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November 10, 2021

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

Attention: Mr. Peter Helland, Director

Dear Mr. Helland:

Re: FortisBC Energy Inc. (FEI)

Application for a Certificate of Public Convenience and Necessity (CPCN) for the Tilbury Liquefied Natural Gas (LNG) Storage Expansion (TLSE) Project (Application)

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

On December 29, 2021, FEI filed the Application referenced above. In accordance with the regulatory timetable established in British Columbia Utilities Commission Order G-185-21 for the review of the Application, FEI respectfully submits the attached response to RCIA IR No. 2.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

cc (email only): Commission Secretary
Registered Parties

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A. Project Need and Justification

30. Reference: Exhibit B-22, FEI Response to RCIA IR1, IR 2.1

In the response to RCIA IR1 2.1, FEI states: "One possible scenario in a system experiencing a hydraulic collapse, is that the pressure experienced by customers in the affected areas may drop low enough such that the customers' appliances fail to operate. The pressure may then recover somewhat (since some consumer appliances have shut down), resulting in repeated pressure increase/decrease cycles as appliances attempt to recover. In a hydraulic collapse, FEI anticipates that such situations would be occurring at multiple locations and would be widely distributed through the system."

30.1 Does FEI have experience responding to safety incidents or emergencies where the customer appliance safeguards failed? If so, please provide any available data that indicates the frequency or severity of these incidents.

Response:

FEI typically responds when an appliance safeguards might fail, as an incident of this kind could result in a gas odour call. With the implementation of a new workforce management system in October 2020, FEI has been able to extract data queries regarding customer premises that list failed safeguards as a specific finding. In the year since the system began operation, FEI has logged the following calls that could have resulted in gas entering customer premises after pressurizing the system had FEI not isolated the customer premises at the meter:

- 29 calls where an issue was identified as "No pilot safety/control";
- 61 calls where an issue was identified as "Defective control valve"; and
- 283 calls identified as "Gas leak at appliance".

The occurrence of incidents resulting in personal injury or significant property damage are very rare and FEI's data does not necessarily document the severity of these incidents. However, each of the listed incidents resulted in gas to the appliance being shut off and the occupant issued a "Red Tag", indicating the appliance needs maintenance and the customer must arrange repair before operating the appliance. Notice is also given to Technical Safety BC when appliances are red tagged.

FEI is not called in all cases where an appliance safeguard is found faulty. Appliances, including the appliance safeguards, are customer-owned devices. The customer may elect to engage a licensed gas fitter directly to address maintenance. As a result, FEI does not possess a complete record of appliance safeguard failures.

31. Reference: Exhibit B-22, FEI Response to RCIA IR1, IR 4.2

In RCIA IR1 4.2, RCIA states: “Explain why Guidehouse considers impact to be of greater importance than probability when considering the risks facing a gas utility such as FEI.”

Guidehouse responds: “The possibility of an event is an important consideration. Moreover, Guidehouse observes that the critical factors to consider include defining the risk, both in terms of the probability of the risk and the consequences. Guidehouse observes that probability of an occurrence often clouds decision-making relative to consequence mitigation.”

RCIA observes that the response to IR1 4.2 does not clarify why Guidehouse considers impact to be of greater importance than probability when considering the risks facing FEI, as requested in the IR.

31.1 Explain why Guidehouse considers impact to be of greater importance than probability when considering the risks facing a gas utility such as FEI.

<u>Response:</u>

The following response has been provided by Guidehouse:

Relative to probability, consequence is of greater importance in the case of a material disruption to the T-South pipeline specifically because of the determined unacceptable outcome that results. The consequence of a supply disruption on the T-South Pipeline during a period of heavy usage, such as during the peak winter season, is well established. The consequences of the supply disruption risk factor make up an unacceptable set of outcomes and therefore must be avoided or mitigated. Therefore, consequence is of greater importance in FEI’s case than probability, due to the unacceptable outcome that results.

When mitigating intolerable or unacceptable consequences, including the supply disruption of the T-South Pipeline as is the case of the TSLE proposed project, decision-making is binary: Either FEI will be adequately prepared in the event of a supply disruption to mitigate the disruption, or it will not.

If the impact is not mitigated, FEI and its customers will suffer the consequences that occur after a significant supply disruption.

31.2 Explain what Guidehouse means by “probability of an occurrence often clouds decision-making relative to consequence mitigation.” Does this mean that decision makers place too much emphasis on probability or too little emphasis? Why does Guidehouse have this view?

Response:

The following response has been provided by Guidehouse:

Risk-based decision-making is applied in many different circumstances and not always within the context of catastrophic and/or intolerable circumstances where severity can be a more important consideration than probability of occurrence. When considering intolerable consequences in risk analysis, such as the case of hydraulic collapse of the FEI system, probability can cloud decision-making. In the case of supply disruption of the T-South Pipeline and its related consequence to FEI and FEI's customers, the focus on probability of occurrence is a distraction from the key question which is: "How can FEI best prepare to mitigate the consequence of a supply disruption during a period of heavy usage?"

