions)

Line	Item	2020 \$	As-Spent	Reference
1	Pipeline Construction Costs	35.895	38.930	Section 5.4 and Confidential Appendix D-4
2	Stations Construction Costs	36.470	39.266	Section 5.5 and Confidential Appendix D-4
3	Project Management and Owner's Costs	15.247	16.166	Section 5.10
4	Subtotal Project Capital Cost	87.613	94.362	
5	Contingency	14.691	15.624	Section 5.10.2 and Confidential Appendix E-3
6	Subtotal Contingency	14.691	15.624	
7	CPCN Application Costs	0.500	0.510	Section 6.3.2
8	Preliminary Stage Development Costs	18.366	18.436	Section 6.3.2
9	Pre-Construction Development Costs	11.847	11.878	Section 6.3.2
10	Subtotal Development and Deferral Costs	30.714	30.824	Table 6-1, Row 1, Col 7
11	AFUDC		6.150	Table 6-3, Row 21, Col 5
12	Tax Offset		(9.117)	Table 6-3, Row 21, Col 4
13	Total Project Cost	133.018	137.843	Table 6-3, Row 19, Col 7

Capitalization

FEI will capitalize \$13.2 million of development costs (\$13.877 million including \$0.630 million AFUDC on capital costs²⁴⁴) related to the base line QRA, QRA sustainment, and EMAT inspections. FEI assessed the development costs under United States Generally Accepted Accounting Principles (US GAAP), and identified these costs as eligible for capitalization. It proposes to transfer these costs to FEI's plant-in-service on January 1 in the year following BCUC approval of the Application.²⁴⁵

Deferral Account

As for the estimated remaining balance of the Project development costs, FEI is seeking approval to transfer \$13.2 million of the balance in the TIMC Development Cost deferral account, related to project scoping, planning, development, and regulatory proceeding costs,²⁴⁶ to rate base. FEI seeks to amortize the TIMC Development Cost deferral account balance over a three-year period commencing January 1, 2023.²⁴⁷ FEI evaluated amortization periods of one through five years for the deferral account and provided the following table summarizing the levelized annual delivery rate impact in dollars per gigajoule (GJ) and the levelized annual

²⁴³ Exhibit B-1, pp. 121-122.

²⁴⁴ Ibid., p. 123.

²⁴⁵ FEI Final Argument, p. 38.

²⁴⁶ Ibid., p. 120.

²⁴⁷ Ibid., p. 1; Exhibit B-5, BCUC IR 26.2; FEI originally sought approval in the Application to amortize the deferral account commencing in 2022. However, as the request was based on an expectation that FEI would receive a decision on the CTS TIMC CPCN in 2021, FEI subsequently amended the amortization commencement date to January 1, 2023.

bill impact for a residential customer with an average consumption of 90 GJs per year for each of the amortization periods evaluated.²⁴⁸

Levelized Annual Delivery Rate Impact

	Amortization Period				
	1 Year	2 Years	3 Years	4 Years	5 Years
Levelized Annual Delivery Rate Impact (\$/GJ)	0.096	0.049	0.034	0.026	0.021
Levelized Annual Bill Impact for Residential Customer, 90GJs (\$)	8.60	4.42	3.03	2.33	1.91

5.3.1 QRA

As noted above, FEI undertook a QRA to inform its understanding of susceptibility and risk. The QRA considered transmission pipelines on both the CTS and ITS and the results informed the overall priority and urgency of addressing cracking throughout FEI's system.²⁴⁹ FEI states it had no expectation of what systems would require mitigation at the time of requesting the deferral account, or that there would be a need for multiple projects.²⁵⁰

Therefore, FEI did not develop a split in the estimated costs between the CTS and ITS²⁵¹ but submits that the results of the baseline QRA provided a foundation for proceeding with the TIMC Project in two separate applications: (1) the Application for the CTS TIMC Project; and (2) a forthcoming CPCN application for the pipelines forming the ITS.²⁵²

ITS TIMC Project

With respect to the related ITS TIMC Project, FEI states it will continue to incur, record and track costs related to the ITS TIMC Project separately in the deferral account and will request recovery of those costs as part of the future ITS TIMC Project.²⁵³ FEI clarifies that even though the ITS TIMC development costs will be recorded in the existing TIMC Development Cost deferral account, FEI will not begin amortization for these ITS TIMC development costs until it receives BCUC approval for the ITS TIMC CPCN.²⁵⁴ FEI confirms that the development costs for the ITS TIMC application will be lower than those of the CTS TIMC Application which is primarily due to the inclusion of the baseline QRA and EMAT Pilot Project costs in the CTS TIMC Project development costs.²⁵⁵

²⁴⁸ Exhibit B-5, BCUC IR 26.2.

²⁴⁹ Exhibit B-5, BCUC IR 27.4.1.

²⁵⁰ Ibid., BCUC IR 26.1.

²⁵¹ Ibid., BCUC IR 26.1.

²⁵² Ibid., BCUC IR 27.4.1.

²⁵³ Exhibit B-1, pp. 3–4.

²⁵⁴ Exhibit B-11, BCUC IR 47.3.

²⁵⁵ Exhibit B-7, CEC IR 35.1.

Second Deferral Account

FEI states it could have requested the creation of two separate deferral accounts – one for the QRA and one for the CTS TIMC costs. If two accounts had been requested, FEI explains that it would have a similar amortization period for both but did not see value in having two separate deferral accounts.²⁵⁶ FEI states that there would be value to maintaining a separate deferral account for QRA costs on an ongoing basis as FEI is planning for future iterations of QRAs, the costs for which could be recorded in the new account.²⁵⁷ However, as the existing TIMC Development Cost deferral account had a specific scope and estimate associated with its creation (including the initial QRA, but not ongoing, future QRAs), FEI does not intend to include costs related to future iterations of QRAs in the existing TIMC Development Cost deferral account.²⁵⁸

FEI provided the following table with a breakdown between the QRA costs, CTS TIMC development costs, ITS TIMC development costs and the development costs that were capitalized in accordance with FEI's proposal.²⁵⁹

QRA, ITS, CTS Costs

Amounts in (\$000s)	Original Estimate	Actual Spend	Projected Remaining Spend	Total Actual & Projected Costs
CTS Development Costs - deferral		2,701	6,117	8,818
CTS Development Costs - capitalized		9,340	3,907	13,247
CTS Carrying Costs		233	257	490
Total CTS Costs		12,274	10,281	22,555
ITS Development Costs	-	-	6,050	6,050
ITS Carrying Costs	-	-	351	351
Total ITS Costs	-	-	6,401	6,401
QRA Costs		11,700	-	11,700
QRA Carrying Costs		1,011	341	1,352
Total QRA Costs	-	12,711	341	13,052
Combined CTS, ITS, & QRA Costs (After Carrying Costs)	41,600	24,985	17,023	42,008

Positions of Parties

BCOAPo submits that the BCUC should consider directing FEI to amortize the costs over a longer timeframe but does not specify a period.²⁶⁰ Similarly, the CEC recommends that the BCUC approve the transfer of the balance of the TIMC development costs non-rate base deferral account to a rate base deferral account, and submits that establishing a longer amortization is appropriate and recommends a period of seven years.²⁶¹

The CEC submits that an amortization period of seven years would match the EMAT ILI tool run interval²⁶² and that establishing a longer amortization period for the development costs could also be “an appropriate means for the Commission to manage rate increases for customers.”²⁶³ The CEC recommends that the BCUC consider

²⁵⁶ Exhibit B-5, BCUC IR 27.4.1.

²⁵⁷ FEI Final Argument, p. 39.

²⁵⁸ Ibid.

²⁵⁹ Exhibit B-11, BCUC IR 47.3.

²⁶⁰ BCOAPo Final Argument, p. 12.

²⁶¹ CEC Final Argument, pp. 1, 25, 28.

²⁶² CEC Final Argument, p. 28.

²⁶³ Ibid., p. 25.

the total rate impacts expected to occur over the next several years when determining amortization periods for deferred costs from the viewpoint of fairness to customers from an intergenerational equity point of view. The CEC submits it would be in the public interest to match costs with the benefits of avoiding full pipeline replacement because of unacceptable risks.²⁶⁴

In addition, the CEC does not find ‘consistency’ with other CPCN projects to be “an especially valid justification given the large variances in types of projects and magnitude of project costs” nor that costs must necessarily be amortized over three years and in less than five years because of the Project term. The CEC submits that “any reduction in rate impacts based on cost and benefit matching, collectively over the FEI project portfolio, will be in the public interest and should not be trivialized as being immaterial.”²⁶⁵

Similarly, BCOAPO states that the scope of the Project and the benefits that will flow to ratepayers are long-term and not limited only the next three years. It submits that the BCUC should consider directing FEI to amortize the costs over a longer period, so that current ratepayers are not paying for development costs that will benefit ratepayers beyond the next three years. Further, BCOAPO is of the view that should the BCUC reject the Application, the development costs should not be passed on to ratepayers.²⁶⁶ In BCOAPO’s view, any development costs incurred must consider the context of the larger long-term viability of natural gas as a fuel source in the province when upfront development costs are incurred for long-term projects. In support of its statement, BCOAPO cites the *CleanBC Roadmap to 2030* (CleanBC Roadmap).²⁶⁷

In response to the CEC and BCOAPO’s proposal for FEI to amortize the balance of the TIMC Development Cost deferral account over a longer period of time, FEI argues that its proposed three-year amortization period is reasonable and consistent with past practice.²⁶⁸ FEI states that it is appropriate to amortize the deferral account for the CTS TIMC Project in under five years as the Project is forecasted to be undertaken over a five-year period. FEI submits that, with the exception of a one-year amortization period, FEI considered the differences between the annual delivery rate impact to be immaterial.²⁶⁹ FEI states that while it is not opposed to a longer amortization period, such as the CEC’s proposal of seven years, FEI is concerned that amortizing over a much longer period would be unusual compared to past practice and would do little to benefit ratepayers. FEI argues that any rate mitigation benefits increasingly diminish with the length of the amortization period and have incremental higher carrying costs.²⁷⁰

Panel Determination

The Panel approves FEI’s request to transfer the balance in the TIMC Development Cost deferral account associated with the development of the CTS TIMC Project to rate base.

