Diane Roy
Director, Regulatory Affairs

FortisBC Energy
16705 Fraser Highway
Surrey, B.C. V4N 0E8
Tel: (604) 576-7349
Cell: (604) 908-2790
Fax: (604) 576-7074
Email: diane.roy@fortisbc.com
www.fortisbc.com

Regulatory Affairs Correspondence
Email: gas.regulatory.affairs@fortisbc.com

January 10, 2014

Via Email
Original via Mail

Commercial Energy Consumers Association of British Columbia
c/o Owen Bird Law Corporation
P.O. Box 49130
Three Bentall Centre
2900 – 595 Burrard Street
Vancouver, BC
V7X 1J5

Attention: Mr. Christopher P. Weafer

Dear Mr. Weafer:

Re: FortisBC Energy Inc. (FEI or the Company)

Application for a Certificate of Public Convenience and Necessity (CPCN) for the Huntingdon Station Bypass (the Application)

Response to the Commercial Energy Consumers Association of British Columbia (CEC) Information Request (IR) No. 1

On October 25, 2013, FEI filed the Application as referenced above. In accordance with Commission Order G-185-13 setting out the Regulatory Timetable for the review of the Application, FEI respectfully submits the attached response to CEC IR No. 1.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

cc: Commission Secretary
Registered Parties (e-mail only)

1. Reference: Exhibit B-1, Page 1 and Page 17

> Pressure Control Station (the Huntington Station or the Station). The bypass as proposed will significantly reduce the risk of gas supply disruption to approximately 600,000 customers residing in the Lower Mainland and in Whistler, Squamish, the Sunshine Coast, and Vancouver Island in the event of a failure of the Huntingdon Station.

Page 1

> Based on GHD's report, the Huntingdon Station was ranked the highest in terms of BRE due to the highest CoF. The CoF was high because of the Huntingdon Station being a single point of failure and the financial losses based on the estimated 1,375 mmcfd of lost throughput and 2009/2010 peak day simulations. GHD recommended a bypass around the Huntingdon Station to mitigate the risk[3].

Page 17

> The quantitative RA considered two scenarios: the Huntingdon Station without the bypass in place; and with the bypass in place. Risk calculations were performed for each of the major pressure retaining equipment items in the Huntingdon Station. The assessment concludes that:
>
> *The overall risk of all equipment items combined that is associated with current operation (without the bypass in place) is $3,275,000 per year of operation. The corresponding risk value for the scenario with the bypass in place is $2,100 per year of operation. The risk differential between the two scenarios is $3,272,900 per year of operation. This analysis illustrates that the installation of a bypass around Huntingdon Station would result in significant savings in operational risk.* [5]

Page 17

1.1 Please confirm that the risk reduction exceeds the project costs by a substantial margin, using expected value EV equal to the change in risk (R_1-R_2) times the outcome of realization of the risk O, (EV=(R_1-R_2)*O) as the measure of risk reduction.

Response:

The risk reduction exceeds the project costs by a substantial margin on an ongoing basis, using the quantitative analysis conducted by Dynamic Risk Assessment System (DRAS) in the Application, Appendices C1 to C3.

The risk analysis conducted by DRAS evaluates both the likelihood and the consequences associated with a failure, taking due account of the influence of detection, isolation and mitigation factors in determining the overall outcome of the failure. The operational risk (expected value) is the product of the likelihood (risk) and the consequence (outcome of realization).

For example, the risk differential between the base case and Option 4 is $3,366,886 per year (refer to the Application, Appendix C3, page 11). In a five year period, the net operational risk reduction value can be estimated at $16.8 million, a substantial margin to the overall project cost of $8.0 million.

1.2 Please confirm that the quantitative analysis summary on Page 17 shown above is the evidence to support the answer to the first question above.

Response:

Confirmed. The quantitative analysis summary in the Application, Appendix C1 as well as the revised report in the Application, Appendix C3 were used to complete analysis in the response to CEC IR 1.1.1.

1.3 Please confirm that this project is the highest priority risk reduction project in the FEI portfolio of risk reduction opportunities identified, based on an assessment of risk (EV) as suggested above.

Response:

The Huntingdon Station was identified as the highest risk asset in the GHD Phase 1 Risk Assessment Report, a one-time high level asset screening study to identify areas of higher potential business risk which warranted further detailed assessment. The methodology used by GHD for this risk assessment is summarized in section 3 of its report. Please refer to the Application, Appendix B, at pages 2-6.

Subsequent to the GHD assessment, FEI engaged Dynamic Risk Assessment Systems (DRAS) to conduct three quantitative risk assessments, where the EV was calculated. The results of DRAS assessment were provided the Application, Appendices C1, C2 and C3.

1.4 Please confirm that the evidence in the GHD report provides the answer to the question above.

Response:

Please refer to the response to CEC IR 1.1.3. However, as explained in the response to BCUC Confidential IR 1.3.1, FEI considers the DRAS reports more relevant to the risk assessment of the Project.

2. Reference: Exhibit B-1, Page 1 and Page 3

> FEI is also seeking Commission approval under sections 59-61 of the Act for deferral treatment of costs for preparing this Application and to amortize these costs over the subsequent three year period. The Application costs include expenses for consultant reports, legal review, costs for archaeological assessments, Commission costs and Commission approved intervener costs.
>
> Page 1

> The Huntingdon Station bypass was presented in FEI's Application for Approval of a Multi-Year Performance Based Ratemaking Plan for 2014 through 2018 (FEI 2014-2018 PBR Application) as an anticipated CPCN.[1]
>
> Page 3

2.1 Please confirm that this process of deferral account treatment for costs of the application is a usual and common treatment for FEI.

Response:

Confirmed. Requesting deferral treatment of Application costs has been common practice for FEI over the past several decades and this treatment has been previously approved by the Commission.

2.2 Please confirm that the costs to which the deferral account treatment applies were not forecast in the last approved revenue requirements application for setting FEI rates for 2013.

Response:

Confirmed.

2.3 Please confirm that the costs to which the deferral accounting treatment applies have not been forecast in the currently underway PBR application for 2014 to 2018.

1 **Response:**

2 Confirmed.

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3. Reference: Exhibit B-1, Page 1

> Also, under sections 59-61 of the Act, FEI is seeking approval from the Commission to defer prefeasibility costs that cover expenses for project management, engineering, and consultants' costs for assessing the potential design and alternatives and associated costs prior to Commission approval of the Project. FEI is seeking Commission approval to amortize these deferred prefeasibility costs over three years starting in 2016. The prefeasibility costs would be recorded in a Non-Rate Base deferral account on a net-of-tax basis attracting AFUDC. At the beginning of 2016, the deferral account would be included in Rate Base, ending any further AFUDC addition.

3.1 Please confirm that this treatment of prefeasibility costs is a usual and common treatment of these types of costs for FEI.

Response:

FEI made the transition from recording feasibility costs as an expense rather than capital for regular capital expenditures starting in 2010. This necessitated that feasibility costs for CPCNs be captured in deferral accounts rather than capital, also starting in 2010.

Other than CPCN projects, FEI has received approval per Commission Order G-101-12, to capture feasibility costs related to the Kingsvale-Oliver Reinforcement Project in a deferral account, and FEVI received approval per Commission Order G-66-13a to capture feasibility costs related to a development agreement with Pacific Energy Corporation in a deferral account.

3.2 Please confirm that none of these types of costs was included in the forecasts for revenue requirements for the 2013 year in the FEI last revenue requirements regulatory process.

Response:

Confirmed.