Decision makers often place too much emphasis on probability when addressing low probability but high consequence events. Low probability and high consequence events continue to be high risk events regardless of their probability. High risk must be mitigated in alignment with what a utility can tolerate. Guidehouse considers that a resilience investment is akin to purchasing insurance.

As reviewed by Zuppinger and the Project Management Institute (PMI) in 2012; based on the influential work of Taleb 2004, Fooled by Randomness[1], it is assessed that improbable events should not be overlooked in risk analysis. Black swan events, although improbable, are not impossible and if the consequence is too severe to be tolerated, the risk must be managed effectively so that they do not take us by surprise. Probability is important, but can be misleading in risk assessment by creating biases that convince of the unlikeliness without understanding the real severity of the risk in question.

In the insurance context, the probability of an event occurring illustrates why probabilities can cloud consequence-based decision making. The probability of getting into or causing an automobile accident is low; however, the consequences are often high. We do not purchase insurance based on a probability adjusted basis. We purchase insurance based on whether or not we can tolerate the consequences of the event.

If the determination is made that the likely outcome of a significant supply disruption on T-South is intolerable (which FEI has concluded it is), risk management principles would suggest cost effective steps be taken to protect against occurrence of those consequences.

[1] Assessing Risk is it a Black Swan, 2012. https://www.pmi.org/learning/library/assessing-risk-black-swan-fukushima-6084.

32. Reference: Exhibit B-22, FEI Response to RCIA IR1, IR 8

In the response to RCIA IR1 8.3, FEI states: "In FEI's experience, when a system pressure collapse occurs, air enters the collapsed system through various pathways."

32.1 Provide details of FEI's specific experience with system pressure collapses, such as when, where, the geographic extent, and number of customers affected.

Response:

Please refer to the response to BCUC Confidential IR1 15.3 for information related to the Fort Nelson gas emergency and the response to BCUC Confidential IR1 1.3 for information related to the Parksville gas emergency.

32.2 Explain how FEI verified that air was entrained in the system while the system was at zero pressure. In particular, explain how FEI verified that air was entrained through fitting and pipeline leaks (as opposed to obvious locations such as damaged pipe and facilities).

Response:

The two pressure-collapse examples, referenced in RCIA IR2 32.1, were a result of valve failures and lasted approximately one day. Because of the short duration of these incidents, FEI did not confirm whether air entered the collapsed system in significant volumes.

Even so, FEI's experience has confirmed a significant amount of air can enter a pressure-collapsed system if given enough time. This experience is based on customer houselines that have been disconnected from FEI's system for days or weeks. In these situations, when FEI returns to reconnect the customer and relight their appliance(s), FEI often finds a significant amount of air in the houseline. The large volume of air is confirmed by the amount of purging at the appliance undertaken before the appliance is able to be relit and operate properly. Because these houselines are closed systems, the air could only have entered through a leaking connection or an appliance that is weeping gas through a slightly open gas safety valve, which is effectively a leak.

In the large-scale system pressure collapse contemplated as part of this application, it would take weeks before FEI could manually disconnect all the affected customers. During this time, the air that would enter customer houselines would be able to move into FEI's pressure collapsed system. Also, above ground leaks on FEI's system would be another entryway for air to enter the pressure collapsed system.

After a long duration pressure collapse, as contemplated in the TLSE application, FEI would always assume air has entered the system through customer houselines, fittings, leaks, or third-party damage. In this situation, FEI would isolate all affected customers from the collapsed system, pressurize the system with natural gas, leak survey the newly pressurized system, repair any leaks, purge the system with nitrogen if required, purge every service to ensure all potential air is removed from the system, and then conduct customer relights, which would take months to complete.

32.3 Explain the steps FEI took in these examples to purge the system of air and whether these steps are any different from the approach described in the Application and Workshop.

Response:

During the pressure collapse examples provided in RCIA IR2 32.1, FEI followed its re-pressurization operating procedure which consists of:

- Isolating all affected customers from the collapsed system;
- Re-pressurizing the system with natural gas;
- Purging at the meter set; and
- Relighting customer appliances.

The only difference between these steps and what is stated in the Application and Workshop involves undertaking leak survey activity and subsequent system repairs. Because the pressure collapse examples provided in RCIA IR2 32.1 were short durations and FEI had field personnel working throughout the area affected by the pressure collapse, FEI determined there was no risk of third-party damage to the collapsed system; consequently, FEI did not perform a leak survey.

The steps taken to reconnect an individual customer, after they have been disconnected from FEI's system, follow FEI's standard operating procedure listed above:

- Re-pressurizing the customer houseline with natural gas by opening the meter set valve;
- Purging the houseline of air at the appliance(s); and
- Relighting the customer's appliance(s).