However, the Panel denies FEI’s request to amortize the balance of these costs over a three-year period commencing January 1, 2023 and directs FEI to amortize the balance instead over a five-year period. The

²⁶⁴ Ibid.

²⁶⁵ CEC Final Argument, p. 27.

²⁶⁶ BCOAPO Final Argument, p. 12.

²⁶⁷ Ibid., p. 13.

²⁶⁸ FEI Reply Argument, p. 29.

²⁶⁹ Exhibit B-5, BCUC IR 26.2.

²⁷⁰ FEI Reply Argument, pp. 29–30.

Panel also directs FEI to report as part of its Semi-Annual Progress reporting, on the balance of the TIMC Development Cost deferral account pertaining to the development of the ITS Project.

The Panel agrees with the CEC and BCOAPO that establishing a longer amortization for the TIMC Development Cost deferral account is appropriate. However, the Panel finds that ‘consistency’ in treatment with other CPCNs alone is not determinative, given the large variances in types of projects and magnitude of project costs. Parties must bring forward sufficient evidence in each application to support their requested amortization periods for deferral accounts.

Based on the evidence provided, the Panel finds that the levelized annual impact over five-years is reasonable as it more closely matches to FEI’s EMAT ILI run interval period, aligns with the five-year construction period of the Project, and allows for a smoothing of rates. The Panel takes this opportunity to remind interveners that recommendations, such as amortizing the Project over a period of seven years to match the run interval period, should be supported by evidence including the resulting rate impact on ratepayers. The Panel reiterates that it is inappropriate for new proposals to be introduced on final arguments and reply without any prior evidence in support of those proposals on the record.

As for the possibility of establishing two separate deferral accounts – one for the QRA and one for the CTS TIMC costs, the Panel appreciates FEI’s effort in providing details on the proposal but does not see the need to direct FEI to set up two separate deferral accounts at this time to track these costs.

We agree with BCOAPO’s submission that there must be a consideration of the larger long-term viability of natural gas as a fuel source in the province when upfront development costs are incurred for long-term projects. However, the context of BCOAPO’s remark is when development costs are stranded – i.e. in cases where the project does not proceed. That is not the case here where the Panel determines that the granting of a CPCN is warranted.

Further, the Panel has, in its series of Panel IRs, canvassed the issue how this pipeline system fits into FEI’s long term vision of hydrogen, as already discussed earlier in Sections 2.4 and 5.2 of this Decision. We are satisfied with FEI’s response to our Panel IRs that the deployment of EMAT ILI tools can potentially enhance the viability of the CTS network to carry hydrogen blends in the longer term, in addition to providing critical safety enhancements in the near and medium term. In summary we rely on the following two FEI statements:²⁷¹

1. The potential for hydrogen blending will not have any impact on the depreciation rates and useful life of the CTS TIMC Project assets as the Project assets will not be impacted by hydrogen blending activities. Industry experience from hydrogen blending pilot projects around the world has consistently demonstrated that steel pipelines can accommodate low hydrogen concentrations (approximately 10 percent or less) with no negative effects.
2. As cracking remains a threat with or without hydrogen blending, EMAT ILI tools will need to be used on the CTS pipelines to identify cracking threats regardless of whether hydrogen blends are introduced into the pipelines.

²⁷¹ FEI Exhibit B-20 FEI further response to Panel IR No 1, pp. 2-3.

However, we encourage BCOAPO and other interveners to continue to pursue this issue, as it relates to the continued viability of natural gas as a fuel source in the province, the CleanBC Roadmap and related matters by adducing relevant evidence as to their impact and the extent to which the BCUC should take these matters into account when reviewing future CPCN applications from natural gas utilities in British Columbia.

5.4 Indicative Rate Impacts

FEI performed a financial evaluation of the Project based on the present value (PV) of the incremental revenue requirement and the levelized delivery rate impact to FEI's non-bypass customers over a 70-year analysis period.²⁷² The 70-year analysis period was based on a 65 year post-project analysis period, reflecting the average service life (ASL) of transmission mains pooled asset (detailed in FEI's 2017 Depreciation Study),²⁷³ plus five years prior relating to the construction period and the Project close out period.²⁷⁴ The table below summarizes the financial analysis:²⁷⁵

Table 6-4: Financial Analysis of the Project (\$millions)

Line	Particular	Project ^a	Reference (Confidential Appendix Financial Schedules)
1	Total Charged to Gas Plant in Service (\$ millions)	124.600	Schedule 6, Line 35, less Table 6-4 Line 4
2	Total Project Deferral Cost	13.243	Schedule 9, Line 2 + Line 7
3	Total Project Cost - Excluding Sustainment Capital (\$ millions)	137.843	Sum of Line 1 & Line 2
4	Sustainment Capital ^b	84.983	Schedule 6, Sum of lines 12 & 13, 2026-2090
5	Total Project Cost - Including Sustainment Capital (\$ millions)	222.826	Sum of Line 3 & Line 4
6	Incremental Rate Base in 2026 (\$ millions)	107.257	Schedule 5 Line 19 (2026)
7	Incremental Revenue Requirement in 2026 (\$ millions)	11.588	Schedule 1 Line 11, (2026)
8	PV of Incremental Revenue Requirement 70 Years (\$ millions)	147.460	Schedule 10, Line 25
9	Net Cash Flow NPV 70 Years (\$ millions)	(4.718)	Schedule 11, Line 17
10			
11	Delivery Rate Impact in 2026 (%)	1.32%	Schedule 10, Line 28 (2026)
12	Levelized Delivery Rate Impact 70 years (%)	0.94%	Schedule 10, Line 32
13	Levelized Delivery Rate Impact 70 years (\$/GJ)	0.042	Schedule 10, Line 45

Notes:

a Confidential Appendix G-2 – Financial Schedules

b Sustainment Capital allowance included to refresh end of life Telemetry and Measuring Equipment, original estimate inflated at 2 percent per annum every 11 years

The CTS TIMC Project results in an estimated cumulative delivery rate impact of 1.32 percent by 2026 and the average annual delivery rate impact over the five years from 2022 to 2026 is estimated to be 0.26 percent annually or \$0.013 per GJ annually.²⁷⁶ For a typical FEI residential customer consuming 90 GJ per year, this equates to a bill increase of approximately \$1.19 per year over the five years, or \$5.96 cumulatively by 2026.²⁷⁷ The levelized delivery rate impact for the 70-year analysis period is 0.94 percent which equates to \$0.042 per GJ and would result in a \$3.78 bill impact for an average residential customer who consumes 90 GJs per year.²⁷⁸

²⁷² Exhibit B-1, p. 122

²⁷³ Transmission mains pooled asset account 46500 as detailed in FEI's 2017 depreciation study approved with Order G-165-20 as part of FEI's 2020-2024 Multi Year Rate Plan (MRP) Application

²⁷⁴ Exhibit B-1, p. 122.

²⁷⁵ Ibid., p. 123.

²⁷⁶ Ibid., p. 124.

²⁷⁷ Ibid.

²⁷⁸ Exhibit B-5, BCUC IR 25.2.1.

The CTS TIMC Project is planned to be completed in phases with assets entering rate base between 2022 and 2026.²⁷⁹ Combined with the amortization of the deferral account costs beginning in 2022, the incremental impact to customer delivery rates will change each year from 2022 to 2026 as set out in the table below.²⁸⁰ The rate reduction in 2024 reflects that there are no additions to rate base forecast to occur in that year.²⁸¹

Table 6-5: Summary of Rate Impact of the Project

Project Rate Impacts	2022	2023	2024	2025	2026
Annual Delivery Margin, Incremental to 2021 Approved, Non-Bypass (\$millions)	10.726	11.004	10.691	11.461	11.588
% Increase to 2021 Approved Delivery Margin, Non-Bypass	1.22%	1.25%	1.22%	1.30%	1.32%
Incremental % Delivery Rate Impact (Year-over-Year)	1.22%	0.03%	-0.04%	0.09%	0.01%
Average Annual % Delivery Rate Impact (5 years, 2022-2026)	0.26%				
Average Annual Delivery Rate Impact (5 years, 2022-2026), \$/GJ	0.013				
Cumulative % Delivery Rate Impact (5 years, 2022-2026)	1.32%				
Cumulative Delivery Rate Impact (5 years, 2022-2026), \$/GJ	0.066				

FEI provided the table below which details the levelized annual bill impact for small and large commercial customers.²⁸²

Levelized Annual Bill Impact for Small and Large Commercial Customers

	Amortization Period				
	1 Year	2 Years	3 Years	4 Years	5 Years
Levelized Annual Delivery Rate Impact (\$/GJ)	0.096	0.049	0.034	0.026	0.021
Levelized Annual Bill Impact for Residential Customer, 90GJs (\$)	8.60	4.42	3.03	2.33	1.91
Levelized Annual Bill Impact for Small Commercial Customer, 340GJs (\$)	32.50	16.69	11.43	8.80	7.23
Levelized Annual Bill Impact for Large Commercial Customer, 3,770GJs (\$)	360.33	185.09	126.73	97.60	80.15

FEI also provided a table that summarizes the future annual Sustainment Capital cost and the estimated delivery rate impacts for the years in which the costs are forecast to occur.²⁸³ As noted above, the Sustainment Capital costs are not included in the \$137.8 million estimate Project cost set out in the Application.