3.3 Please confirm that none of these types of costs is included in the currently underway PRB process for 2014 to 2018.

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2 **Response:**

3 Confirmed.

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4. Reference: Exhibit B-1, Page 1

> FEI owns and operates the Huntingdon Station, which is located south of Abbotsford, British Columbia, approximately 3 km east of the Huntingdon/Sumas border crossing. Immediately east of the Huntingdon Station is a metering facility operated by Spectra, which serves facilities of FEI and Williams Northwest Pipeline LLC, a subsidiary of the Williams Company Inc. (Williams). Williams has a major compression facility immediately across the Canada-US border.

4.1 Please advise whether or not the Williams system connection at Huntingdon has a by-pass for similar reasons or whether the FEI and Williams case are sufficiently different that similar risk profiles would not exist.

Response:

Please refer to the response to BCUC Confidential IR 1.1.1.

5. Reference: Exhibit B-1, Page 2 (CONFIDENTIAL)

> The potential risk of single point of failure of the Huntingdon Station can result from various events, including:
>
> - Failures of facility components resulting from lack of ability to perform maintenance or repairs;
> - Failures of non-visible facility piping caused by corrosion or imperfections; and
> - Potential equipment failures resulting from natural hazards.

5.1 Please advise whether or not security concerns would be included in the risk profile and how these may have been considered in analysis of risk potential.

Response:

Security concerns were implicitly considered under the Consequence Category, Physical Damage/Economic Loss, Company (Asset) Damage (refer to the Application, Confidential Appendix C1, page 12). To reduce the risk of security related incidents at the Huntingdon Station, FEI has installed high security fencing and security cameras.

6. Reference: Exhibit B-1, Page 2

> Recovery from a significant failure and complete shutdown of the Huntingdon Station would require a complex, large scale plan for shutdown, repair, and service restoration to be undertaken. To fully restore service to the customers in the Lower Mainland, Sunshine Coast and on Vancouver Island following a complete shutdown of the Huntingdon Station, FEI estimates that it would take approximately 4 months and would cost an estimated $34 million. The total economic loss from the complete service outage at the Huntingdon Station could be in the range of $1 billion, including estimated economic losses because of service disruption, shut in and relight costs, and loss of revenue. As detailed in Section 3 below, the magnitude of potential consequences from large-scale service disruption and damage from failure of the Station is the primary justification for the Project.

6.1 Please confirm that the Huntingdon Station risk has been present since the Station was built and commissioned in 1956.

Response:

Please refer to the response to BCPSO IR 1.1.5.

6.2 Please advise whether or not the FEI system has ever suffered a complete shut-down event leading to large-scale service disruption and damage and if so how often such an event has occurred.

Response:

FEI has not suffered a complete shutdown event resulting in large-scale service disruption and damage. However, for the most closely related event please refer to the response to BCUC Confidential IR 1.4.1.

6.3 Please advise what the frequency of large scale customer disruption has been in North America for the last 50 years defined on the basis of events per 100,000,000 customer-years of operation.

Response:

FEI does not have this information, nor is it aware that this sort of information is readily available.

The operating conditions, equipment and facilities differ significantly from company to company and they are not necessarily applicable from one instance to another. For FEI, the Huntingdon Station is a sole source of supply, a single point of failure facility and lacks redundancy. It is a high risk facility considering the consequence of failure and the risk to the Company and customers. The proposed bypass will significantly reduce the risk.

6.4 Please advise whether the Huntingdon Station is unique in North American gas systems by being less accessible for maintenance and inspection and or not having a by-pass.

Response:

FEI does not have this specific information. It would require considerable time and effort to obtain this information, assuming the specific information would be available to the public. Please also refer to the response to CEC IR 1.6.3.

7. Reference: Exhibit B-1, Page 7 (CONFIDENTIAL)

> 2. The Huntingdon Station is a single-point-of-failure facility. This is caused by certain critical components and sections of piping within the Huntingdon Station lack redundancy. This means that failure of one of these components or sections of piping within the Station can lead to a Station shutdown and cause the complete outage on both the CTS and the FEVI system within a short period of time. Building redundancy, such as the proposed Project, will avoid single point of failure and significantly reduce the consequence of large-scale service disruption.

7.1 Please describe the certain critical components and sections of piping that would lead to a complete shutdown in the event of failure and those that would not require a complete shutdown.

Response:

Non-redundant or single point of failure components and sections of piping are presented in the Application, Figure 3-4. Depending on nature, location and time of the failure of a critical component, repair or replacement may require shutting down the station. Repair or replacement of any redundant components and sections of piping will not require a station shut down. For a list of detailed components, please refer to the response to BCUC IR 1.1.1.

7.2 Please confirm that the Huntingdon Station bypass project will not result in a reduction in the likelihood of potential failure from the original piping, but is limited to providing mitigation in the result of failure.

Response:

Confirmed. However, the bypass provides redundancy and can be used for emergency responses. Also, following the installation of the bypass, the Company can perform complete inspection and maintenance of the non-redundant components and sections of the piping within the Station without the need of a shut down, thereby enhancing the reliability of the Huntingdon Station.

7.2.1 If not confirmed, please explain how the Bypass project will contribute to a reduction in the likelihood of failure of the original piping.

Response:

Please refer to the response to CEC IR 1.7.2.

7.3 Are there other sections in the FEVI and CTS systems that similarly lack redundancy and thus represent single-points-of-failure for large numbers of customers?

Response:

There are other sections in the FEVI and CTS systems which lack redundancy and are considered single points of failure. FEI is aware of these risks and is working on a plan to address them. Please refer to CEC IR1.7.3.1 for a list of pipe sections.

The Huntingdon Station is ranked the highest priority in terms of risk assessment and affects the greatest number of customers; therefore, FEI is proposing a bypass to provide redundancy and reduce the single point of failure risk at this facility.

7.3.1 If so, please provide a list of the areas in which a single-point-of-failure could affect large numbers of customers, and identify the numbers of customers that would be affected at each location.

Response:

The response to this question is being filed confidentially under separate cover as it contains sensitive asset security information regarding the CTS and FEVI system.

7.4 Has FEI been undertaking to provide redundancy in multiple locations over the last several years or has Huntingdon Station been the only area subject to single-point-of-failure concerns?

Response:

Where required and justified, FEI provides redundancy to stations and meter sets when the opportunity arises. This typically occurs when a station or meter set is due for replacement and is part of the annual capital program.

Please also refer to the responses to BCUC Confidential IR 1.7.2.

7.4.1.1 If Huntingdon Station has been the only single point of failure for a long period of time, why is FEI undertaking to address the issue at this time?

Response:

Please refer to the response to BCPSO IR 1.1.5.

7.5 Please provide a high level discussion of other types of risks to the CTS and FEVI systems that are not necessarily related to single-points-of-failure.

Response:

The FEI Integrity Management Program (IMP) typically follows a "hazard management" approach for risk, with various activities being implemented for hazard control and risk reduction. The identified hazards within the FEI IMP include: Third Party Damage, Natural Hazards (e.g. water crossings, soil movement, seismic), Pipe Condition (e.g. corrosion and cathodic protection monitoring), Material Defects & Equipment Failures, and Human-Related Factors (e.g. construction and operations practices).

Risk assessments consider both the likelihood and consequences of potential failure incidents. Although the Huntingdon bypass is not primarily intended to mitigate likelihood of failure due to the above hazards, it has been assessed as significantly reducing the potential consequences in the event of station failure or shut down. Please refer to further discussion in the Application, Section 3.4.2.

8. Reference: Exhibit B-1, Page 10

> The Huntingdon Station is a single point of failure because it has to be taken out of service if one of the critical, non-redundant of components or piping of the Station fails and cannot be isolated for repair or replacement. This is further explained in this section.

8.1 Please advise how frequently over the last 50 years the Huntingdon Station has been shut down intentionally in order to provide services to the facility and if any, please describe any the most significant of these.