As discussed in the response to RCIA IR2 32.2, when a customer's houseline has been disconnected from FEI's system for days or weeks, FEI often finds a relatively large volume of air in these houselines. Because the houseline is a closed system, air can only have entered through a leaking connection or an appliance that is weeping gas through a slightly open gas safety valve, which is effectively a leak.

33. Reference: Exhibit B-22, FEI Response to RCIA IR1, IR 13

In the response to RCIA IR1 13.1, FEI states: "During the October 2018 no-flow event, of the approximately 230 large customers (both firm and interruptible) that FEI contacted individually to curtail their consumption, approximately 50 customers were either firm or held an amount of firm capacity."

33.1 Did all 230 customers curtail their consumption as requested by FEI? If not, how many continued to consume gas, or continued for an extended period prior to curtailing their consumption?

Response:

FEI performed a high-level regional review of the change in daily consumption of the curtailed customers and observed compliance from the majority of the customers who were requested to curtail their usage following the 2018 T-South Incident.

34. Reference: Exhibit B-15, FEI Response to BCUC IR1, IR 1.5, 3.4, 65.1

In BCUC IR1 3.4, the BCUC requests: "Please discuss whether FEI considers it is possible to undertake a probability estimate of the occurrence of a disruption event occurring on a pipeline, based upon the frequency events outlined in the tables in Appendix B, the total length of pipelines in the regions reviewed, and the length of time.

3.4.1 Please discuss any limitations of this approach."

In response, FEI states: "The following explanation was provided by PwC, with which FEI agrees.

'Natural gas disruption represents "black swan" events that are of an unforeseen, binary nature that either happen or they don't. For this reason a probabilistic or risk adjusted approach is not applicable and system resiliency investment decisions should be considered on the basis of total potential impact that may occur in the event of disruption. While likelihood was considered at the highest level (i.e., disruption events do happen periodically), we did not undertake an assessment of this type. The intent was that the study would assess the potential impact of natural gas disruption and provide the province and the energy industry with data to help weigh the costs and benefits of different infrastructure investments to enhance system resiliency in the province.'

FEI also provides the following response:

Please refer to the response to BCUC IR1 1.5 where FEI has provided the cumulative probability of a disruption event based on Canadian and US industry pipeline performance data."

In the response to BCUC IR1 1.5, FEI states: "However, FEI retained JANA Corporation (JANA) to conduct an independent, expert probabilistic analysis of a pipeline incident occurring on the Westcoast T-South system."

34.1 Reconcile PwC's position in BCUC IR1 3.4, which FEI agrees with, which is that a probabilistic or risk adjusted approach is not applicable, with FEI contracting JANA to conduct a probabilistic analysis of the rupture of T-South.

<u>Response:</u>

Please refer to the responses to BCUC IR2 68.11 and BCOAPO IR2 2.1.

The following response has been provided by PwC:

PwC was not retained to review the referenced JANA analysis so can not comment on this reconciliation.

For additional clarity, PwC's study was not constrained by the type of disruption (cause) or specific assets disrupted.

34.2 Explain why FEI arranged for JANA to conduct the probabilistic analysis in response to information requests and not in advance of filing the CPCN Application.

Response:

Please refer to the response to BCOAPO IR2 2.1.

In the response to RCIA IR1 4.2, Guidehouse states: "The possibility of an event is an important consideration. Moreover, Guidehouse observes that the critical factors to consider include defining the risk, both in terms of the probability of the risk and the consequences."

In the response to BCUC IR1 9.3, Guidehouse states: "It is not only the probability of a major system disruption that defines the level of risk, but also the significance, or impact of the event. In the example of FEI, it is the case that a major system disruption of its upstream supply delivery will severely impact the achievement of its objectives, which are FEI's ability to serve its customers.

Our key finding that "FEI has fittingly applied the appropriate risk management approach" is based on our evaluation of the analysis that FEI performed to understand the magnitude of impact to its ability to deliver gas in the event of a major system disruption during a period of peak demand."

34.3 Explain why Guidehouse's finding that FEI fittingly applied the appropriate risk management approach is based on FEI's assessment of the impact, but not the probability, of a disruption.

34.3.1 If Guidehouse's finding that FEI fittingly applied the appropriate risk management approach is based on an assessment of probability as well as impact, explain how Guidehouse arrived at this finding in advance of FEI obtaining JANA's report on the probability of a T-South rupture.

Response:

The following response has been provided by Guidehouse:

Where consequences are intolerable and impactful for FEI and its customers, such as the case of supply disruption of the T-South Pipeline, effective risk management is comprised of developing responses and controls to prepare for, withstand and recover from the risk of a significant event that, left unmitigated, would lead to adverse consequences.

Guidehouse observes that generally accepted definitions of risk include:

- The impact of uncertainty on objectives (ISO 31000)[2]; and
- The possibility that an event will occur and adversely affect the achievement of objectives (COSO ERM).[3]

Furthermore, Guidehouse observes that generally accepted definitions of risk management include "A process … [to] manage risk to be within [the entity's] risk appetite, to provide reasonable assurance regarding the achievement of entity objectives." (COSO ERM)[4], i.e., risk management efficiency is achieved by managing risk to the tolerable level, cost-effectively. It should be noted that the least cost option may not be the most cost-effective option when considering all outcomes of an investment.