Sustainment Capital Cost and the Estimated Delivery Rate Impact

Sustainment Capital	2035	2045	2055	2065	2071	2075	2085	Total
Estimated Delivery Rate Impact								
Telemetry Sustainment Capital (\$000s)	6,481	8,058	10,019	12,457	-	15,489	19,259	71,763
Measuring & Regulating Sustainment Capital (\$000s)	-	-	-	-	13,220	-	-	13,220
Total Sustainment Capital	6,481	8,058	10,019	12,457	13,220	15,489	19,259	84,983
% Delivery Rate Impact	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	

5.4.1 Major Projects

FEI showed the cumulative rate impact of major projects is expected to have a 1.4 percent average annual rate impact over the upcoming 10-year period.²⁸⁴

²⁷⁹ Exhibit B-7, CEC IR 38.1.

²⁸⁰ Exhibit B-1, p. 124.

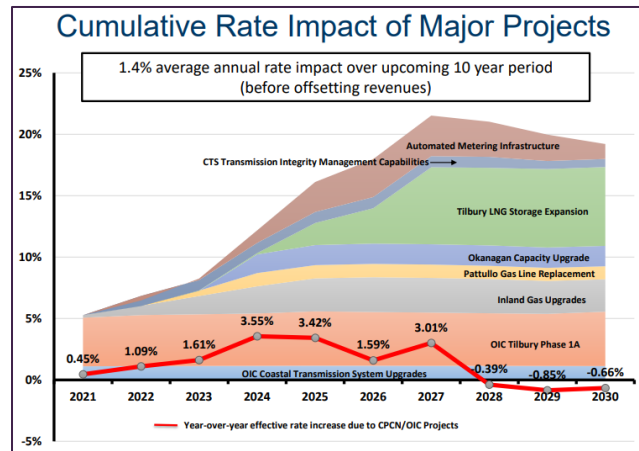
²⁸¹ Exhibit B-7, CEC IR 38.1.

²⁸² Exhibit B-13, CEC IR 54.1.

²⁸³ Exhibit B-5, BCUC IR 25.1.2.

²⁸⁴ Exhibit B-4, Workshop Presentation, p. 5.

Cumulative Rate Impact of Major Project



FEI states that the offsetting revenues refer to revenues from the projects that support increased capacity or demand and the potential revenue from LNG sales under FEI's Rate Schedule 46 which would offset the rate impact of the Tilbury Phase 1A project.²⁸⁵

Positions of Parties

Some interveners have concerns about the cumulative rate impact of FEI's major projects.

The CEC points out that the CTS TIMC Project is occurring at a similar time as many other CPCN projects are being placed into rate base.²⁸⁶ Further, while the CEC does not dispute the need for the CTS TIMC Project to be completed, and acknowledges the importance of timely implementation from a risk mitigation perspective, it submits that projects should be examined "not only from an 'incremental cost' perspective, but also in light of the total rate impact."²⁸⁷

BCOAPPO states that FEI's estimate of the impact of the Project on its ratepayers' delivery rates as of January 1, 2026 "reflects only the impact of this project on its delivery rates, and not the cumulative impacts of any other capital projects and certainly not any change in the cost of the natural gas (or "commodity") FEI delivers to its ratepayers."²⁸⁸

In response, FEI argues that "the risk benefits and cost of projects are assessed on an individual project basis."²⁸⁹

Panel Discussion

While the Panel shares similar concerns as some interveners over the cumulative rate impact of FEI's major projects in the upcoming 10-year period, the Panel must assess the need of the Project and its individual rate impact on their own merits.

²⁸⁵ Exhibit B-7, CEC IR 1.1.

²⁸⁶ CEC Final Argument, p. 23.

²⁸⁷ Ibid., p. 24.

²⁸⁸ BCOAPO Final Argument, p. 11.

²⁸⁹ FEI Reply Argument, p. 27.

The Panel is satisfied with FEI's calculation of the rate impact of the CTS TIMC Project and that the impact of this Project on rates is reasonable. While the Panel has raised concerns about the potential impact of future hydrogen blending on the used and useful life of FEI's pipelines as already discussed earlier, the Panel also finds FEI's use of a 70-year analysis period based on a 65-year post-Project analysis period to be reasonable as it reflects the average service life of transmission mains pooled assets in FEI's 2017 Depreciation Study.²⁹⁰

6.0 Environment and Archaeology

As detailed in Section 7 of the Application, FEI expects that the Project's scope, which is confined to existing rights of way and facilities, will have low to moderate environmental and archaeological impacts.²⁹¹

To evaluate the Project's environmental impact, FEI hired Stantec Consulting Ltd. (Stantec) to complete an Environmental Overview Assessment (EOA) of the Project components.²⁹² The EOA provides a basis for the completion of detailed assessments and preparation of environmental management plans prior to construction commencement.

Stantec states potential Project impacts vary by location but may include disturbance to environmental features such as terrestrial and aquatic resources, species at risk, and soils. Based on this preliminary assessment, the overall environmental risk of the Project is low to moderate. FEI states it will implement best practices for management and mitigation of any potential environmental impacts from the Project.²⁹³

FEI states the Project will require extensive federal, provincial and municipal permitting and approvals due to the construction work.²⁹⁴ With respect to environmental permitting, FEI states further environmental assessments will be undertaken during detailed engineering to confirm permitting requirements and it will apply for permits as required.²⁹⁵ FEI submits that although delays in obtaining the required environmental permits could potentially impact the Project schedule, the potential for such delays are low as construction of the Project is not currently scheduled to commence until 2024, leaving ample time to obtain the required permits. FEI anticipates that permitting timelines will range from 3 to 9 months.²⁹⁶

As for the Project's archaeological impacts, Stantec completed an Archaeological Constraints Report (Stantec Report) identifying areas of low, moderate or high potential impact areas.²⁹⁷ Stantec contacted all affected Indigenous communities before FEI filed this Application and provided them with an opportunity to participate in the Archaeological Overview Assessment (AOA) preliminary field reconnaissance. FEI states Indigenous cultural heritage permits were received from Katzie First Nation, Kwantlen First Nation, Musqueam Indian Band, Squamish Nation, Sto:lo Nation, and Tsleil-Waututh Nation in March 2021 prior to the initiation of the AOA.²⁹⁸ FEI states that it has obtained all but one Indigenous cultural heritage permit, which is being delayed due to

²⁹⁰ Transmission mains pooled asset account 46500 as detailed in FEI's 2017 depreciation study approved with Order G-165-20 as part of FEI's 2020-2024 Multi Year Rate Plan (MRP) Application.

²⁹¹ Exhibit B-1, p. 125.

²⁹² Ibid., Appendix H.

²⁹³ Ibid., pp. 126, 130-131.

²⁹⁴ Ibid., pp. 110-112.

²⁹⁵ Ibid., p. 131.

²⁹⁶ Exhibit B-11, BCUC IR 49.1

²⁹⁷ Exhibit B-1, p. 125; Appendix I.

²⁹⁸ Exhibit B-5, BCUC IR 31.1.

capacity constraints of the community, not due to concerns with the permit itself. FEI states it expects to obtain this outstanding permit in the fourth quarter of 2021.²⁹⁹

The Stantec Report concluded that the majority of the expected Project's footprint would have low archaeological potential impact due to the amount of previous disturbance. Stantec identified two areas of high archaeology potential (HUN ROE 1067 Event 12 and Huntingdon Facility), and all other events and facilities other than Fraser Gate may have elevated archaeological potential. It went on to recommend an Archaeological Impact Assessment (AIA) for ground disturbance activities in areas identified as moderate or high potential impact which would help in developing site-specific mitigation strategies to offset any potential impacts.³⁰⁰ To date, FEI states no issues or concerns have been raised by Indigenous groups with respect to archaeology. All potentially impacted Indigenous groups will receive a copy of the final AOA report in the third quarter of 2021.³⁰¹

Under the *Heritage Conservation Act*, FEI requires permits to undertake detailed AIA activities, which FEI indicates it will obtain during the Project's detailed engineering phase. Indigenous concerns can be addressed as part of the *Heritage Conservation Act's* permitting process. FEI also confirms that detailed archaeological specifications will be prepared as part of the Project's tendering process to ensure that contractors are aware of the archaeological requirements under the permits. The AIA will be initiated in mid-2023 after all required permits and input from Indigenous groups regarding the AOA are received.³⁰² FEI states that, similar to the risks regarding environmental permitting, the risks to the Project schedule from archaeological permits are low. FEI anticipates that archaeological permitting timelines will range from two to 12 months.³⁰³

Positions of Parties

RCIA did not comment on environmental or archaeological issues in argument.

The CEC submits it has reviewed the evidence and concludes that the EOA was comprehensive, necessary and appropriate for a Project of this size. The CEC submits that FEI has assessed the Archaeological impacts well and has developed a comprehensive plan. The CEC recommends that the BCUC find FEI's assessment of the environment and archaeological impacts to be appropriate.³⁰⁴

BCOAPO submits that the contents of the EOA Report appear to be a comprehensive examination of the potential of the Project to have either direct or indirect "adverse effects" on the environment in not only the immediate term, but the medium and longer term as well. BCOAPO submits Stantec did a reasonable survey of regulatory acts, regulations and municipal bylaws that the planned Project is likely to engage, mitigating the risk of any such unforeseen issues arising. BCOAPO concludes that the preparatory work FEI has completed relies on the opinions of experts in the field to form a sufficient evidentiary basis upon which to dispose of environmental concerns as a bar to proceeding with the Project.³⁰⁵

²⁹⁹ Exhibit B-11, BCUC IR 50.4.

³⁰⁰ Exhibit B-1, pp. 132-133.

³⁰¹ Exhibit B-5, BCUC IR 31.5.

³⁰² Exhibit B-1, p. 133; Exhibit B-5, BCUC IR 31.4.

³⁰³ Exhibit B-11, BCUC IR 50.3.

³⁰⁴ CEC Final Argument, p. 25.