Response:

To FEI's best knowledge, the Huntingdon Station has not been fully shut down intentionally in order to provide services to the facility in the last 50 years. Since 1988 when FEI (its predecessor) acquired the Station, temporary bypasses have been installed to complete services such as capital upgrades to single points of failure, without significant interruption of gas supply to customers.

Please also refer to the response to BCUC IR 1.1.1.2.

9. Reference: Exhibit B-1, Page 11

> Shutting down the Station even for a relatively short period of time (as further explained in Section 3.4.2.1) can cause gas supply disruption to customers on both CTS and the FEVI system. FEI's current internal design standard, the practice of other major gas utilities and good utility practice all require that a single-point-of-failure station that cannot easily be taken out service have provisions for a station bypass. The Huntingdon Station is one of those stations that cannot easily be taken out of service because it is the sole source of gas supply to the CTS and the FEVI system.

9.1 Please advise when this design standard became the practice at FEI and when it became good utility practice for other major gas utilities.

Response:

FEI assumes that the "design standard" questioned above is the requirement that a single-point-of-failure station that cannot easily be taken out of service has provisions for a station bypass.

This standard was implemented by FEI in the early 1990s. The standard was added as a requirement due to challenges in completing replacements of existing stations without a loss of customers at that time.

FEI is unaware of when this requirement became good utility practice for other major gas utilities. However, the Company is aware that it currently is good utility practice through its affiliations with the Canadian Gas Association and Western Energy Institute.

9.2 Please confirm that other major gas utilities with similar non-bypassed facilities have upgraded their systems or are in the process of considering such upgrades, if Huntingdon is not unique.

Response:

FEI does not know of other specific situations where other gas utilities with similar non-bypassed facilities are upgrading them or are in the process of considering such upgrades to these facilities.

However, the Company is aware that it currently is good utility practice to meet the requirement that a single-point-of-failure station that cannot easily be taken out of service has provisions for a station bypass through its affiliations with the Canadian Gas Association and Western Energy Institute.

9.3 Please confirm that where FEI knows that it is good utility practice to have a by-pass, and does not have a project underway to upgrade its system and if it were to have a major shut-down event that a further aspect to the risk could be litigation and its related costs.

Response:

Please refer to the responses to CEC IRs 1.9.1 and 1.9.2 with respect to FEI's knowledge regarding the good utility practice and lack of knowledge about any specific project undergoing such an upgrade.

With respect to subsequent litigation as a result of a station failure, FEI acknowledges that such risk exists, but cannot make any further comments as to the potential impact of the litigation and associated costs.

10. Reference: Exhibit B-1, Section 3, Page 11; Section 3, Page 12

> This is the situation of the Huntingdon Station. Within the Huntingdon Station, with the exception of the two independent control valve stations and the portions of mainline downstream of the in-line inspection tool launchers, all portions of the Huntingdon Station are non-redundant, as shown in confidential Figure 3-4. With so many components and sections of piping within the Station being non-redundant, there are many potential points of failure. Depending on the nature, location, and time of the failure of any of these critical components, repair or replacement may require shutting down of the Station and may take hours, days, or weeks to complete the necessary work. For instance, a number of components, such as valves, cannot be taken out of service for repair or replacement because they cannot be isolated. If a failure occurs to one of these components that precludes in-service repair, the Huntingdon Station will need to shut down. Additionally, if an unforeseen failure occurs to one of these
>
> Page 11

> ### 3.3 *A Further Reliability Concern*
>
> Lack of redundancy in critical components and sections of piping within the Huntingdon Station presents a further reliability concern as it prevents the Company from conducting a complete, fulsome inspection and maintenance of these components and of the whole Station. Although the Company can maintain, and has maintained, these components, to perform a complete inspection and maintenance will require the shutdown of the Station because these components cannot be easily isolated. For example, routine valve maintenance is performed; however, a major repair or replacement of a critical valve would not be possible without a temporary Station shutdown.
>
> Without the ability to perform complete maintenance of critical components, the reliability of the entire Station is further reduced.
>
> Page 12

10.1 Please confirm that portions of the Huntingdon plant have never been taken out of service for repair or replacement since they were commissioned because they cannot be isolated from service.

Response:

Confirmed. Some portions of the Huntingdon Station have never been taken out of service for repair since they were commissioned because they cannot be isolated from service.

10.2 Is it FEI's opinion that a Huntingdon Station failure is ultimately unavoidable without the bypass being constructed?

Response:

FEI has identified the Huntingdon Station as a high risk facility because it is a single point of failure facility and is the sole source of gas supply to the CTS and FEVI System, with the

potential of wide spread consequences in the event of a failure. See more detailed discussion in section 3.4 of the Application. If not addressed, the operational risks will continue to increase due to the age of the assets as well as the inability to fully inspect and maintain critical components and sections of piping within the Station.

10.3 What is the expected remaining life span of the Huntingdon Station?

Response:

FEI cannot quantify the remaining life span of the Huntingdon Station. FEI intends to continue to operate and maintain the Huntingdon Station into the foreseeable future. As long as preventative maintenance, corrective maintenance and necessary upgrades and replacements are performed to maintain the safety and integrity of the facility, FEI believes the Huntingdon Station will continue to meet the needs of FEI's customers it is intended to serve.

10.4 What is the current estimated cost of replacing the Huntingdon Station?

Response:

The capital investment to replace the Huntingdon Station for the current capacity is in excess of $21 million (AACE Class 5 cost estimate).

The assumptions for this high level estimate include the following conditions:

- the current land is sufficient in size to host the new facility;
- the interconnecting piping to the CTS will require minimal replacement;
- no additional connections are required from Spectra;
- there is no additional capacity increases; and
- single point-of-failure piping and components are removed through redundancy.

10.5 Please discuss how FEI will probably respond when the Huntington Station nears the end of its serviceable life with and without the bypass being constructed.

Response:

Please refer to the response to CEC IR 1.10.3.

10.6 Please confirm that by utilizing the bypass, it will be possible to complete equipment inspections, servicing and replacements that would not otherwise be possible.

Response:

Confirmed if the bypass is installed as proposed.

10.6.1 If confirmed, please discuss the ability to increase the life span of the Huntingdon Station with an estimate of how many years.

Response:

The bypass will increase the life span of the Huntingdon Station because it will allow for the necessary inspection, maintenance, upgrades and replacements of non-redundant components and sections of piping.

Please also refer to the response to CEC IR 1.10.3.

10.6.2 If not confirmed, please explain why not.

Response:

Please refer to the response to CEC IR 1.10.6.

10.7 (Stated as a percentage) what is FEI's opinion of the likelihood of a station failure today versus the plant's first year of service?

Response:

FEI cannot provide a likelihood of failure (stated as a percentage) as requested because an analysis for the plant's first year of service needs to be completed. Such an analysis would require the services of a risk analysis consultant and take a considerable amount of time (estimated at approximately 3 months) and costs (estimated at $90,000) to complete. However, in the absence of an analysis, the Company believes the probability of failure is higher now than it was in the first year of operation due to the fact that the components of the facility have aged. The risk analysis completed for the existing station (refer to the Application, Confidential Appendix C1, page 46) confirms that the risk will continue to increase with increasing age of the components and sections of piping.

10.8 (Stated as a percentage) what was FEI's opinion of the likelihood of a total station failure during the station's 1st year of operation?

Response:

Please refer to the response to CEC IR1.10.7.

11. Reference: Exhibit B-1, Page 13

- Failures of Facility Components

  The failure of the facility components can result from lack of maintenance or repair. FEI has an Integrity Management Program that is used to ensure the integrity of the gas system assets by taking a comprehensive and systematic approach to providing effective prevention, detection and remediation activities. However, as mentioned above, many components or sections of piping within the Huntingdon Station lack redundancy, which prevents FEI's ability to perform complete maintenance or repair functions.