FEI has relied on the appropriate approach to understand the consequences of the risk, in this case a major supply disruption, e.g., understanding the "the impact of uncertainly on objectives" and evaluated all possible mitigants that could provide "reasonable assurance regarding the achievement" of FEI's objectives. We arrived at the conclusion by developing a risk mitigation evaluation framework situation and then assessed how FEI's approach followed the framework.

We arrived at this conclusion in advance of JANA's report because the probability of occurrence is not the critical or determining factor in assessing the effectiveness of the risk management decision, given that the consequences are deemed intolerable.

The critical factor is whether or not the entity's risk management approach effectively mitigates unacceptable consequences of the known risk event.

2 https://www.iso.org/iso-31000-risk-management.html.
3 https://www.coso.org/Pages/erm.aspx.
4 https://www.coso.org/Documents/COSO-ERM-Executive-Summary.pdf.

35. Reference: Exhibit B-15, FEI Response to BCUC IR1, IR 10.6; Exhibit B-24, FEI Response to Sentinel IR1, IR 30a

In the response to BCUC IR1 10.6, FEI states: "FEI is completing the initial scoping and planning for a Regional Gas Supply Diversity (RGSD) solution which would entail building a new pipeline route to the Lower Mainland connecting to the Southern Crossing Pipeline (SCP) in the BC Interior (i.e., Diverse Pipelines). The design of the RGSD project would be optimally sized to form a cost-effective resiliency solution in combination with FEI's other gas supply assets."

In the response to Sentinel IR1 30a, FEI states: "FEI anticipates that the earliest filing date for a CPCN application would be sometime in 2023."

35.1 What is FEI's timeline, or range of potential timelines, for completing construction of a SCP expansion pipeline to the Lower Mainland?

Response:

Based on FEI's preliminary evaluation, it is anticipated that the earliest completion of construction for the SCP expansion could be the end of 2028; however, a number of factors could extend this timeline. These factors will only become apparent once Indigenous and stakeholder engagement, detailed technical analysis, and environmental assessment work and approval processes are underway.

36. Reference: Exhibit B-17, FEI Response to BCOAPO IR1, IR 5.4; Exhibit B-15, FEI Response to BCUC IR1, IR 6.1

In the response to BCOAPA IR1 5.4, FEI states: "The rationale and analysis behind the MRPO is set out in Section 3 of the Application. In essence, the MRPO is based on several factors, but primarily the need to buy time to assess options, to withstand a 3-day no-flow event on the T-South system, and in the worst case scenario, to perform a controlled shutdown of the system."

In the response to BCUC IR1 6.1, FEI states: "To isolate a few hundred customers at their premises could take several hours; in contrast, isolating tens of thousands of customers could take weeks to complete, dependent on the number of field technicians available."

36.1 In the event of a T-South no-flow event, explain how the 3 days specified by the Minimum Resource Planning Objective buys enough time to perform a controlled shutdown, which entails actuating each customer's meterset shutoff valve, considering FEI states that completing such a task would take weeks for tens of thousands of customers. If flow is not restored by the time the LNG inventory is exhausted, will not an uncontrolled shutdown be inevitable?

Response:

Please refer to the responses to BCUC IR2 70.1 and 70.2.1.

36.1.1 With AMI fully implemented as proposed in FEI's AMI CPCN, would three days be sufficient time to perform a controlled shutdown, including actuating meterset shutoff valves for all customers that do not have remote shutoff capability?

Response:

FEI expects the AMI system will be capable of remotely disconnecting 600,000 advanced meters per hour. Therefore, allowing for several hours to plan and coordinate the execution of the isolation, FEI could accomplish disconnection of the Lower Mainland's advanced meters (excluding radio-off customers) within the same day.

The AMI system is not capable of remotely disconnecting a portion of the commercial and all the industrial meters at this time, or advanced meters that are not connected to the AMI network (i.e., radio-off customers). In the case of some large customers, the customer has the ability to cease taking service within a few hours of receiving a curtailment order from FEI. Otherwise, FEI expects that using the available FEI resources and through direct communication with customers without AMI meters (to assist with isolations), three to four days would be adequate to disconnect all of the Lower Mainland commercial and industrial customers and any advanced meters not connected to the AMI network.

There are two other points of note when considering the above:

1. FEI's order of curtailment in a controlled shut down would follow the BCUC-approved System Preservation and Restoration (P&R) Plan, which differs from the order implied by the time it takes to disconnect (for instance, it also considers minimizing overall impacts and health and welfare).
2. Determining whether a hydraulic collapse would occur is not as simple as determining whether it takes longer than three days to shed load. As customers are progressively disconnected/shut off, the system load would also be declining, such that available storage volumes would last longer for supporting the remaining customers on the system.