³⁰⁵ BCOAPO Final Argument, p. 14.

BCOAPO states it has no position on the assessment of the potential archaeological impacts of the Project.³⁰⁶

Panel Discussion

We are satisfied with the steps FEI has taken to assess the potential environmental and archaeological impacts of the Project, including identifying potential areas of sensitivity. Environmental and land use constraints have been identified, as well as the required regulatory standards. FEI has indicated its intention to commence permit applications in the second or the third quarter of 2023, well in advance of construction in 2024.

7.0 Consultation and Engagement

Section 3 of the BCUC's CPCN Guidelines outlines the information expected from an applicant regarding consultation with First Nations and the public, which includes: a description of consultation activities; issues and concerns raised; the applicant's assessment of the sufficiency of the consultation process; and a statement of planned future consultation.

FEI created a Consultation and Engagement Plan and targeted engagement activities towards Indigenous groups, municipalities and those stakeholders who live and work in close proximity to the Project, as the Project is designed to occur on existing rights of way and within FEI premises. FEI initiated engagement and consultation in October 2020 by letter to nine municipalities and 25 Indigenous groups that may be affected by the Project.³⁰⁷

The following subsections provide an overview of FEI's engagement activities with First Nations communities and consultation with stakeholders such as local governments, landowners and customers.

7.1 Indigenous Consultation

Section 3 of the BCUC's CPCN Guidelines specifies requirements with respect to First Nations consultation, including that project proponents identify those First Nations potentially affected by the application, and provide a summary of the consultation to date for each potentially affected First Nation. The BCUC considers the sufficiency of consultation to date when evaluating CPCN applications.

FEI states it has engaged with Indigenous groups through a "transparent, frequent, two-way dialogue, which has allowed for the early identification of issues, concerns and shared interests, and has focused engagement activities on finding mutually agreeable solutions."³⁰⁸

FEI identified 25 Indigenous groups that may be affected by the Project by consulting with the BC Government's CAD Spatial Overview Engine.³⁰⁹ On October 2, 2020, FEI emailed a Project information letter and maps based on the preliminary project scope.³¹⁰ On November 6, 2020, FEI sent follow-up letters included a copy of the EOA, ACR, and maps and spatial data reflecting updates to the proposed Project work sites.³¹¹ FEI offered to schedule

³⁰⁶ Ibid., p. 15.

³⁰⁷ Exhibit B-1, p. 136; Appendix J-1.

³⁰⁸ Ibid., p. 145.

³⁰⁹ Ibid., pp. 145-146.

³¹⁰ Exhibit B-1, p. 146.

³¹¹ Ibid., p. 147, Appendix K-3; Exhibit B-5, BCUC IR 33.4.1.

virtual meetings with Indigenous groups to review Project details to respond to any questions or concerns about the Project. FEI has also followed up on questions from Indigenous groups either by email, phone, or through virtual meetings. On December 3, 2020, FEI hosted virtual meetings with Matsqui First Nation (MFN) and the People of the River Referrals Office (PRRO) to review the Project and to discuss interests, issues, and concerns.³¹² On March 29, 2021, FEI notified Indigenous groups of the filing of the Application with the BCUC.³¹³

FEI submits it has received two requests for capacity funding. FEI states that Tsleil-Waututh Nation (TWN) requested capacity funding to review materials, which FEI has accepted. TWN requested FEI and its consultants apply for TWN archaeological permits for each work sites rather than one permit for the entire Project. FEI states it has noted the request for multiple permits and will work with archaeological consultants to obtain the required permits. FEI is awaiting comments on the Environmental Overview Assessment and will continue to engage TWN to address any interests or concerns.³¹⁴ Kwikwetlem First Nation (KFN) indicated an interest in capacity funding to participate in engagement. FEI provided a capacity funding agreement for KFN to review on May 18, 2021, which included capacity funding for multiple FEI projects.³¹⁵ On Sept 24, 2021, FEI confirmed funding for a Project Coordinator for KFN to support engagement with FEI on the CTS TIMC Project.³¹⁶ FEI states it has received no further requests from Indigenous groups for capacity funding to date.³¹⁷

FEI states several Indigenous groups have indicated an interest in engaging on future archaeological and environmental reports and plans as they become available and through the BCOGC permitting process, closer to Project construction.³¹⁸ FEI states it will continue to share the results of environmental and archaeological reports with Indigenous groups, including those who have not responded to previous communications. FEI will also engage Indigenous groups on site-specific impacts through the BCOGC permitting process which includes soliciting feedback on environmental and archaeological reports and management plans in advance of construction.³¹⁹ FEI expects to share the AOA with all Indigenous groups with an asserted interest in the Project area in the fourth quarter of 2021. In addition, FEI expects to engage with these groups in advance of applying for permitted works and ground disturbing activities.³²⁰

FEI will also engage Indigenous groups on employment and contracting opportunities through its Socio-Economic Impact Program. These activities will occur leading up to Project contracting and construction, between 2022 and 2024.³²¹

FEI considers that its early engagement activities have been successful in understanding the level of interest and the nature of interests of Indigenous groups for the Project, reflecting this stage in the Project lifecycle.³²² FEI submits that its engagement activities with Indigenous groups to date have been “sufficient, appropriate, and reasonable, and are consistent with the BCUC’s CPCN Guidelines.”³²³

³¹² Ibid., p. 148.

³¹³ Exhibit B-5, BCUC IR 33.8.

³¹⁴ Ibid., BCUC IR 33.1.

³¹⁵ Ibid.

³¹⁶ Exhibit B-11, BCUC IR 52.1.

³¹⁷ Ibid., BCUC IR 52.5.

³¹⁸ Exhibit B-5, BCUC IR 33.4.1

³¹⁹ Ibid., BCUC IR 33.5; Exhibit B-11, BCUC IR 50.4.

³²⁰ Exhibit B-11, BCUC IR 52.3.

³²¹ Exhibit B-5, BCUC IR 33.9, 33.10.

³²² Exhibit B-5, BCUC IR 33.9.

³²³ FEI Final Argument, p. 47.

Positions of Parties

Based on its review of the evidence, the CEC finds FEI's indigenous engagement activities to be satisfactory, and recommends that the BCUC find this to be so.³²⁴

BCOAPO states it has no position on the assessment of the potential archaeological impacts or Indigenous engagement, and submits that the public interest is served by detailing and including rationale behind further Indigenous engagement. BCOAPO explains that FEI's response to a question regarding future engagement planned regarding potential archaeological impacts of the Project with affected Indigenous groups did not include any further rationale for follow up engagement nor explain what else the FEI might do, beyond noting that the archaeologist will continue to engage with Indigenous groups. FEI stated it intends to share a draft AOA for review and provision of feedback. BCOAPO submits that "ensuring that Indigenous engagement is sufficient at the outset, a determination which is difficult to make without detailed information, is crucial to the success of the Project, if approved, and its evaluation that it is in the public interest."³²⁵

RCIA did not provide argument on the issue of Indigenous engagement.

FEI did not comment on interveners' submissions in Reply.

Panel Discussion

The Panel finds that FEI has adequately consulted indigenous groups to date. We are satisfied with FEI's indigenous engagement activities. FEI has obtained most of the required heritage permits from First Nations, and has identified areas of potential archaeological sensitivity. Although a delay in the granting of a permit would likely lead to further delays, there is nothing to indicate that the outstanding permit will not be forthcoming. Indigenous groups have been provided with copies of the Archaeology Constraints Report, and FEI indicates that Indigenous groups will have the opportunity to provide comments on the s. 12.2 *Heritage Conservation Act* permit.

We agree with BCOAPO's submission that FEI ensure indigenous engagement from the outset, and FEI has taken appropriate steps to do so, but will need to remain diligent in such measures as sharing information and inviting First Nation participation in required field work, and constructive feedback on its AIA report.

7.2 Public Consultation

As part of its Consultation and Engagement Plan, FEI developed a list of stakeholders including nine municipalities, FEI customers, residents and businesses along the rights of way, residents and businesses nearby the rights of way and worksites and permitting authorities.³²⁶ FEI then developed communications materials including: project webpage, mail notifications, email and phone line, newsletter and social media, customer notifications and bill inserts.³²⁷

³²⁴ CEC Final Argument, p. 26.

³²⁵ BCOAPO Final Argument, p. 15

³²⁶ Exhibit B-1, p. 143.

³²⁷ Exhibit B-1, p. 143; Exhibit B-7, CEC IR 43.1.

FEI states, to date, it has only received the following concerns which relate to:

- i. noise and construction impacts;³²⁸
- ii. whether a new gas line formed part of the Project scope;³²⁹
- iii. the need for the Project and FEI's approach to asset depreciation,³³⁰ and
- iv. the rate impacts of the Project to customers.³³¹

FEI explains that each of these concerns was responded to and has been resolved, and FEI is unaware of any outstanding concerns.³³² FEI will continue to consult with stakeholders regarding construction timelines, scope of work, safety, and mitigation plans. FEI anticipates resuming public consultation activities in 2022 in tandem with Project developments.³³³

FEI submits its Consultation and Engagement Plan and associated public consultation activities have been sufficient, appropriate, and reasonable to meet the requirements of the BCUC CPCN Guidelines.³³⁴

Positions of Parties

The CEC states it has reviewed the evidence and considers that FEI has provided ample consultation with clear communications, and opportunities for comments. The CEC submits it finds FEI's consultation activities to be satisfactory and recommends the BCUC conclude similarly.³³⁵

Neither BCOAPO nor RCIA commented on public consultation in argument.

Panel Discussion

We are satisfied with FEI's public consultation efforts to date and its plan for further consultation and engagement.

8.0 Provincial Government Energy Objectives and the Long-Term Resource Plan

As stated earlier, section 46(3.1) of the UCA requires the BCUC to consider "the applicable of British Columbia's energy objectives," the most recent long-term resource plan filed by the utility and the extent to which the Application is consistent with the requirements of the CEA.³³⁶

³²⁸ Exhibit B-1, Table 8-2.