11.1 Please confirm that the Integrity Management Program conforms to industry standards, and provide the source of the industry standards.

Response:

FEI's Integrity Management Program is fundamental to delivering on the corporate commitment of safe and reliable energy delivery to our customers, and is also a regulatory requirement. British Columbia's Pipeline and Liquefied Natural Gas Facility Regulation (B.C. Reg. 281/2010) states that permit holders must not operate without an Integrity Management Program that complies with CSA Z662 and Annex N of CSA Z662.

FEI has developed and maintained its Integrity Management Program in compliance with these requirements.

11.2 Does the Integrity Management Program or other aspects of FEI's maintenance and repair programs differentiate between areas that are classified as single points of failure or higher risk relative to other portions?

Response:

Programs and activities as described in the FEI Integrity Management Program (IMP) have been developed to ensure that adequate safety levels are maintained throughout the lifecycle of the system. The primary consideration in assessing the adequacy of Integrity Management activities is human safety.

Integrity Management activities most relevant to the Huntingdon Station include: Security, Cathodic Protection, Maintenance, Pressure Monitoring, and Odorization Management. Due to the safety focus of the IMP, none of these activities differentiates areas that are classified as single points of failure.

11.2.1 If yes, please provide an overview of the difference in maintenance and repair that is required for single-points-of-failure or other high risk areas relative to standard maintenance and repair requirements.

Response:

Please refer to the response to CEC IR 1.11.2.

11.3 What is the annual cost of the implementing the Integrity Management program for the Huntingdon Station?

Response:

The Integrity Management Program (IMP) is a collection of activities and management systems incorporated into FEI's day to day business and operations that are used to ensure the integrity of gas system assets for the entire FEI portfolio. Since the IMP is an integrated program involving FEI's entire transmission and distribution piping systems (including facilities), the Company is unable to provide costs to execute the IMP for one specific asset.

11.4 Will the construction of the Bypass result in any reduction in the Integrity Management Program in the future for Huntingdon station? Please explain why or why not.

Response:

Please refer to the responses to CEC IRs 1.11.2 and 1.11.3. The Integrity Management Program is intended to ensure the ongoing safe and reliable operation of all gas system assets. The activities and management systems that are currently carried out as part of the Integrity Management Program will still be carried out on any new or existing parts of the Huntingdon Station following construction of the bypass; therefore, there will be no reduction in the Integrity Management Program. As explained in the Application, the bypass is intended to

reduce the risk resulting from the failure of non-redundant companies within the Station and to provide reliable delivery of gas to over 600,000 customers.

11.5 If the construction of the Bypass will result in reduction of the Integrity Management Program, please provide a projection of the reduction in costs that will result.

Response:

Please refer to the response to CEC IR 1.11.3.

11.6 Has FEI been able to date to perform all necessary maintenance or repair functions or is there maintenance and repair that has been outstanding?

Response:

Please refer to the responses to BCUC IRs 1.1.1 and 1.1.1.1.

11.6.1 Please cite any examples of situations in which FEI has been unable to conduct necessary maintenance or repair functions at Huntingdon station and explain why.

Response:

Please refer to the responses to BCUC IRs 1.1.1 and 1.1.1.1.

11.6.1.1 Please provide an indication of where these incomplete maintenance and repair functions have been recorded and are accessible for review.

Response:

The maintenance and repair functions are recorded in FEI's internal database software system that is used to track the life cycle of the assets, maintenance, repairs and upgrades. Please also refer to the responses to BCUC IRs 1.1.1 and 1.1.1.1.

12. Reference: Exhibit B-1, Page 13

> A substantial amount of non-redundant piping within the Huntingdon Station is sub-surface and is not readily accessible for inspection. Corrosion, material imperfections, and weld flaws are primary threats to this asset, with corrosion creating the highest risk. Corrosion is the loss of metal thickness of the pipe wall due to iron oxide formation and the integrity of the piping gradually reduces over time, increasing the risk of piping failure.

12.1 Please advise whether or not FEI has undertaken sample uncovering of sections or components of the Huntingdon facility system to check for corrosion and flaws.

Response:

To date, excavations performed on the Huntingdon Station below-grade facility piping have been associated with site construction activities. There are critical sections of below-grade piping which have not been directly inspected.

13. Reference: Exhibit B-1, Page 14

> • Natural Hazards
>
> The Huntingdon Station is located in a flood zone and an active seismic zone. A failure resulting from a major seismic or flood event could also lead to a release of gas or a gas cloud ignition, which could consequently shut down the Huntingdon Station.

13.1 Please confirm that the flooding risk and seismic zone risk would apply to the by-pass as well as to the station facilities, such that the by-pass does not provide a complete redundancy risk protection for these natural hazards.

Response:

Please refer to the response to BCUC IR 1.3.1.

14. Reference: Exhibit B-1, Page 14

> **3.4.2 Consequences of Failure of the Huntingdon Station**
>
> The risk posed by the Huntingdon Station is primarily driven by the Consequence-of-Failure factor - the potential complete shutdown of the Station and the loss of natural gas supply to approximately 600,000 customers in the Lower Mainland and on Vancouver Island. The magnitude of service interruption and the potential business and economic loss, in the Company's view, make the risk posed by the Station unacceptable. As such, the Company is proposing the Project to mitigate the Consequence of Failure by creating system redundancy and removing the Huntingdon Station as a single point of failure.

14.1 Given the significant consequences of failure, why was the original infrastructure created without adequate redundancy?

Response:

Please refer to the response to BCPSO IR 1.1.5.

14.2 Are the consequences of failure primarily related to business and economic loss, or does it extend to safety concerns as well? Please explain.

Response:

The Consequence of Failure (CoF) is related to social, environmental, safety and financial losses. The failure of a critical component or section of piping within the Huntingdon Station can lead to the rapid loss of natural gas supply to approximately 600,000 customers for a relatively prolonged period of time. As outlined in the Application, Section 3.4.2.2, a high level, approximate breakdown of critical customer accounts affected by such an outage is as follows:

- 125 hospital and emergency facilities;
- 375 care homes; and
- 2,000 schools and public assembly facilities.

The Huntingdon Station is located in a rural area, so the immediate risk to public safety and property damage due to a gas leak and possible ignition is lower than it would be if it were situated in an urban area. The CoF is therefore driven by the potential social, economic or financial consequences to these critical customers, and other commercial and industrial

1 customers, resulting from a complete outage, as opposed to public safety risk in the surrounding
2 area.

3

15. Reference: Exhibit B-1, Page 15

> In case of a complete shutdown of the Huntingdon Station, the following additional mitigation measures may also be employed to extend system survival time:
>
> 1. Lower Mainland Industrial customer curtailment;
> 2. LNG sendout from the Tilbury LNG facility; and
> 3. Reverse flow of FEVI line pack into the CTS via the Eagle Mountain Reverse Flow Facility.
>
> However, these additional measures all have limitations. For instance, the Tilbury LNG facility is intended for peak load conditions and may be used to extend system survival time where possible, but is insufficient to sustain the CTS by itself. Additionally, all of them are short-term measures to extend CTS system survival time, and all require one to several hours to put into effect, which may not be available during a sudden outage of the Huntingdon Station. Thus, none of the measures can replace the Huntingdon Station as a supply source.

15.1 Has FEI made an analysis of how to shorten the time for implementation of the additional survival time extension efforts?