36.2 If FEI has the TLSE at its disposal and therefore could maintain supply for three days at the winter peak, would FEI immediately commence performing a controlled shutdown in the event of a similar T-South rupture where one tube is damaged and the other isolated as a precaution? Or would FEI try to wait out the no-flow event utilizing the TLSE inventory?

Response:

In the time gained by having the additional storage provided by the TLSE tank, FEI would assess the situation and the potential options available for mitigating the situation in order to determine at what point a controlled shutdown would need to commence in order to avoid an uncontrolled hydraulic collapse. It is difficult to provide a definitive response to the question, given the number of factors at play. However, in response to all T-South no-flow incidents, FEI would immediately commence planning for a potential controlled shutdown response as a precautionary measure.

36.2.1 If FEI waits for two or three days before determining that it must commence a controlled shutdown (due to the uncertain timing of the no-flow event ending), is there sufficient time to complete the controlled shutdown (with AMI in place)?

Response:

FEI would initiate a controlled shutdown as soon as the specifics of an incident require such a response. The TLSE Project will give FEI time to develop, prepare for, and execute an appropriate response. Even with AMI, it takes time to shed significant load, so emergency planning needs to account for that lead time. If FEI were to wait two or three days, it would only be as a result of the situation allowing for such a delay, reflecting the system load and FEI's response plan at the time. Please also refer to the responses to BCUC IR2 70.1 and RCIA IR2 36.2, which describe how FEI would immediately begin planning a shutdown either with or without AMI as a precautionary measure and then begin executing a controlled shutdown as soon as necessary thereafter.

B. Description and Evaluation of Alternatives

37. Reference: Exhibit B-22, FEI Response to RCIA IR1, IR 18; Exhibit B-15, FEI Response to BCUC IR1, IR 16.22, 22.7

In the response to RCIA IR1 18.1, FEI states: "Additionally, as explained in the response to BCUC IR1 16.22, there are also benefits to removing the Base Plant facilities as part of the TLSE Project, as the demolition activities can be planned and synchronized as part of the overall Project execution, thus allowing for a more efficient and streamlined process."

In the response to BCUC IR1 16.22, FEI states: "Additionally, continuing to operate the Base Plant facilities would increase the operation and maintenance costs for the overall Tilbury facility, as FEI would be operating and maintaining three storage tanks (the Base Plant tank, Tilbury 1A tank, and the new TLSE tank); in particular, the maintenance requirements for the Base Plant tank would be different from the other newer tanks due to the Base Plant tank's age and design."

In the response to BCUC IR1 22.7, FEI states: "As discussed at the TLSE Workshop, approximately 0.3 Bcf of storage and 150 MMcf/day of regasification capacity is currently part of FEI's gas supply resource stack (refer to the presentation slide from the Workshop below). As FEI explained at the Workshop, absent the Base Plant resource, FEI would have to find a replacement in the open market.41 Contracting for a 150 MMcf/day peaking asset in the open market would be challenging and costly, absent new infrastructure being built, which is discussed further in the response to BCUC IR1 46.1."

37.1 Provide excerpts from any filings made to the BCUC prior to the T-south incident where FEI indicates that the Base Plant tank will soon reach the end of its life and requires replacement.

Response:

Prior to the T-South Incident on October 9, 2018, FEI filed the 2014 Depreciation Study on September 3, 2015 as part of FEI's 2016 Annual Review. The 2014 Depreciation Study, which was approved by Order G-119-16, determined an average service life for the Tilbury Base Plant of 40 years under the Asset Account Class 44300.[5] As the Base Plant was built in 1971, it was 43 years old at the time the 2014 Depreciation Study was completed, and therefore, was already past its expected average service life.

FEI's next depreciation study (the 2017 Depreciation Study), which was filed on March 11, 2019 as part of FEI's 2020-2024 MRP and was approved by Order G-165-20, maintained the average service life of the Base Plant at 40 years[6] under Asset Account Class 44300. This means the

[5] FEI's 2016 Annual Review, Appendix D1, page IV-4.
[6] FEI's 2020-2024 MRP, Appendix D2-1, page 5-2.

Base Plant was 49 years old (i.e., almost 10 years past its expected average service life) when the study was approved by the BCUC in 2020.

37.2 Explain the advantages and disadvantages of removing the Base Plant tank in advance of completing the TLSE tank. How will FEI manage peaking during the period without the Base Plant tank or TLSE tank?

Response:

FEI has planned the construction for the TLSE Project such that the Base Plant tank will be available until two of the new vapourizers are in-service using LNG provided from the T1A tank. The advantage of removing the Base Plant tank in advance of completing the TLSE tank is that it provides additional construction and laydown area, in addition to providing better accessibility to the site during the tank construction period. The disadvantage of removing the Base Plant before completing construction of the TLSE tank would be the resulting reduction in the amount of storage available on-site for peak demand periods or emergency situations.