³²⁹ Ibid.

³³⁰ Exhibit B-5, BCUC IR 32.2.

³³¹ Ibid.

³³² Exhibit B-5, BCUC IR 32.5.

³³³ Exhibit B-1, p. 144; Exhibit B-11, BCUC IR2 51.1.

³³⁴ FEI Final Argument, p. 44.

³³⁵ CEC Final Argument, p. 26.

³³⁶ *Utilities Commission Act*, RSBC 1996, c. 473., sections 46(3.1)(a) & (c).

Based on that assessment, FEI submits that the Project supports the following BC energy objective found in section 2(k) of the CEA.³³⁷

To encourage economic development and the creation and retention of jobs.

FEI's most recent long-term resource plan is the 2017 Long-Term Gas Resource Plan (LTGRP) filed on December 14, 2017.³³⁸ The Project is described in section 6.4 of that plan and mentions FEI's intent to focus on the implementation of the EMAT technology to detect SCC in older pipeline systems in the CTS and ITS. Accordingly, FEI submits the CTS TIMC Project focusses on the CTS pipeline system and is consistent with its 2017 LTGRP.³³⁹

Positions of Parties

None of the interveners commented on this issue in their Final Arguments.

Panel Discussion

The Panel agrees with FEI that the Project is consistent with FEI's long-term planning as reflected in its 2017 LTGRP. The Panel also views that a Project entailing some \$137.8 million in capital expenditures over a period of five years is one which can reasonably be expected to "encourage economic development and the creation and retention of jobs" in this Province, within the meaning of section 2(k) of the CEA.

9.0 CPCN Determinations

Section 45(1) of the UCA³⁴⁰ stipulates that a person must not begin the construction or operation of a public utility plant or system, without first obtaining from the BCUC a certificate that public convenience and necessity require, or will require, the construction or operation of the plant or system.

Sections 46(1) and (3) of the UCA state that:³⁴¹

An applicant for a certificate of public convenience and necessity must file with the commission information, material, evidence and documents that the commission prescribes.

...

(3) ... the commission may, by order, issue or refuse to issue the certificate... and may attach to the exercise of the right or privilege granted by the certificate, terms, including conditions about the duration of the right or privilege under this Act as, in its judgment, the public convenience or necessity may require.

Positions of Parties

In support of its Application for the granting of a CPCN for the Project, FEI submits that:

³³⁷ Exhibit B-1, p. 152.

³³⁸ <https://www.bcuc.com/OurWork/ViewProceeding?applicationid=617>. FEI filed its 2022 Long Term Gas Resource Plan on May 9, 2022. It has not been considered in this proceeding due to the timing of that filing.

³³⁹ Exhibit B-1, pp. 152-153.

³⁴⁰ *Utilities Commission Act*, RSBC 1996, c. 473.

³⁴¹ UCA, s.46(3).

... the evidence in this proceeding is compelling and demonstrates that the Project is in the public interest. FEI must carry out the Project to implement EMAT ILI in order to mitigate the threat of cracking to the safe operation of the 11 CTS pipelines. EMAT ILI is the industry standard approach and will enhance FEI's ability to locate, assess, and address cracking threats on these pipelines. The BC Oil and Gas Commission (BCOGC) has indicated its support for FEI taking action to address its known integrity concerns in alignment with its regulatory and legal responsibilities as a BCOGC permit holder.³⁴²

In urging the BCUC to approve its Application, FEI submits:

FEI's evidence in this proceeding is comprehensive, responding to all issues raised, and conclusively demonstrates that the CTS TIMC Project is in the public interest. The need and justification for the Project is clear and FEI's alternatives analysis demonstrates that EMAT ILI is the only feasible and most cost-effective alternative to meet the Project need. FEI's cost estimate is reasonable and robust, appropriately including contingency and management reserve reflecting the attributes and risk of the Project. The Project is expected to have minimal environmental and archeological impacts, and FEI's public consultation and early engagement with Indigenous communities has not indicated any significant concerns.³⁴³

Overall, RCIA submits it believes that FEI is justified in proceeding with the CTS TIMC Project. RCIA supports the TIMC Project in principle, with some modifications to the proposed Project works, discussed earlier in Sections 4.2 and 4.3 of this Decision.³⁴⁴

RCIA elaborates on its position as follows:

RCIA agrees with FEI that there is a gap in its integrity management program with respect to the threat of axial cracking from SCC and seam weld defects on its CTS pipelines. RCIA agrees that a program to inspect the CTS pipelines which are susceptible to SCC and seam weld cracking is required, and that EMAT ILI tools should be used on the CTS pipelines as proposed by FEI. RCIA further supports the modifications to the pig launching and receiving facilities to permit the use of EMAT ILI tools. RCIA also supports the addition of a pressure regulating station at Noons Creek to permanently reduce the pressure in the Noons [sic] Creek to Burrard segment.

RCIA supports the overall timing of the TIMC project and the proposed ILI schedule, and the approach recommended by RCIA is to conduct the EMAT ILI runs on a similar timeline to that proposed by FEI in response to RCIA IR1 14.2.

RCIA does not support the modifications to the heavy wall segments, pressure control stations, or flow control stations at this time and recommends that the BCUC withhold approval for these expenditures when approving the TIMC CPCN.³⁴⁵

The CEC submits that it finds the Project to be appropriately justified and costed and recommends that the BCUC find the Project to be necessary and in the public interest.³⁴⁶ The CEC recommends the BCUC grant a CPCN for the Project.³⁴⁷

³⁴² FEI Final Argument, pp. 2-3.

³⁴³ Ibid., p. 47.

³⁴⁴ RCIA Final Argument, p. 5.

³⁴⁵ RCIA Final Argument, p. 27.

³⁴⁶ CEC Final Argument, p. 28

³⁴⁷ Ibid., p. 1.

BCOAPO submits that it:

...accepts FEI's evidence and ultimately takes the position that the Application should be approved, this is not an unqualified position. There is a line, a level after which the goal of system resilience is abandoned in favour of a dogged pursuit of perfection that can, if left unchecked, drive parties to overbuild, overengineer, and overspend. It is that line that our clients wish to ensure is not crossed: they will not stand silent if it appears an energy utility is seeking to make imprudent expenditures that will result in either stranded assets or unnecessarily high rate impacts.³⁴⁸

BCOAPO further explains its position in the following manner:

BCOAPO acknowledges the prudence of adhering to safety standards and ensuring that risks of SCC, pipeline failure or other impacts are mitigated. However, there are numerous reasons BCOAPO has concerns about FEI's plans and operations in the longer term: our clients realize that how we navigate the issues raised by these projects now as the Utility faces the challenges of its aging transmission systems will have a far more profound effect on the Utility and its ratepayers than it would have in the past. Now we do so in a time when the sunseting of fossil fuels is no longer a far off future but something we can expect far sooner than we thought.

FEI has brought forward a project it has said is not cost prohibitive but the Utility was not able to provide a specific threshold beyond which it would decline to proceed on that basis and, when asked about metrics from other jurisdictions to determine cost-effectiveness and quantify the dollar value range of cost effectiveness for ILI, even Dynamic Risk was unable to provide such metrics, instead saying only, "[t]he industry is moving towards developing such metrics..." Unfortunately, that is small comfort for our clients as those who will pay for not only this project, but any other ILIs FEI might bring online in the near future.³⁴⁹

In response to BCOAPO, FEI submits that:

...the cost and benefits associated with a given project, including the value of incremental improvements in risk, are within the scope of a CPCN application process through the assessment of the public interest. In particular, section 2(ii) of the BCUC's CPCN Guidelines states that a CPCN application should contain: "A comparison of the costs, benefits and associated risks of the project and feasible alternatives, including estimates of the value of all of the costs and benefits of each alternative or, where these costs and benefits are not quantifiable, identification of the cost area or benefit that cannot be quantified." The CPCN application process is robust, providing an effective and efficient means of assessing the cost and benefits of a project as a whole.³⁵⁰

In summary, FEI submits that the assessment of the public interest through the CPCN process is robust.³⁵¹

³⁴⁸ BCOAPO Final Argument, p. 6.

³⁴⁹ Ibid., p. 17.

³⁵⁰ FEI Reply Argument, pp. 26-27.

³⁵¹ Ibid., p. 2.

Overall Panel Determination on CPCN Application

The Panel finds that the public convenience and necessity require the Project to modify the CTS pipelines to allow for EMAT ILI. Having reviewed the entirety of the evidence and submissions in this proceeding, the Panel finds that the Project is appropriately justified and costed, and warrants the granting of a CPCN, as being in the public interest, in order to mitigate the risk of rupture due to the credible threat of undetected cracking on the CTS pipelines.

Accordingly, the Panel:

- 1. Grants to FEI a CPCN for the CTS TIMC Project pursuant to sections 45 and 46 of the UCA; and**
- 2. Approves the recovery of the balance of costs in the TIMC Development Cost Deferral Account associated with the development of the Project, estimated at \$13.2 million, pursuant to sections 59 to 61 of the UCA, by amortizing the December 31, 2022 actual balance of these actual costs over five years commencing January 1, 2023.**

Given the magnitude of the Project and the timeline for its implementation, the Panel also finds it appropriate to direct FEI to provide ongoing reporting to the BCUC for the duration of the Project, as detailed in Appendix A of this Decision.

While the Panel is satisfied that on balance, approval of the CPCN Application is warranted in this case given the nature of the risk in question and the location of the CTS, we caution that this may not be determinative of future applications including a similar project under consideration by FEI in respect of the ITS. In light of uncertainties with respect to long term viability of natural gas as an energy source in this Province and the increasing risk of stranded assets given changing climate policies, it is incumbent on affected utilities to innovate and pursue cost effective solutions to address pipeline integrity concerns in the best interest of ratepayers.

