Doug Slater
Director, Regulatory Affairs

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

Electric Regulatory Affairs Correspondence
Email: electricity.regulatory.affairs@fortisbc.com

FortisBC
16705 Fraser Highway
Surrey, B.C. V4N 0E8
Tel: (778) 578-3874
Cell: (778) 214-3842
Fax: (604) 576-7074
Email: doug.slater@fortisbc.com
www.fortisbc.com

January 10, 2019

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

Attention: Mr. Patrick Wruck, Commission Secretary and Manager, Regulatory Support

Dear Mr. Wruck:

Re: FortisBC Energy Inc. (FEI)

Project No. 1598977

Application for Acceptance of the Biogas Purchase Agreement Between FEI and the City of Vancouver (the Application)

Response to the British Columbia Utilities Commission (BCUC) Information Request (IR) No. 1

On September 21, 2018, FEI filed the Application referenced above. In accordance with BCUC Order G-234-18 setting out the Regulatory Timetable for the review of the Application, FEI respectfully submits the attached response to BCUC IR No. 1.

If further information is required, please contact Sarah Smith, Director NGT, RNG, and Regional LNG at (604) 582-7528.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Doug Slater

Attachments

cc (email only): Registered Parties

1.0 Reference: Project Overview

Exhibit B-1, Section 3, p. 6; Section 4.5, pp. 12–13

Biomethane upgrading facilities

On page 6 of the FEI Biogas Purchase Agreement between FEI and CoV application (Application), FEI states:

> Using approved depreciation rates, the biomethane Upgrader, Structure and Improvements, Compressor Equipment, Distribution Mains and Meters will all depreciate over a longer period than 20 years… [This] is aligned with the term of the CoV BPA [Biogas Purchase Agreement] of 20 years.

1.1 Please provide the location, technology type and number of years that FEI's existing biomethane Upgrader systems have been operational.

Response:

The following table provides a summary of the requested information.

Supplier	Location	Upgrader Type	FEI Owns Upgrader	Online Date	Years Operational
Salmon Arm Landfill	Salmon Arm, BC	PSA	Y	Feb 2013	6
Glenmore Landfill	Kelowna, BC	PSA	Y	Sep 2016	2
Fraser Valley Biogas	Abbotsford, BC	Water Wash	N	Oct 2010	8
Seabreeze Farm	Delta, BC	Water Wash	N	Feb 2015	4
Surrey Biofuel	Surrey, BC	Water Wash	N	Jun 2018	<1

1.2 What evaluation did FEI conduct to conclude a 20-year asset life is suitable? Please explain.

Response:

FEI has not concluded that a 20-year asset life is suitable. For the purpose of this Application, FEI used approved depreciation rates but also performed a secondary evaluation using a 20-year asset life to ensure the acquisition price per GJ remained below the prescribed maximum of $30/GJ for the term of the CoV BPA, which is 20 years.

FEI's depreciation rates are approved by the BCUC in FEI's revenue requirements applications based on depreciation studies conducted from time to time. FEI has modeled this Project using BCUC approved depreciation rates and will depreciate the Project assets at the depreciation rates that are in effect at the time the Project enters rate base (which are currently longer than 20 years) unless otherwise directed. If FEI's depreciation rates are updated in a depreciation study and approved by the BCUC, then the depreciation rates for the Project assets would also be updated as part of that process.

On page 12 of the Application, FEI states:

> It was determined that a low limit of 48 percent methane and a high limit of 12 percent nitrogen would maximize the expected future operational time for the upgrading plant. FEI confirmed with LFG [landfill gas] technology suppliers that these limits are reasonable.

On page 13 of the Application, FEI states:

> To establish a short list of the most suitable or appropriate technology, FEI conducted a review of the LFG upgrading technologies currently in commercial operation and injecting RNG [renewable natural gas] into pipelines in North America. Based on this review and FEI's experience, three technologies were identified as the best candidates for upgrading LFG to biomethane. These three technologies are pressure swing adsorption (PSA), water wash and membrane-based processes. FEI has direct experience owning PSA upgrading equipment and indirect experience interfacing with water wash technology owned by other suppliers.
>
> Of the three technologies, a preliminary assessment concluded that a combined membrane separation and PSA technology is recommended based on the LFG composition.