The current schedule for demolition of the Base Plant tank is based on the best information available at this time. The final construction sequencing will be dependent on several factors, including the progress of detailed design, planning and optimization from the EPC contractor engaged for the Project and the availability of LNG from the T1A tank in the intervening period between when the Base Plant tank is demolished and the TLSE tank is put into service. For example, if LNG sales through Rate Schedule 46 limit the amount of LNG available during that intervening period, it may be necessary to stage the demolition of the Base Plant tank after the TLSE tank is put into service. Ultimately, FEI will select the most cost-effective and efficient way to complete the TLSE Project, while maintaining its ability to provide peaking and emergency service during the Project's construction period.

37.3 Provide the current annual operating and maintenance costs of the Base Plant tank

Response:

The 2020 operating and maintenance costs for the Base Plant facilities (including the tank) were approximately $2.2 million. The 2021 costs are projected to be consistent with 2020.

38. Reference: Exhibit B-15, FEI Response to BCUC IR1, IR 16.1

In the response to BCUC IR1 16.1, FEI states: "AMI will provide complementary resiliency benefits to the TLSE Project. However, AMI alone would not prevent a pressure collapse in all scenarios, nor would it prevent wide-scale customer outages."

38.1 In what scenarios would AMI's remote shutoff capability, augmented by site visits to larger volume customers whose meters do not have this capability, be unable to isolate FEI's system and prevent a pressure collapse?

Response:

Please refer to the response to BCUC IR2 69.1.

39. Reference: Exhibit B-15, FEI Response to BCUC IR1, IR 22.5, 11.9.2, 30.1, 23.1; Exhibit B-1-4, Updated Public Application, p. 112

At page 112 of the Updated Public Application, FEI states: "Constructing more regasification capacity and storage at Tilbury will allow FEI to deliver a large amount of supply within a short period of time, providing FEI with additional operational flexibility to manage daily balancing."

FEI further states: "FEI plans the next-day gas supply based on a weather forecast, which can deviate significantly from the actual weather experienced during the day as Lower Mainland demand increases by approximately 25 MMcf/day when temperature decreases by one degree Celsius."

In the response to BCUC IR1 22.5, FEI states: "Additional liquefaction capacity will not need to be reserved. There will be an interconnection between the Tilbury 1A tank and the TLSE tank that allows FEI to utilize 5 MMcf/day of liquefaction from the new Tilbury 1A liquefier to refill the Base Plant. Given that the daily balancing from the TLSE Project would only come from the "third Bcf" of storage, the 5 MMcf/day of liquefaction will be sufficient for refilling purposes."

39.1 Does FEI currently use the Tilbury Base Plant for balancing? If so, what is the highest draw for balancing purposes made in recent years?

<u>Response:</u>

FEI does not use the Tilbury Base Plant as a primary daily load balancing tool. FEI's off-system storage resources (Aitken Creek, Jackson Prairie, and Mist) are generally used for daily load balancing in normal operations. FEI's on-system storage resources (Mt. Hayes and Tilbury) are typically reserved for handling shorter-interval weather events and emergency situations, but can be used by FEI to balance the system if needed.

39.2 What is the highest daily draw that FEI anticipates making from TLSE in order to assist in balancing?

<u>Response:</u>

Please refer to the response to RCIA IR2 39.1.

The amount of volume used for daily load balancing would depend on several factors, including: the variance in the short-term weather forecast (i.e., weather forecast 24 hours out versus actual); the current inventory level of FEI's off-system and on-system storage assets; and the line pack status of the Westcoast T-South pipeline and FEI's own pipeline. These factors make it difficult for FEI to determine the amount of send-out from Tilbury that can be labeled as a balancing activity. Please also refer to the response to CEC IR1 26.1 for the quantity of Tilbury LNG that was sent out from the Base Plant for each of the last 10 years.

39.3 Explain whether 5 MMcf/d liquefaction is sufficient in the instance where FEI makes multiple significant draws (>10 MMcf) from TLSE for balancing purposes in a short period of time.

Response:

FEI considers that 5 MMcf/day of liquefaction will be sufficient because FEI's off-system storage resources in the gas supply portfolio will also be available for daily load balancing requirements, as discussed in the response to RCIA IR2 39.1. Optimizing all of FEI's storage resources for daily load balancing helps to mitigate the risks of future dependence on making multiple significant draws for balancing purposes.

39.4 Explain whether 5 MMcf/d liquefaction is sufficient if volumes must be replenished simultaneously resulting from depletions due to balancing, peaking use, and resiliency (i.e. no-flow event).