10.0 Guidance to Parties in Future Proceedings

10.1 Guidance to FEI for future CPCN Applications

FEI notes that it has been developing the ITS TIMC Project in parallel with the CTS TIMC Project, and that it anticipates filing a CPCN application for the ITS TIMC Project in 2022 following the receipt of the BCUC's decision on the Application.³⁵²

Panel Discussion

In consideration of some of the issues, which arose during the Proceeding, the Panel takes this opportunity to provide guidance regarding the content of the forthcoming ITS TIMC CPCN application and other similar applications.

³⁵² Exhibit B-11, BCUC IR 34.2, 34.5.

Project Scoping

Should FEI continue to pursue EMAT ILI tools as an alternative to meet the identified objectives of the ITS TIMC Project, the Panel considers that it would be helpful for FEI to include certain additional information in the ITS TIMC CPCN application. As discussed in preceding sections of this Decision, extensive pipeline and facility modifications have been proposed as part of the Project to reduce the risk of EMAT ILI tool velocity excursions that result in the degradation or loss of pipeline integrity data. With respect to the Application, the Panel notes that information regarding how FEI selected the specific scope of pipeline modifications was contained largely within confidential appendices or, in some cases, in responses to IRs.

In an effort to improve regulatory efficiency and to allow for transparent testing of the assumptions made in developing project scope, the Panel expects FEI to provide, in its forthcoming ITS CPCN application, the criteria and metrics which it considers would define an acceptable EMAT ILI tool run and the basis for selecting these criteria and metrics. As an example of a criterion which could define an acceptable EMAT ILI tool run, FEI should provide its selected metrics for the acceptable pipeline length of discontinuous or continuous loss of pipeline integrity data for each pipeline segment undergoing an EMAT ILI run.

The Panel anticipates that by FEI providing this additional information regarding the ITS TIMC Project scope determination, the BCUC, interveners and the public will be more readily understand how the project scope was determined and why any proposed infrastructure modifications are necessary or desirable. The Panel expects this additional information will help distinguish between necessary and potentially discretionary pipeline or facility modifications which may help to reduce the resulting ratepayer impact of the project.

BCOGC

FEI states that, in February 2021, it was selected for an audit of its Integrity Management Programs (IMPs) by the BCOGC's Compliance Assurance Process.³⁵³ Discussions between FEI and the BCOGC regarding this audit continued into October 2021.³⁵⁴

The Panel requests that FEI include an update regarding BCOGC activities as they relate to oversight of FEI's IMPs, including any outcomes from the IMP audit such as corrective actions plans or directives. The Panel anticipates that this information will support the BCUC's understanding of the BCOGC's expectations as they relate to FEI's ongoing pipeline integrity management and will clarify how FEI, through its various TIMC projects, is addressing any integrity management deficiencies identified by the BCOGC.

CleanBC Roadmap to 2030

The provincial government issued its *CleanBC Roadmap to 2030* (CleanBC Roadmap) in October 2021, which among other initiatives, proposes to limit GHG emissions from the use of natural gas in 2030 to approximately 47 percent less than 2007 levels.³⁵⁵ Due to the timing of the CleanBC Roadmap release date, FEI was not aware

³⁵³ Ibid., BCUC IR 39.2.

³⁵⁴ Ibid., BCUC IR 39.2.

³⁵⁵ https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030.pdf

of these energy objectives at the time the Application was filed. However, FEI does submit that the CleanBC Roadmap is not relevant as the CTS TIMC Project is driven by pipeline safety risks posed by cracking threats. Given that the CleanBC Roadmap is now in place, the Panel requests that FEI include information in its forthcoming ITS TIMC CPCN Application, which demonstrates how, if at all, that project aligns with FEI's own decarbonization goals, as well as the provincial energy objectives outlined in the CleanBC Roadmap.

10.2 Guidance to Interveners Regarding Intervener Evidence

The Panel values and appreciates the active participation of all the interveners in this proceeding. In particular, the Panel notes the Final Argument submitted by RCIA, which brought forward concerns regarding the justification of the expenditures associated with some of the proposed pipeline and facility modifications.³⁵⁶ In its Final Argument, as discussed in Section 4.2 of this Decision, RCIA proposed an alternative approach to preparing the CTS pipeline system for the use of EMAT ILI tools. For example, RCIA submits that modifying pipelines to remove heavy wall segments is an expensive way to obtain integrity for 2.84 percent of the CTS system pipeline length at risk of EMAT ILI tool speed excursions.³⁵⁷ In RCIA's view, the pipeline modification costs are not justified and it may be acceptable to remain blind to the pipeline condition for this small length of the CTS pipeline system, if the remaining pipe is found to have limited cracking.³⁵⁸ In response, FEI submits that RCIA's proposed approach to implementing the EMAT ILI tools is not prudent and should be rejected.³⁵⁹ Further, FEI submits that RCIA's approach is not recommended by FEI or Dynamic Risk, and that RCIA has not filed evidence to support its position.³⁶⁰

The Panel understands that the difference in the approaches advocated by RCIA and FEI relates, in part, to differences in these two parties' definition and perception of acceptable risk. While the Panel appreciates interveners raising concerns regarding the risk of unjustified or discretionary expenditures, the Panel also agrees with FEI that RCIA's proposed reductions in scope of the Project are not supported by any evidence.

Therefore, the Panel encourages those interveners who wish to propose alternative approaches to projects under review to submit evidence to support their positions, thus allowing other parties to test the soundness of that evidence prior to the argument phase of the proceeding when the evidentiary record has already been closed. As a matter of procedural fairness, it is unfair to the applicant for the BCUC to rely on new, untested evidence put forward as part of an intervener's Final Argument as a basis for its decision.

³⁵⁶ RCIA Final Argument, p. 21.

³⁵⁷ *Ibid.*, p. 18.

³⁵⁸ RCIA Final Argument, p. 20.

³⁵⁹ Reply Argument, para. 4.

³⁶⁰ FEI Reply Argument, para. 4.

11.0 Summary of Panel's Approvals and Directives

	Directive	Page(s)
1.	The Panel requests FEI to provide suggestions in terms of timing for the preparation and review of such a proposal in a compliance filing within 30 days of the issuance of this Decision.	12
2.	<p>The Panel finds that FEI has provided sufficient evidence in this proceeding to satisfy the Panel that on balance:³⁶¹</p> <ul style="list-style-type: none"> (i) The addition of flow control capability provides important benefits and is cost effective; (ii) The installation of pressure reduction facilities is necessary to ensure that FEI can mitigate the significant safety risk to the public due to cracking threats while maintaining service to customers over the winter, will provide ongoing benefits and is cost effective; (iii) The removal of the 13 heavy wall segments is necessary for successful EMAT ILI tools runs to mitigate the significant safety risk to the public due to the potential for cracking on over 5 kilometres of the CTS in proximity to populated areas. 	30
3.	The Panel accepts FEI's total Project cost estimate of \$137.8 million in as-spent dollars, including contingency, escalation and AFUDC.	38
4.	The Panel accepts FEI's proposed treatment for the capital costs of the Project to be held in Capital Work In Progress, attracting AFUDC, is consistent with its past practice as previously approved by the BCUC for projects of this nature.	39
5.	<p>The Panel approves FEI's request to transfer the balance in the TIMC Development Cost deferral account associated with the development of the CTS TIMC Project to rate base.</p> <p>However, the Panel denies FEI's request to amortize the balance of these costs over a three-year period commencing January 1, 2023 and directs FEI to amortize the balance instead over a five-year period. The Panel also directs FEI to report as part of its Semi-Annual Progress reporting, on the balance of the TIMC Development Cost deferral account pertaining to the development of the ITS Project.</p>	45-46
6.	<p>Accordingly, the Panel:</p> <ul style="list-style-type: none"> 1. Grants to FEI a CPCN for the CTS TIMC Project pursuant to sections 45 and 46 of the UCA; and 2. Approves the recovery of the balance of costs in the TIMC Development Cost Deferral Account associated with the development of the Project, estimated at \$13.2 million, pursuant to sections 59 to 61 of the UCA, by amortizing the December 31, 2022 actual balance of these actual costs over five years commencing January 1, 2023. <p>Given the magnitude of the Project and the timeline for its implementation, the Panel also finds it appropriate to direct FEI to provide ongoing reporting to the BCUC for the duration of the Project, as detailed in Appendix A of this Decision.</p>	59

³⁶¹ Ibid., para. 3.

DATED at the City of Vancouver, in the Province of British Columbia, this 18th day of May 2022.