Response:

Based on operational experience, FEI does not believe it can significantly improve on the implementation time for mitigating measures without significant expenditures. FEI maintains Emergency Plans and regularly conducts emergency exercises that help guide and continuously improve efforts in implementing responses to a wide range of emergency incidents including large scale outages. Regardless, when faced with a system survival time of very short duration, each of the available mitigation measures has limitations, which are very challenging to improve upon.

Industrial customer curtailment is intended to shed load in peak winter conditions and is normally executed one to several days in advance based on communications with several hundred customers. This allows these customers the necessary time to switch to alternate fuels or safely shutdown their process. For a curtailment without advanced notice, FEI could devote increased personnel to minimize time to communicate demands to curtail customers; however, the Company cannot rely on the ability of the customer to immediately respond in the first hour or two. Experience has shown that it usually takes several hours after the call is issued for the effects of a demand to curtail to be realized.

FEI cannot rely on LNG sendout from our existing facilities on short notice year round. During winter these facilities are prepared to sendout, within approximately one hour; however, most of the rest of the year is devoted to liquefaction and refilling of the storage tanks and maintenance activities. These facilities when liquefying require 8-12 hours to swing to a sendout mode. The times are dictated by the temperature extremes involved, requiring controlled warm up of exchangers and cool down of cryogenic components.

Reverse flow from the FEVI system at the Eagle Mountain reverse flow facility can contribute 67 mmscfd, only a small fraction of the CTS demand.

15.2 Please describe why Tilbury is insufficient to sustain CTS by its self and describe how much of CTS it can sustain.

Response:

As a peak shaving LNG facility the vapourization (sendout) capability at Tilbury was designed only to supplement the CTS and gas supply requirements on the coldest few days of the year. The sendout capability to meet these requirements can therefore be small compared to the total demand on the system. This is the case with the Tilbury facility. Tilbury has a sendout capability of 150 mmcfd. This sendout capability represents less than 30% of the flow required to sustain the CTS core and industrial customers in the warmer, lower demand, periods of the year. This is also assuming the flow to the FEVI system has been isolated at the FEVI Eagle Mountain Compressor Station and BC Hydro's Burrard Thermal Generating station is not in operation.

Also as a peak shaving facility, the inventory of LNG will vary with time of the year, at its lowest point following the winter period. The facility could not be relied upon to sustain even 30% of the CTS beyond a day or two.

15.3 Please advise what the potential impact of the recently announced expansions to Tilbury LNG capability might provide in the way of survival time extension, to the extent that LNG storage capability is expanded.

Response:

The planned expansions to Tilbury LNG capabilities are intended to increase both liquefaction rates and storage capacity; however, there is no plan to increase sendout rates as a result of the expansion. The additional LNG is intended for LNG sales; therefore, no new vapourizers are currently planned to provide additional sendout capacity. As a result, the ability of Tilbury to sustain the CTS would remain as described in the response to CEC IR 1.15.2.

16. Reference: Exhibit B-1, Page 18

> The risk differential between the without-bypass scenario and with-bypass scenario represents only a snapshot in time. As the equipment within the Huntingdon Station ages, the risk differential will increase due to the Company's inability to perform complete inspection and maintenance. More specifically, as discussed in the DRAS report[6] (refer to Confidential Appendix C1, at page 46), deferring the Project will increase the overall risk to operations in five years by 275 percent, from $3,275,000 to $9,116,200 per year of operation.

16.1 This is a dramatic increase in risk over a short period of time. When did FEI become aware of the factors that would lead to this level of dramatic increase in risk in a short period of time?

Response:

FEI became aware of the dramatic increase in the quantitative value of operational risk at the Huntingdon Station when the Company received the first Dynamic Risk Assessment Systems report (dated March 30, 2011) (refer to the Application, Confidential Appendix C1). FEI was aware of the factors contributing to an increased risk, primarily corrosion; but, prior to the report, the Company was unable to quantify the risk value.

17. Reference: Exhibit B-1, Page 22

> However, there is a substantial risk by completing this activity on the non-redundant sections of the piping. If the inspection mentioned above discovers a piping defect, there are limited methods of maintaining gas supply without shutting down the entire Station. If repair or replacement is required, the Company may have to construct a temporary bypass to complete the work. Costs would be incurred to develop and execute contingency plans to build the temporary bypass.

17.1 Please describe how a temporary by-pass would be made and the costs to make such a by-pass.

Response:

Please refer to the response to BCUC IR 1.8.1.

17.2 Does FEI maintain a capability to make a temporary bypass of portions of its system should a catastrophic requirement necessitate such?

Response:

FEI maintains the capability to construct a temporary bypass of portions of its system. However, constructing and installing a temporary bypass will take time (depending on the size and length, it may take days or weeks). In contrast, the proposed permanent bypass will be fully operational for immediate response.

17.3 Please provide the cost of a temporary by-pass.

Response:

Please refer to the response to BCUC IR1.8.1.

18. Reference: Exhibit B-1, Page 24

> 8). The calculated operational risk with the internal upgrades in place would be $140,869 per year, or a reduction of 96% from the current condition (without the internal upgrades).
>
> Additionally, under this option, all of the additional piping would be located within the fenced compound of the Huntingdon Station, without the need to procure new land or acquire new Right-of-Way (ROW) from surrounding landowners.

18.1 With a 96% reduction in risk and an almost 9% reduction in costs, please confirm that FEI would consider that this option is a quite viable option.

Response:

As explained in the Application, Section 4.3, Option 3 and Option 4 were evaluated because both options satisfy the project objectives to a significant degree. However, as explained on page 24 of the Application, Option 3 has considerable constructability, operational and safety concerns. Specifically, upgrades would add new piping and valves to make an already congested and complex site more challenging in which to construct and maneuver. Moreover, increased congestion would also impact the ability to safely access and effectively keep the Huntingdon Station operational during an incident. In comparison, Option 4 is a preferred and more cost-effective alternative based on financial and non-financial factors.

18.2 Would FEI proceed with Option 3 if the Commission indicated that it would approve Option 3?

Response:

FEI cannot confirm at this time whether it would proceed with Option 3 if that was the option approved by the Commission. The Company would review again its overall objectives of providing safe reliable service to its customers along with the terms and conditions of any such Commission decision to determine the most appropriate course of action if such a decision were rendered.

18.3 Please confirm that Option 3 would not facilitate the eventual replacement of the Huntingdon Station, when and if that was required.

1

2 **Response:**

3 Confirmed. Option 3 would not facilitate a replacement of the Huntingdon Station.

4

19. Reference: Exhibit B-1, Page 27

The following table provides a summary of the financial evaluation conducted.

Table 4-1: Financial Comparison

	Option 3 – Internal Station Upgrades	Option 4 – External Bypass Pipeline
Estimate Accuracy	Class 4	Class 3[8]
Total Direct Capital Cost excl. AFUDC (2013$)	$6.3 million	$6.8 million
Gross O&M (2013$/ year)	$13 thousand	$14 thousand
Levelized Rate Impact $ / GJ – 25 Yr.	$0.004 / GJ	$0.005 / GJ
Levelized Rate Impact $ / GJ – 60 Yr.	$0.004 / GJ	$0.006 / GJ
PV Incremental Cost of Service - 25 Yr	$7.8 million	$9.6 million
PV Incremental Cost of Service – 60 Yr	$9.1 million	$12.1 million

As the differential in terms of Levelized Rate Impact between the two options is negligible, financial considerations in this instance have a less significant role when selecting a preferred option in the overall Project objective of eliminating the Huntingdon Station as a single-point-of-failure facility.

19.1 Please confirm that the PV cost difference between the alternatives is $1.8 million or a 23% cost increase for Option 4 versus Option 3, assessed over 25 years, and a $3 million difference or a 33% cost increase for Option 4 versus Option 3, assessed over 60 years.