Response:

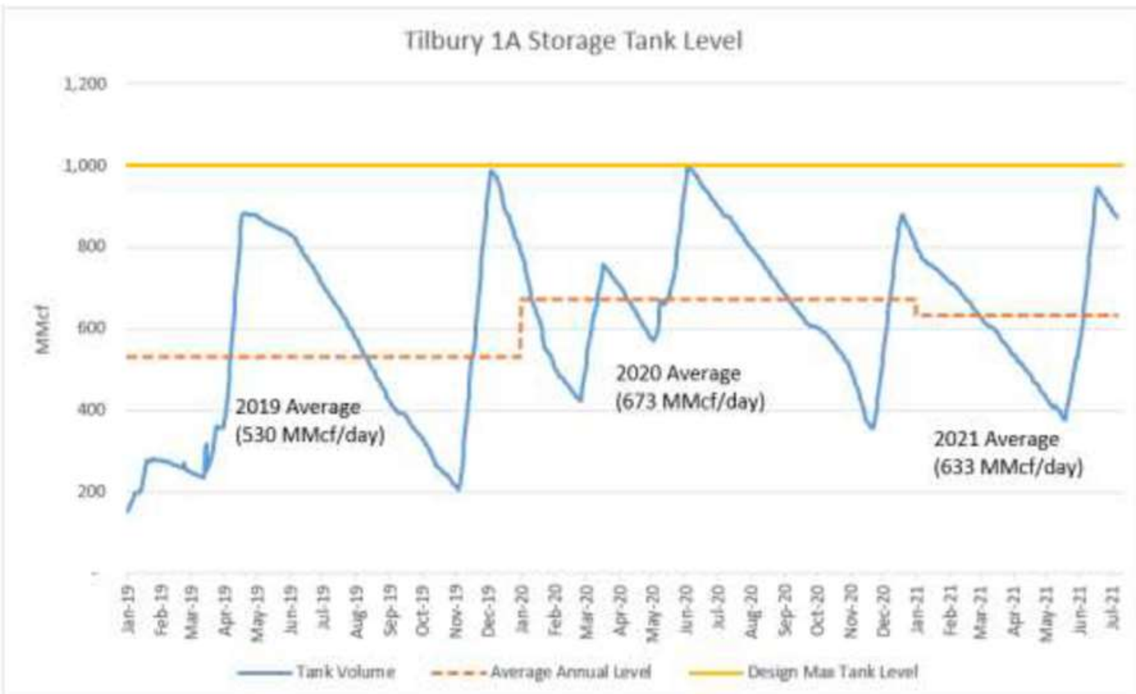
FEI considers that 5 MMcf/day of liquefaction will be sufficient for the purposes of daily load balancing and peaking use for the following reasons:

- Under normal operations, the supply for peaking use and daily load balancing would only come from the "third Bcf" of the TLSE Project. The 5 MMcf/day allocated for gas supply and operational benefits will provide FEI approximately 1.8 Bcf of supply (i.e., 5 MMcf x 345 days = 1,725 MMcf[7]); and
- As discussed in the response to RCIA IR2 39.1, FEI's off-system storage resources (Aitken Creek, Jackson Prairie, and Mist) offer greater flexibility in terms of daily load balancing; therefore, the supply from the TLSE Project may not be heavily relied upon for this requirement.

[7] FEI has used 345 days and not 365 days to reflect that the plant will have annual turnarounds and/or maintenance to perform each year.

If a no-flow event were to occur, the sufficiency of the 5 MMcf/day of liquefaction for replenishing the LNG inventory after T-South supply resumes will depend on the severity of the no-flow event. However, FEI may be able to utilize a portion (if not all) of the Tilbury 1A liquefaction capability (i.e., 28 MMcf/day), depending on the sales commitments to Rate Schedule 46 customers.

In the response to BCUC IR1 11.9.2, FEI shows the T1A storage tank levels, which indicate the periods of filling using the T1A liquefaction facilities.



39.5 Provide the number of days when the T1A liquefaction facilities were used to refill the T1A tank for each of the past three years.

Response:

The number of days that the Tilbury T1A liquefaction facilities were used is provided below:

	2019	2020	2021
Number of days T1A liquefaction in operation	78	80	32

39.6 It appears that FEI operates the T1A liquefaction facilities continuously for a period of time to increase storage inventory, but then allows the inventory to draw down over a period of months before restarting liquefaction. Explain whether FEI could operate the T1A liquefaction facilities more frequently in order to maintain the T1A inventory at a level closer to the tank capacity of 1 BCF. What are the downsides of operating in this manner? Can liquefaction occur simultaneously with LNG withdrawal?

Response:

Please refer to the response to BCUC IR2 76.2.

In the response to BCUC IR1 30.1, FEI states: "Under Direction No. 5 to the BCUC, FEI has approval to proceed with installation of a second liquefaction train (Tilbury 1B) to support additional LNG sales under RS 46, making additional liquefaction potentially available beyond the 33 MMcf/day currently at Tilbury 1A which could shorten the time."

39.7 What conditions would trigger FEI or FortisBC to construct the additional liquefaction facilities?

Response:

The decision to move forward with the Tilbury 1B facilities will be based on a combination of Indigenous and stakeholder input, as well as commercial (primarily demand) and technical factors.