Original signed by:

A. K. Fung, QC
Panel Chair / Commissioner

Original signed by:

C. M. Brewer
Commissioner

Original signed by:

D. M. Morton
Commissioner



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**ORDER NUMBER
C-3-22**

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

FortisBC Energy Inc.
Application for a Certificate of Public Convenience and Necessity
for the Coastal Transmission System Transmission Integrity Management Capabilities Project

BEFORE:

A. K. Fung, QC, Panel Chair
C. M. Brewer, Commissioner
D. M. Morton, Commissioner

on May 18, 2022

CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

WHEREAS:

- A. On February 11, 2021, FortisBC Energy Inc. (FEI) filed an application (Application) with the British Columbia Utilities Commission (BCUC) for a Certificate of Public Convenience and Necessity (CPCN), pursuant to sections 45 and 46 of the *Utilities Commission Act* (UCA), for FEI's Coastal Transmission System (CTS) Transmission Integrity Management Capabilities (TIMC) Project (CTS TIMC Project);
- B. The CTS TIMC Project includes the following:
 - 1. Required pipeline alterations including replacement of heavy wall segments and alterations to related facilities that are necessary to ready the 11 susceptible CTS pipelines for electro-magnetic acoustic transducer (EMAT) in-line inspection (ILI); and
 - 2. Installation of a pressure regulating station (PRS) on a single segment of one of the pipelines where EMAT ILI is not possible;
- C. FEI also requests approval, pursuant to sections 59 to 61 of the UCA, to recover the balance of costs in the TIMC Development Cost deferral account associated with the development of the Application, estimated at \$13.2 million, by amortizing the December 31, 2021 actual balance of these costs over three years;
- D. By Order G-74-21 dated March 11, 2021, the BCUC established a regulatory timetable for review of the Application;
- E. On May 13, 2021, by Exhibit A-6, the BCUC notified parties that Dynamic Risk Assessment Inc. (Dynamic Risk) has been retained to produce an independent expert report for the evidentiary record in the proceeding;

- F. By Order G-149-21 dated May 17, 2021, the BCUC established a further regulatory timetable, which included dates for the filing of Dynamic Risk's Independent Expert Report and one round of information requests (IRs) to FEI and Dynamic Risk;
- G. By Order G-251-21 dated August 25, 2021, the BCUC established a further regulatory timetable, which included dates for a second round of IRs, and final and reply arguments;
- H. By Orders G-285-21, G-295-21, G-318-21, G-337-21, Exhibit A-19 and Order G-63-22, the BCUC amended the regulatory timetable to provide, among other things, extensions to deadlines, Panel IRs and FEI's responses to same along with interveners' submissions relating to those IRs; and
- I. The BCUC has reviewed the Application, the evidence and submissions in this proceeding and determines that certain approvals are warranted.

NOW THEREFORE pursuant to sections 45 to 46 and 59 to 61 of the *Utilities Commission Act* and for the reasons set out in the Decision issued concurrently with this order, the BCUC orders as follows:

- 1. FEI is granted a CPCN for the CTS TIMC Project.
- 2. FEI is approved the recovery of the balance of costs in the TIMC Development Cost Deferral Account associated with the development of the CTS TIMC Project, estimated at \$13.2 million, by amortizing the December 31, 2022 actual balance of these actual costs over five years commencing January 1, 2023. FEI is directed to report as part of its Semi-Annual Progress reporting, on the balance of the TIMC development deferral account pertaining to the development of the Interior Transmission System (ITS) TIMC Project.
- 3. FEI is directed to file reports as outlined in Appendix A to the Decision.
- 4. FEI is directed to comply with all the directives outlined in the Decision issued concurrently with this order.

DATED at the City of Vancouver, in the Province of British Columbia, this 18th day of May 2022.

BY ORDER

Original signed by:

A. K. Fung, QC
Commissioner

FortisBC Energy Inc.
Certificate of Public Convenience and Necessity for the
Coastal Transmission System Transmission Integrity Management Capabilities Project

PROJECT REPORTING

The Panel directs FEI to file the following reports:

1. Semi-annual Progress Reports

Each report is required to detail:

- Actual costs incurred to date compared to the CPCN estimate highlighting variances with an explanation and justification of significant variances;
- Updated forecast of costs, highlighting the reasons for significant changes in Project costs anticipated to be incurred; and
- The status of Project risks, highlighting the status of identified risks, changes in and additions to risks, the options available to address the risks, the actions that FEI is taking to deal with the risks and the likely impact on the Project's schedule and cost.

FEI must file semi-annual progress reports within 30 days of the end of each semi-annual reporting period, with the first report covering the period ending June 30th, 2022. Each report must provide the information set out in Appendix A to this Decision.

2. Material Change Reports

A material change is a change in FEI's plan that would reasonably be expected to have a significant effect on the schedule, cost or scope of that particular plan, such that:

- there is a schedule delay of greater than six months compared to the CPCN construction schedule for the lateral;
- there is a cost variance of greater than 10 percent of the CPCN capital estimate for the Project; or
- there is a change to the project alternative selected for a given pipeline modification.

In the event of a material change, FEI must file a material change report with the BCUC, explaining the reasons for the material change, FEI's consideration of the Project risk and the options available and actions FEI is taking to address the material change. FEI must file the material change report as soon as practicable and in any event within 30 days of the date on which the material change occurs. If the material change occurs within 30 days of the date for filing a semi-annual progress report, FEI may include the material change information in the progress report.

3. Final Report

The Final Report must include a breakdown of the final costs of the Project compared to the cost estimates included in Table 6-2 in the Exhibit B-1-2 and provide an explanation and justification of any material cost variances of 10 percent or more.

The Final Report must be filed within six months of substantial completion or the in-service date of the Project, whichever is earlier.

FortisBC Energy Inc.
 Certificate of Public Convenience and Necessity for the
 Coastal Transmission System Transmission Integrity Management Capabilities Project

LIST OF ACRONYMS

ACRONYM / GLOSSARY	DESCRIPTION
AACE	Association for the Advancement of Cost Engineering International
ACR	Archaeology Constraints Report
AFUDC	Allowance for Funds Used During Construction
AIA	Archaeological Impact Assessment
AOA	Archaeological Overview Assessment
Application	Application for a Certificate of Public Convenience and Necessity for FEI's Coastal Transmission System Transmission Integrity Management Capabilities Project
ASL	Average Service Life
BC Hydro	British Columbia Hydro and Power Authority
BCOAPO	British Columbia Old Age Pensioners' Organization et al.
BCOGC	BC Oil and Gas Commission
BCUC	British Columbia Utilities Commission
CEA	<i>Clean Energy Act</i>
CleanBC Roadmap	<i>CleanBC Roadmap to 2030</i>
CMFL	Circumferential Magnetic Flux Leakage
CPCN	Certificate of Public Convenience and Necessity
CPH BUR 508	Cape Horn-Burrard 20" Pipeline
CSA	Canadian Standards Association
CTS	Coastal Transmission System

ACRONYM / GLOSSARY	DESCRIPTION
CTS TIMC Project or Project	Coastal Transmission System Transmission Integrity Management Capabilities Project
Dynamic Risk	Dynamic Risk Assessment Inc.
EMAT	Electro-Magnetic Acoustic Transducer
EMAT ILI	Electro-Magnetic Acoustic Transducer In-Line Inspection
EOA	Environmental Overview Assessment
FCS	Flow Control Station
FEI	FortisBC Energy Inc.
GJ	Gigajoule
HSTP	Hydrostatic Testing Program
HUN NIC 762	Huntingdon-Nichol 30" Pipeline
HUN ROE 1067	Huntingdon-Roebeck 42" Pipeline
ILI	In-line Inspection
IMPs	Integrity Management Programs
IRs	Information Requests
ITS	Interior Transmission System
JANA	JANA Corporation
KFN	Kwikwetlem First Nation
LIV PAT 457	Livingston-Pattullo 18" Pipeline
LTGRP	Long-Term Resource Plan
MFL	Magnetic Flux Leakage
MFL-A	Magnetic Flux Leakage-Axial
MFL-C	Magnetic Flux Leakage-Circumferential
MFN	Matsqui First Nation
MRP	Multi-year Rate Plan

ACRONYM / GLOSSARY	DESCRIPTION
NOO BUR 508	Noon's Creek to Burrard Pipeline Segment
NPS	Nominal Pipe Size
NPV	Net Present Value
O&M	Operations & Maintenance
Pig Barrels	Launching and Receiving Barrels
PLE	Pipeline Exposure and Recoat
PLR	Pipeline Replacement
PRRO	River Referrals Office
PRS	Pressure Regulating Station
PV	Present Value
QRA	Quantitative Risk Assessment
RCIA	Residential Consumer Intervener Association
RRA	Revenue Requirements Application
SCC	Stress Corrosion Cracking
SCCDA	Stress Corrosion Cracking Direct Assessment
SMYS	Specified Minimum Yield Strength
Stantec	Stantec Consulting Ltd.
Stantec Report	Archaeological Constraints Report
The CEC	Commercial Energy Consumers Association of British Columbia
TIMC	Transmission Integrity Management Capabilities
TWN	Tseil-Watuth Nation
UCA	<i>Utilities Commission Act</i>
US GAAP	US Generally Accepted Accounting Principles

ACRONYM / GLOSSARY	DESCRIPTION
Validation Estimating	Validation Estimating LLC, USA
VITS	Vancouver Island Transmission System
WACC	Weighted Average Cost of Capital
YPCI	Yohannes Project Consulting Inc.

FortisBC Energy Inc.
 Certificate of Public Convenience and Necessity for the
 Coastal Transmission System Transmission Integrity Management Capabilities Project

EXHIBIT LIST

Exhibit No.	Description
<i>COMMISSION DOCUMENTS</i>	
A-1	Letter dated February 22, 2021 – Appointing the Panel for the review of FortisBC Energy Inc. Certificate of Public Convenience and Necessity for the Coastal Transmission System Transmission Integrity Management Capabilities Project dated February 11, 2021
A-2	Letter dated March 11, 2021 – BCUC Order G-74-21 establishing the regulatory timetable
A-3	Letter dated April 12, 2012 – Amending the Panel for the review of the Application
A-4	Letter dated April 16, 2021 – Workshop Guidance
A-5	Letter dated May 7, 2021 – BCUC request for submissions regarding independent consultant
A-6	Letter dated May 13, 2021 – BCUC Submitting Consultant Introduction
A-7	Letter dated May 17, 2021 – BCUC Order G-149-21 with the regulatory timetable
A-8	Letter dated June 29, 2021 – BCUC Information Request No. 1 to FEI
A-9	CONFIDENTIAL – Letter dated June 29, 2021 – BCUC Confidential Information Request No. 1 to FEI
A-10	Letter dated July 6, 2021 – BCUC Information Request No. 1 to Dynamic Risk
A-11	Letter dated August 25, 2021 – BCUC Order G-251-21 establishing a further regulatory timetable
A-12	Letter dated September 14, 2021 – BCUC Information Request No. 2 to FEI
A-13	CONFIDENTIAL - Letter dated September 14, 2021 – BCUC Confidential Information Request No. 2 to FEI
A-14	Letter dated September 28, 2021 – BCUC Order G-285-21 establishing a further regulatory timetable
A-15	Letter dated October 13, 2021 – BCUC Order G-295-21 amending the regulatory timetable
A-16	Letter dated October 29, 2021 – BCUC granting CEC an extension to file its final argument