Response:

Not confirmed.

The numbers in the table should not be compared in the manner suggested in the IR. The principle reason is that the Option 3 Internal Station Upgrade cost estimate was only done to Class 4 level of specification whereas Option 4 is a more stringent AACE Class 3 level of specification. To bring Option 3 to a Class 3 level of specification, an additional few months of work and additional prefeasibility costs would have to be incurred. Under the BCUC CPCN Guidelines, this additional work and cost is not necessary for the purposes of economic comparison.

Also, on a 25 year present value basis, when the Present Value of the Operational Risk is factored in, the difference between Option 3 and Option 4 is only $100,000 (Table 4-2).

The primary reasons for favouring Option 4 over Option 3 are as follows:

- Under Option 3 the station is still subject to the single-point-of-failure risk;
- Under Option 3 internal upgrades will leave in place existing piping and components that do not meet current seismic standards for new construction and may not be able to maintain operating pressures immediately following the occurrence of a natural hazard;
- Under Option 3 work would have to take place in an already congested and complex site which would require more complicated measures for safety during construction; and
- Option 4 provides the ability to safely access and effectively maintain the Huntingdon Station operationally during an incident (for example, fire and/or gas release).

19.2 Please confirm that in any given year approximately $5 present value represents about 1% on the FEI rates for 1 year.

Response:

Not confirmed.

Approximately $5 million (not $5) present value of the incremental Cost of Service represents about 0.8% on FEI delivery rates or approximately 0.4% to average FEI burner tip rates.

19.3 Please confirm that FEI has a number of these capital decisions to make on an ongoing basis year after year such that single project decisions will accumulate into more significant impacts, where there is a common policy to opt for more expensive options than less expensive ones despite the apparently small $/GJ numbers shown in the table.

Response:

FEI has no such policy “to opt for more expensive options than less expensive ones despite the apparently small $/GJ” impact. Rather, FEI regularly evaluates the need for capital projects to ensure that FEI can meet its obligation to maintain its system and to ensure the safe, reliable delivery of natural gas to about 900,000 gas consumers in British Columbia.

Projects larger than $5 million will be reviewed by the BCUC through a CPCN process which allows interveners the opportunity to provide input on the project and its impact on current and future customers.

It is important to note for this particular project the primary reasons for FEI's preference of Option 4 over Option 3 are summarized in Table 4-3. In addition, as discussed in the response to BCUC Confidential IR 1.6.1, the scope was revised (i.e. reduced) through the project development process to achieve a balance between cost and reduction of risk.

20. Reference: Exhibit B-1, Page 28

Table 4-2: Financial and Operational Risk Comparison

	Option 3 – Internal Station Upgrades	Option 4 – External Bypass Pipeline
Operational Risk Reduction (%)	96	99
Operational Risk (2013$ / year)	$141 thousand	$31 thousand
PV Operational Risk – 25 Yr	$2.1 million	$0.4 million
PV Incremental Cost of Service – 25 Yr	$7.8 million	$9.6 million
PV Operational Risk + PV Incremental Cost of Service – 25 Yr	$9.9 million	$10.0 million

20.1 Please discuss the FEI capability to assess risk to two digits of significance.

Response:

FEI consulted with Dynamic Risk Assessment Systems (DRAS), a multidiscipline consulting company specializing in risk and engineering assessments, to develop the risk assessment. The values in the Application, Table 4-2 were obtained from DRAS reports and a detailed breakdown of the estimates can be found in BCUC IR 1.9.4.

20.2 Please prepare the above table with 60 year evaluation.

Response:

Please refer to the table below.

	Option 3 - Internal Station Upgrade	Option 4 - External Bypass Pipeline
Operational Risk Reduction (%)	96%	99%
Operational Risk (2013$ / year)	$141 thousand	$31 thousand

	Option 3 - Internal Station Upgrade	**Option 4 - External Bypass Pipeline**
PV Operational Risk - 60 Yr	$3.0 million	$0.6 million
PV Incremental Cost of Service - 60 Yr	$9.1 million	$12.1 million
PV Operational Risk + PV Incremental Cost of Service - 60 Yr	$ 12.1 million	$12.7 million

1
2

21. Reference: Exhibit B-1, Section, Page 1, Section 5, Page 32

> **1.1 *EXECUTIVE SUMMARY***
>
> FortisBC Energy Inc. (the Company or FEI), pursuant to sections 45 and 46 of the *Utilities Commission Act* (the Act), applies (the Application) to the British Columbia Utilities Commission (the BCUC or the Commission) for a Certificate of Public Convenience and Necessity (CPCN) to construct and operate a bypass pipeline immediately around FEI's Huntingdon Flow and Pressure Control Station (the Huntington Station or the Station). The bypass as proposed will significantly reduce the risk of gas supply disruption to approximately 600,000 customers residing in the Lower Mainland and in Whistler, Squamish, the Sunshine Coast, and Vancouver Island in the event of a failure of the Huntingdon Station.
>
> Page 1

> **5.2.2 Pressure Control Valve and Isolation Valves**
>
> On the east or upstream (inlet) end of the bypass, FEI will install two isolation valves to direct gas flow from the main Spectra facility to the CTS through the existing station or through the bypass. Spectra operates their pipelines at a higher pressure than the FEI maximum operating pressure; therefore, a pressure control valve and a monitor valve for over pressure protection will be installed on the bypass line to regulate pressure to the CTS maximum operating pressure.
>
> An odorant injection tap will also be installed on the bypass to facilitate the addition of odorant to the gas.
>
> On the west or downstream (outlet) end of the bypass, FEI will install two isolation valves to direct flow of gas from the bypass into the existing NPS 30 and 42 pipelines.
>
> Page 32

21.1 Please describe, if any, the technology improvements that will be installed, as compared to technology currently utilized in the Huntingdon Station.

Response:

There will be no technology improvements at the Huntingdon Station. There is currently remote operation capability at the Huntingdon Station to control flow between stations. The new bypass will use the same technology to implement the ability for remote operation of the bypass.

Please also refer to the response to BCUC Confidential IR 1.8.5.

21.2 Please describe, if any, the functional differences there will be between the Huntingdon Bypass Station and the proposed bypass system.

Response:

There will be no functional differences between the Huntingdon Station and the proposed bypass system. The design capacity of the bypass is 1635 mmscfd. Please also refer to the response to BCUC IR 1.20.3.

21.2.1 If there are functional differences, please confirm that gas flows and controls will remain unchanged when the bypass is utilized.

Response:

Please refer to the response to CEC IR 1.21.2.

21.3 If not confirmed, please describe how these differences will, or might, affect FEI's customer service.

Response:

Please refer to the response to CEC IR 1.21.2.

21.3.1 If new technology is to be installed, please discuss their benefits, reasons for selecting and how FEI established the new technology is dependable.

Response:

Please refer to the response to CEC IR 1.21.1.

21.3.2 If there will be no new technology utilized, please explain why not.

Response:

No new technology will be utilized as the design does not necessitate the need for new technology and FEI's preference is to use standardized, established designs.

22. Reference: Exhibit B-1, Section 5, Page 31; Section 5; Appendix F-1, Schedule 7

> **5.1 *INTRODUCTION***
>
> The Project involves constructing 182m of NPS 36 pipeline connecting an existing Spectra pipeline (entering the Huntingdon Station from the east) to the existing transmission pipelines located west of the Huntingdon Station beneath an agricultural field. All construction will occur within a 100m radius of the Huntingdon Station, in the City of Abbotsford. The bypass will have a capacity of 1,635 mmcfd. The figure below illustrates the Project.