FEI continues to engage with Indigenous groups and stakeholders to seek feedback about the proposed Tilbury 1B facilities and will look to incorporate it throughout development.

The commercial justification will include overall market conditions for the global uptake of LNG as a marine fuel, the availability of bunkering service providers in the Port of Vancouver capable of providing ship to ship bunkering services to the marine customers, and willingness of current and prospective customers to enter into offtake agreements, all of which will drive actual and forecast demand.

The technical justification will include consideration for the long lead time required to complete the engineering, design and construction of the Tilbury 1B facilities. As such, FEI will need to ensure it is executing this project at the appropriate time.

In the response to BCUC IR1 23.1, FEI states: "Of the 3 Bcf of storage provided by the proposed new TLSE Project storage tank, 2 Bcf is required to address the risk reflected in the MRPO. Accordingly, from a planning perspective, FEI will reserve 2 Bcf in the tank solely for resiliency purposes. The remaining 1 Bcf of storage will also provide resiliency benefits. However, because it is in excess of the MRPO, the remaining 1 Bcf can be used more flexibly. It would be available to provide either resiliency or the ancillary benefits to FEI and its customers described in Section 4.4.1.5 of the Application, including accommodating LNG from the Liquefaction Facility, in certain circumstances."

39.8 What is the storage space required in the 3 Bcf TLSE tank to perform peak shaving and balancing through an entire winter, assuming only 5 MMcf/d of liquefaction is available to replenish volumes throughout the winter?

Response:

Please refer to the response to BCUC IR1 22.7.

39.8.1 Would FEI have concerns if the BCUC made it a condition of the CPCN approval that this volume be reserved for peak shaving and balancing operations?

Response:

FEI would have concerns with the suggested condition. At a high level, imposing such a condition would be detrimental for ratepayers as it would limit FEI's flexibility in how it could use the additional 1 Bcf of storage. There are other ancillary benefits beyond peak shaving and balancing which the 1 Bcf of storage could be utilized for, and the opportunity to make use of each of the ancillary benefits may vary from year to year. For example, in the response to BCUC IR1 16.24, FEI discussed that the additional 1 Bcf could provide operational benefits such as adjusting gas flows in the Coastal Transmission System (CTS) pipeline system for integrity management tools. Additionally, the incremental 1 Bcf of LNG storage provides a resiliency margin above the Minimum Resiliency Planning Objection (MRPO). This could help FEI manage either a longer duration initial no-flow event or any reduced supply for a period of time following a no-flow event (as explained in the response to BCUC IR1 4.5). Thus, in FEI's view it would not be reasonable to lock FEI into specific uses for the additional 1 Bcf of storage.

The BCUC has ongoing oversight of FEI's operations and can evaluate FEI's use of the facility through its existing regulatory processes.

40. Reference: Exhibit B-15, FEI Response to BCUC IR1, IR 23.1

In the response to BCUC IR1 23.1, FEI states: "The Tilbury Phase 2 Expansion Project has two components: (i) the 3 Bcf storage tank, and (ii) a liquefaction facility."

In the response to BCUC IR1 23.2, FEI states: "As stated above, the primary resource which could be shared if the entire Tilbury Phase 2 LNG Expansion Project (both the TLSE Project and Liquefaction Facility) is completed is the new storage tank; however, as discussed in the response to BCUC IR1 23.1, 2 Bcf of the storage tank will be reserved at all times for minimum resiliency requirements. In order for this sharing to occur, the Liquefaction Facility would be interconnected to the 3 Bcf storage tank so that it could produce LNG and also accept boil-off gas from the 3 Bcf tank for reprocessing."

40.1 When does FEI anticipate the Phase 2 liquefaction facilities to be operational?

40.1.1 Will the Phase 2 liquefaction facilities be available to initially fill the TLSE volumes? Explain why or why not.

Response:

FEI does not currently have an estimate for when the Phase 2 Liquefaction Facility will be operational, as this timing is dependent on commercial arrangements. To provide some perspective on project timing, when firm commercial terms for the Liquefaction Facility are set, it would take approximately five years from the commencement of pre-FEED engineering to the Liquefaction Facility entering commercial service. As a result, the Liquefaction Facility will not be available to assist with filling the TLSE tank.

40.2 Explain whether the fact that FEI plans for additional liquefaction facilities in Phase 2 is the reason that liquefaction facilities are not proposed for the TLSE.

Response:

Not confirmed. As explained in the response to BCUC IR1 30.1, FEI plans to use the existing liquefaction capacity available on the Tilbury site to fill the new TLSE tank. Had FEI required new liquefaction as part of the TLSE Project (i.e., as part of the CPCN project), FEI would have included the request in this Application. Further, regardless of whether the Liquefaction Facility contemplated in the Tilbury Phase 2 LNG Expansion Project environmental assessment process is built, additional liquefaction facilities are not required for the TLSE Project to achieve its resiliency benefits.