- A-17 Letter dated November 3, 2021 – BCUC Order G-318-21 amending the regulatory timetable
- A-18 Letter dated November 19, 2021 – BCUC Order G-337-21 further amending the regulatory timetable
- A-19 Letter dated February 4, 2022 – Panel Information Request No. 1 to FEI
- A-20 Letter dated March 4, 2022 - BCUC Order G-63-22 establishing a further regulatory timetable

COMMISSION STAFF DOCUMENTS

- A2-1 Letter dated June 15, 2021 – BCUC staff submitting the Independent Report on the FortisBC Energy Inc. Application for Approval of a Certificate of Public Convenience and Necessity for the Coastal Transmission System Transmission Integrity Management Capabilities Project dated June 15, 2021 prepared by Dynamic Risk Assessment Systems, Inc.
- A2-2 Letter dated July 27, 2021 – BCUC staff submitting Dynamic Risk responses to BCUC Information Request No. 1
- A2-3 Letter dated July 27, 2021 – BCUC staff submitting Dynamic Risk responses to RCIA Information Request No. 1
- A2-4 Letter dated July 27, 2021 – BCUC staff submitting Dynamic Risk responses to CEC Information Request No. 1
- A2-5 Letter dated July 27, 2021 – BCUC staff submitting Dynamic Risk responses to BCOAPO Information Request No. 1
- A2-6 Letter dated October 15, 2021 – BCUC staff submitting Dynamic Risk responses to RCIA Information Request No. 2
- A2-7 Letter dated October 15, 2021 – BCUC staff submitting Dynamic Risk responses to CEC Information Request No. 2
- A2-8 Letter dated October 15, 2021 – BCUC staff submitting Dynamic Risk responses to BCOAPO Information Request No. 2

APPLICANT DOCUMENTS

- B-1 **FORTISBC ENERGY INC. (FEI)** - Certificate of Public Convenience and Necessity (CPCN) for the Coastal Transmission System Transmission Integrity Management Capabilities Project (CTS TIMC Project) dated February 11, 2021
- B-1-1 **CONFIDENTIAL** – Letter dated February 11, 2021 – FEI submitting CPCN for the CTS TIMC Project Confidential Appendices

- B-1-1-1 **CONFIDENTIAL** – Letter dated April 6, 2021 – FEI submitting Confidential Financial Models related to Appendix G of the Application
- B-2 Letter dated May 6, 2021 – FEI submitting Workshop Agenda
- B-3 Letter dated May 11, 2021 – FEI submission regarding independent consultant
- B-4 Letter dated May 13, 2021 – FEI submitting Workshop Presentation
- B-5 Letter dated July 27, 2021 – FEI Submitting responses to BCUC Information Request No. 1
- B-5-1 **CONFIDENTIAL** - Letter dated July 27, 2021 – FEI Submitting responses to BCUC Information Request No. 1
- B-6 Letter dated July 27, 2021 – FEI Submitting responses to BCOAPO Information Request No. 1
- B-6-1 **CONFIDENTIAL** - Letter dated July 27, 2021 – FEI Submitting responses to BCOAPO Information Request No. 1
- B-7 Letter dated July 27, 2021 – FEI Submitting responses to CEC Information Request No. 1
- B-7-1 **CONFIDENTIAL** - Letter dated July 27, 2021 – FEI Submitting responses to CEC Information Request No. 1
- B-8 Letter dated July 27, 2021 – FEI Submitting responses to RCIA Information Request No. 1
- B-8-1 **CONFIDENTIAL** - Letter dated July 27, 2021 – FEI Submitting responses to RCIA Information Request No. 1
- B-9 Letter dated August 3, 2021 – FEI submission on further process
- B-10 Letter dated September 27, 2021 – FEI Submitting extension request to file Information Request No. 2 responses
- B-11 Letter dated October 7, 2021 – FEI Submitting responses to BCUC Information Request No. 2
- B-12 **CONFIDENTIAL** - Letter dated October 7, 2021 – FEI Submitting responses to BCUC Confidential Information Request No. 2
- B-13 Letter dated October 7, 2021 – FEI Submitting responses to CEC Information Request No. 2
- B-14 **CONFIDENTIAL** - Letter dated October 7, 2021 – FEI Submitting responses to CEC Confidential Information Request No. 2
- B-15 Letter dated October 7, 2021 – FEI Submitting responses to RCIA Information Request No. 2

- B-16 Letter dated October 7, 2021 – FEI Submitting responses to BCOAPO Information Request No. 2
- B-17 **CONFIDENTIAL** - Letter dated October 7, 2021 – FEI Submitting responses to BCOAPO Confidential Information Request No. 2
- B-18 Letter dated November 18, 2021 – FEI Submitting extension request to file Reply Argument
- B-19 Letter dated February 18, 2022 – FEI Submitting response to Panel Information Request No. 1
- B-20 Letter dated March 28, 2022 – FEI Submitting further response to Panel Information Request No. 1 on Useful Life Depreciation
- B-21 Letter dated April 8, 2022 – FEI submitting reply submission on interveners comments regarding FEI response to Panel Information Request No. 1

INTERVENER DOCUMENTS

- C1-1 **RESIDENTIAL CUSTOMER INTERVENER ASSOCIATION (RCIA)** - Letter dated March 12, 2021 submitting request to intervene by Sam Mason of Midgard Consulting
- C1-2 Letter dated June 4, 2021 – RCIA submitting Confidentiality Declaration and Undertaking for Brady Ryall and Samuel Mason
- C1-3 Letter dated July 6, 2021 – RCIA Information Request No. 1 to Dynamic Risk
- C1-4 Letter dated July 6, 2021 – RCIA Information Request No. 1 to FEI
- C1-4-1 **CONFIDENTIAL** - Letter dated July 6, 2021 – RCIA Information Request No. 1 to FEI
- C1-5 Letter dated August 3, 2021 – RCIA submission on further process
- C1-6 Letter dated September 14, 2021 – RCIA Information Request No. 2 to FEI
- C1-7 Letter dated September 14, 2021 – RCIA Information Request No. 2 to Dynamic
- C1-8 Letter dated November 3, 2021 – RCIA extension request to file Final Argument
- C1-9 Letter dated April 4, 2022 – RCIA comment on FEI response to Panel Information Request No. 1
- C2-1 **COMMERCIAL ENERGY CONSUMERS ASSOCIATION OF BRITISH COLUMBIA (CEC)** Letter dated April 29, 2021 Request to Intervene by Christopher Weafer
- C2-2 Letter dated May 11, 2021 – CEC submission regarding independent consultant

- C2-3 Letter dated May 11, 2021 – CEC submitting Confidentiality Declaration and Undertakings for Christopher Weafer, Patrick Weafer, Janet Rhodes and David Craig
- C2-4 Letter dated July 6, 2021 – CEC Information Request No. 1 to Dynamic Risk
- C2-5 Letter dated July 6, 2021 – CEC Information Request No. 1 to FEI
- C2-6 **CONFIDENTIAL** – Letter dated July 6, 2021 – CEC Information Request No. 1 to FEI
- C2-7 Letter dated August 3, 2021 – CEC submission on further process
- C2-8 Letter dated September 14, 2021 – CEC Information Request No. 2 to FEI
- C2-9 **CONFIDENTIAL** – Letter dated September 14, 2021 – CEC Confidential Information Request No. 2 to FEI
- C2-10 Letter dated September 14, 2021 – CEC Information Request No. 2 to Dynamic
- C2-11 Letter dated October 27, 2021 – CEC extension request to file Final Argument
- C2-12 Letter dated April 4, 2022 – CEC comment on FEI response to Panel Information Request No. 1
- C3-1 **BRITISH COLUMBIA OLD AGE PENSIONERS’ ORGANIZATION, DISABILITY ALLIANCE BC, COUNCIL OF SENIOR CITIZENS’ ORGANIZATIONS OF BC, AND THE TENANT RESOURCE AND ADVISORY CENTRE (BCOAPO)** – Letter dated May 5, 2021 – Request for Intervener Status by Leigha Worth and Irina Mis
- C3-2 Letter dated May 11, 2021 – BCOAPO submitting Confidentiality Declaration and Undertaking for Russ Bell
- C3-3 Letter dated July 6, 2021 – BCOAPO Information Request No. 1 to FEI
- C3-3-1 **CONFIDENTIAL** - Letter dated July 6, 2021 – BCOAPO Information Request No. 1 to FEI
- C3-4 Letter dated July 6, 2021 – BCOAPO Information Request No. 1 to Dynamic Risk
- C3-5 Letter dated September 10, 2021 – BCOAPO Submitting Confidentiality Declaration and Undertakings
- C3-6 Letter dated September 14, 2021 – BCOAPO Information Request No. 2 to FEI
- C3-7 **CONFIDENTIAL** - Letter dated September 14, 2021 – BCOAPO Information Request No. 2 to FEI
- C3-8 Letter dated September 14, 2021 – BCOAPO Information Request No. 2 to Dynamic Risk
- C3-9 Letter dated November 2, 2021 – BCOAPO extension request to file Final Argument

- C3-10 Letter dated November 12, 2021 – BCOAPO further extension request to file Final Argument
- C3-11 Letter dated April 4, 2022 – BCOAPO comment on FEI response to Panel Information Request No. 1

INTERESTED PARTY DOCUMENTS

- D-1 **CLINE, D. (CLINE)** – Submission dated April 9, 2021 Request for Interested Party Status
- D-1-1 Cline, D. - Letter of Comment dated April 7, 2021