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Huntingdon Station Bypass Project: Gross Plant in Service & Contributions in Aid of Construction
Appendix F-1 - Schedule 7
($000's), unless otherwise stated

Line	Particulars	Reference	2016
1	Gross Plant in Service		
2			
3	Gross Plant in Service, Beginning		
4	Structures & Improvements	Preceeding Year, Line 76	-
5	Pipeline - Transmission	Preceeding Year, Line 77	-
6	Land Rights	Preceeding Year, Line 78	-
7	Measuring & Regulating Equipment	Preceeding Year, Line 79	-
8	Telemetry	Preceeding Year, Line 80	-
24	Capitalized Overhead	Preceeding Year, Line 96	-
25	Total Gross Plant in Service, Beginning	Sum of Lines 4 through 24	-
26			
27	Gross Plant in Service, Additions		
28	Structures & Improvements	Schedule 6, Lines 2 + 25 + 48 + 71	15
29	Pipeline - Transmission	Schedule 6, Lines 3 + 26 + 49 + 72	5,169
30	Land Rights	Schedule 6, Lines 4 + 27 + 50 + 73	260
31	Measuring & Regulating Equipment	Schedule 6, Lines 5 + 28 + 51 + 74	2,423
32	Telemetry	Schedule 6, Lines 6 + 29 + 52 + 75	110
48	Capitalized Overhead	Schedule 2, Line 17	2
49	Total Gross Plant in Service, Additions	Sum of Lines 28 through 48	7,979
50			

Schedule 7

22.1 Please provide an overview that identifies the major components and factors that together cause the estimated construction cost for only 182 meters of 36 inch pipeline to be $5.169 million.

Response:

The major components and factors that cause the estimated construction cost for "Pipeline – Transmission" to be $5.169 million are presented in Appendix F3 and include pipeline construction, material costs including the isolation valves and a prorated cost for the project prefeasibility, project management, engineering, permits, consultation, land rights and temporary workspace, operations and commissioning, contingency, and AFUDC.

23. Reference: Exhibit B-1, Section 5, Page 31; Section 5, Page 32

> **5.2 *PROJECT COMPONENTS***
>
> The Project is comprised of the following two major components:
>
> 1. Construction of a new NPS 36 TP pipeline by conventional construction methods to tie into the existing Spectra pipeline adjacent to the Huntingdon Station on the upstream side and into the existing FEI NPS 30 and NPS 42 pipelines on the downstream side; and
>
> Page 31
>
> 2. Installation of inline pressure control and monitor valves and four isolation valves on the bypass to reduce the pressure from Spectra's maximum operating pressure to the FEI maximum operating pressure.
>
> An odorant injection tap will also be installed on the bypass to facilitate the addition of odorant to the gas.
>
> Page 32

23.1 Please confirm that the NPS 36 TP pipeline, inline pressure control and monitor valves, four isolation values and an odorant injection tap is the complete list of all the equipment to be installed and that no equipment upgrades will be made within the Huntingdon Station.

Response:

As proposed, the NPS 36 TP pipeline, inline pressure control and monitor valves, four isolation values and an odorant injection tap is the complete list of all the major equipment to be installed. In addition, there will be instrumentation, control, and telemetry installed as part of this project. Some of this will make use of existing infrastructure within the Huntingdon Station. No upgrades to existing equipment will be made within the Huntingdon Station as proposed.

Please refer also to the response to BCUC Confidential IR 1.8.5.

24. Reference: Exhibit B-1, Section 5, Page 35

> **5.5.2 Design and Quality Control**
>
> External engineering companies will be engaged for the design of all portions of the Project including the tie-ins. Any specialized services required for environmental management, geotechnical investigation and analysis, and construction inspection will be contracted to individuals and companies possessing the demonstrated skills and experience to complete the work. These individuals and companies will be expected to ensure that public and worker safety, quality workmanship and environmental compliance are maintained throughout the Project.
>
> FEI operating personnel will ensure all facilities are efficiently placed into operation upon completion of construction and conform to FEI standards and industry practices.
>
> **5.5.3 Construction Services**
>
> Potential prime construction contractors will be pre-qualified prior to the release of the tender documents. The construction will be subject to a competitive tender for a lump sum form of contract and the bid that provides the best value will be selected by FEI at the close of the procurement process.

24.1 Please provide an overview of the processes and procedures FEI will utilize during the construction phase of the project to insure all design changes and construction specification changes identified as desirable during this stage of the project are adequately reviewed, financially justified, and do not expand the project's scope.

Response:

FEI will utilize established Company practices to ensure only necessary and appropriate design and construction specification changes are approved by the project manager in consultation with the engineer of record on technical matters. FEI standard contract terms require that changes be approved in writing prior to the start of work, and engineering inspection will be on site during construction to ensure drawings and specifications are adhered to and to approve changes if necessary.

25. Reference: Exhibit B-1, Section 5, Page 37, Appendix E

Table 5-2: Project Execution – Risk Control Summary[9]

Key Risk	Probability	Consequence	Mitigation
Market Conditions (High Bids)	3	4	Communication with known contractors to ensure sufficient bidders are interested and available
Contaminated groundwater	2	5	Water sampling prior to bidding process
Late delivery of electrostop fittings	3	3	early order of material - have specification ready for immediate purchase on project approval or consider placing order prior to project approval
Late delivery of pipe	2	4	
Large amount of groundwater	2	4	water sampling, known issue addressed in contract

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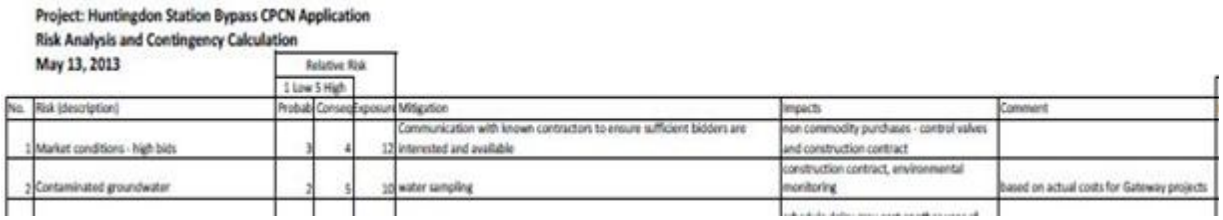

Project: Huntingdon Station Bypass CPCN Application
Risk Analysis and Contingency Calculation
May 13, 2013

No.	Risk (description)	Relative Risk (1 Low 5 High) Probab	Conseq	Exposure	Mitigation	Impacts	Comment
1	Market conditions - high bids	3	4	12	Communication with known contractors to ensure sufficient bidders are interested and available	non commodity purchases - control valves and construction contract	
2	Contaminated groundwater	2	5	10	water sampling	construction contract, environmental monitoring	based on actual costs for Gateway projects

Portion of Appendix E

25.1 Please confirm that the only activity required to mitigate the risk of Contaminated groundwater is "water sampling prior to the bidding process", i.e. no mitigation activities will be required after the bidding process is complete and during the project's construction phase.

Response:

Water sampling prior to the bidding process is the only mitigation identified during the risk analysis workshop. The results of the water sampling may lead to further mitigation by informing the contracting strategy and potentially altering the design.

25.2 Please describe the type of work related to contaminated groundwater that could be reflected in bids.

Response:

The general contractor is generally responsible for dewatering the excavations and managing any contaminated groundwater that may be encountered, either by treating the groundwater such that it is suitable for on-site disposal or by trucking the water off site to an authorized disposal facility.

25.3 Given that Contaminated Groundwater as a risk has been rated "2", i.e.- relatively low, as a probability but the possible consequence of this risk has been rated "5", i.e.-high, does the estimated project cost (without the contingency provision) provide any money to address this risk or is the contingency provision the only place this risk is provided for?

Response:

As the presence of contaminated water on site is not a certainty, the contingency is the only provision for this risk.

26. Reference: Exhibit B-1, Section 5, Page 34

Table 5-1: Schedule Milestones

Activity	Duration
Concept Development	Completed.
CPCN Preparation	October 2012 – October 2013
CPCN Filing	October 2013
CPCN Review and Approval	October 2013 – March 2014
Finalize Detailed Engineering	November 2013 – February 2014
OGC Pipeline Application	January 2014 – June 2014
Tendering (Materials)	March 2014 – March 2015
Tendering (Pipeline & stations)	December 2014 – May 2015
Construction	May – September 2015
In Service	October 2015
Project ROW and Station Site Clean up	September - November 2015

26.1 Will FEI be providing the BCUC with an updated project cost estimate in February 2014, i.e.-prior to receiving approval for this CPCN application, based on the Finalized Detailed Engineering?

Response:

In the event that there is a material change to the cost estimate (as compared to the current control budget) as the Project proceeds, FEI will notify and provide updated information to the Commission.

27. Reference: Exhibit B-1, Section 6, Page 38

> Cost estimates are based on the most recent studies and information currently available to FEI and an in-service date of October 2015. The estimate excludes GST but includes 7 percent PST on materials. FEI, as a GST registrant, is entitled to recover the GST it pays on its taxable purchases. As such, the tax does not represent a net cost to the Company. 2012 market prices have been used for the material supply and construction contracts. An escalation rate of 4.5 percent per annum is used based on the ten year average escalation rates from Statistics Canada for industrial construction and line pipe from 2002 to 2012. The cost estimates exclude First Nations Capacity Funding and Accommodation Costs as no such costs are anticipated at this time.

27.1 Please provide escalation rates by year including the YTD date rate for 2013 if available.

Response:

The escalation rate used is a constant 4.5% for all years.

28. Reference: Exhibit B-1, Section 6, Page 39

> **6.3 *ACCOUNTING TREATMENT***
>
> The capital costs of $8.0 million (including AFUDC), as shown on line 13 in Confidential Appendix F3 of this Application, will be held in work-in-progress until the beginning of the year after the asset is available for use. The Project is forecasted to be in service in October, 2015 and will be closed to gas plant in service on January 1, 2016. Depreciation and negative salvage provisions will commence on January 1, 2016. This treatment conforms to the treatment proposed in FEI's 2014-2018 PBR Application.

28.1 Please describe the types of funds included in the Allowance for Funds used during construction, AFUDC.

Response:

The types of funds included in AFUDC are Long-term debt, Unfunded Debt and Common Equity.

Please also refer to the response to BCPSO IR 1.5.1.

28.2 Is the mix of ADUDC funds charged to this project consistent with the mix of AFUDC funds charged to all other FEI projects?

Response:

Confirmed. The mix of AFUDC funds charged to this project is consistent with the mix of AFUDC funds charged to all other FEI projects.

29. Reference: Exhibit B-1, Section 7, Page 43; Section 7, Page 44

> 7.3 SOCIO-ECONOMIC ASSESSMENT
>
> The economic impact of the Project to the regional area where the Project is to be constructed is expected to be limited. The construction contract and the major materials will likely be procured from out-of-province sources since these resources are not readily available in B.C.
>
> Page 43

> Most of the professional services, such as geotechnical engineering and environmental assessments have been or will be provided by personnel based in B.C., with some provided by personnel in the local area.
>
> Expenditures by the small work force will be of some benefit to local businesses. The Project
>
> Page 44

29.1 Please provide an estimate of the total amount of dollars British Columbia businesses will earn either directly from the project or indirectly from workers temporally employed by the project.

Response:

This response is being filed confidentially under separate cover as it contains details of cost information that must be kept confidential at this time in order to preserve FEI's ability to negotiate.

30. Reference: Exhibit B-1, Appendix E

30.1 Please explain how the Probability was determined for each of the Relative Risks, on the 1-5 Risk Exposure scale.

Response:

The probability was estimated using the consensus of the attendees of the risk analysis workshop. Please refer to the response to BCUC IR 1.23.1.

30.2 Please explain how the Consequence was determined for each of the Relative Risks, on the 1-5 Risk Exposure scale.

Response:

The consequence was estimated using the consensus of the attendees of the risk analysis workshop. Please refer to the response to BCUC IR 1.23.1.

30.3 Please explain how the Relative Risk figures relate to the Expected Value figures.

Response:

In order to calculate the expected value of a particular risk, the initial probability estimated by the attendees of the risk analysis on a scale of 1 to 5 was converted to a percentage according to the following table:

Probability	
Relative Risk	**Expected Value**
1	10%
2	20%
3	40%
4	60%
5	80%

For an explanation of the relationship between relative risk consequence and expected value consequence please refer to the response to BCUC IR 1.23.13.

30.4 Please explain how the Probability was determined for the Expected Value figures, and provide an explanation as to how that relates to the Probability assigned in the Relative Risk – Exposure section.

Response:

Please refer to the response to CEC IR 1.30.3.

30.5 Please explain how the Consequence values were established.

Response:

Please refer to the response to BCUC IR 1.23.13.

30.6 Please provide a range of certainty with respect to the Consequence values.

Response:

In accordance with the AACE Recommended Practice No. 44R-08, the consequences have been estimated at a Class 5 level. This is a preliminary estimate with an uncertain expected accuracy range likely in the +50%/-30% range.

31. Reference: Exhibit B-1, Appendix F-1

Huntingdon Station Bypass Project: O&M, Other Revenue and Property Tax
Appendix F-1 - Schedule 1
($000's), unless otherwise stated

Line	Particulars	Reference	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
1	Gross O&M														
2	Distribution Total		-	-	-	-	-	-	-	-	-	-	-	-	-
3															
4	Transmission Total		15	15	16	16	16	17	17	17	18	18	18	19	19
5	Storage Total		-	-	-	-	-	-	-	-	-	-	-	-	-
6	Measurement		-	-	-	-	-	-	-	-	-	-	-	-	-
7	General Operations Total		-	-	-	-	-	-	-	-	-	-	-	-	-
8	Marketing Total		-	-	-	-	-	-	-	-	-	-	-	-	-
9	Customer Care Total		-	-	-	-	-	-	-	-	-	-	-	-	-
10	Business & IT Services Total		-	-	-	-	-	-	-	-	-	-	-	-	-
11	Administration & General Total		-	-	-	-	-	-	-	-	-	-	-	-	-
12															
13			15	15	16	16	16	17	17	17	18	18	18	19	19

31.1 Please explain how the O&M costs for transmission were calculated and provide figures where available.

Response:

Please refer to the response to BCUC IR 1.9.2 for the details on the calculations for the O&M costs. The O&M costs from the base year (2013) are escalated at a rate of 2%.

31.2 What is the average O&M cost per meter of transmission pipeline in the CTS and FEVI systems?

Response:

The Transmission O&M per kilometer for FEVI was filed as an attachment on December 12, 2013 in response to BCUC IR 1.10.8 regarding FEVI's 2014 Revenue Requirement Application. The 2012 actual cost per km was $5,462.

For FEI, Transmission O&M is a system total for both Coastal Transmission System and Interior Transmission System. The total 2012 actual Transmission O&M per km was $5,254.

Please note that compression costs are included in calculating the Transmission O&M per kilometer for both FEI and FEVI.

31.3 How can FEI or interveners determine the appropriateness of the O&M costs for this project?

Response:

O&M cost estimates are based on historical requirements for pipeline and station operating and maintenance. These are based on manufacturers' recommended practices for each component and equipment and on FEI's asset management program which is based on best practices for pipelines, right-of-way, station and equipment operations and maintenance.