1.3 Please provide a summary of FEI's conducted review and the criteria used to establish suitable technologies.

Response:

FEI's review to establish suitable technologies identified five different technologies in use at a combined total of 43 LFG upgrading facilities that were in commercial operation. The following table shows the breakdown of utilization by technology type:

Core Technology for Upgrader	Projects in Operation	Percent of Projects
Pressure Swing Adsorption (PSA)	7	16%
Selexol™ absorption	8	19%
Water wash	2	5%
Membrane separation	24	56%
Cryogenic separation	2	5%

Both the Selexol™ absorption technology and the cryogenic separation technology involve storage, handling and processing of flammable and/or toxic liquids that are controlled under Canadian WHMIS regulation. They were, therefore, excluded from further consideration.

The remaining three core upgrading technologies (PSA, water wash, and membrane separation), were short-listed for further evaluation. The review concluded that all three short-listed technologies would be technically capable of producing pipeline quality biomethane.

To evaluate the short list of technologies, FEI applied a weighted scale to each of five key criteria in order to come up with a total score for each technology option. Each technology option was ranked in order from best to worst based on its expected ability to satisfy each criterion.

The key criteria are described in the following table:

Criterion	Summary Explanation
Methane Recovery	The Project must be able to recover 80% of the methane emitted
Process Performance	The LFG upgrading process must: a) have at least 94% availability (operational uptime); and b) meet pipeline specifications at maximum input nitrogen and oxygen levels
Biomethane Quality	The LFG upgrading process must produce biomethane that meets or exceeds the FEI pipeline gas quality specifications.
Minimize Costs	The preferred option will be the lowest cost (capital + operational) while meeting technical criteria noted above.
Expansion Potential	Some preference will be given to a plant that can be more readily expanded in the future

FEI gave the most weight to methane recovery, process performance and biomethane quality (the ability for the process to produce high quality gas in a reliable manner). FEI considered cost next and gave expansion potential the least weight.

FEI also considered other evaluation constraints, including:

Criterion	Summary Explanation
Environment	Emissions from the plant must be appropriately accounted for and processed according to legislation and regulation
Site	Smaller footprint is desirable due to space availability
Installed Base	The degree to which the technology has been proven is generally reflected in the number of sites where it is being used (installed base)

The results of the evaluation indicated that the membrane-based process is the preferred technology. The final design recommendation also incorporates a one-stage, nitrogen-removal PSA to complement the membrane process to maximize the methane production.

During the evaluation, FEI concluded that the next best alternative was a pure, two-stage PSA-based system. Despite its lower installed base at the time, there are potential advantages to using a single technology.

1.4 Please provide detail of the indirect experience FEI has with water wash technology.

Response:

FEI has three suppliers that are operating water-wash LFG upgraders. Two of these are agricultural anaerobic digester facilities with a mix of on-farm and off-farm wastes as feedstock, while the third is a municipal waste transfer station processing source-separated organics. These three suppliers are identified in the response to BCUC IR 1.1.1.

In all three cases, the nature of the partnership interface is similar. FEI receives a stream of upgraded biomethane from the water wash system. The stream is analyzed using real time monitoring equipment to ensure that gas quality specifications are met. Gas that meets specifications is then regulated to the correct pressure, odorized for leak detection, and then injected into the FEI distribution system. Any gas that does not meet specifications does not enter the system, but is instead diverted and sent back to the supplier.

The calibration, operation, and troubleshooting of FEI's interconnect stations at these projects has provided indirect experience interfacing with the water wash upgrading plants by evaluating all parameters of the biomethane, such as pressure, flow, and gas composition. Through collaboration with the partner organizations, FEI has gained insight into the various challenges and process upsets that the water wash systems encountered.

As a result of its experience, FEI can conclude that water-wash technology has proven to be effective for gas upgrading as these suppliers have all been able to successfully meet pipeline quality specifications.

1.5 Please provide an overview of the preliminary assessment that was conducted and the criteria used to determine that a combined membrane separation and PSA technology is recommended.

Response:

Please refer to the response to BCUC IR 1.1.3.

1.5.1 Would a single type of technology be suitable for the upgrade facility given the gas composition? Please explain.

Response:

The preliminary assessment shows that a single technology type – a PSA only - could be suitable for the facility; however, this would result in impacts to other selection criteria such as capital and operating costs. For a PSA system, there would be a limitation on the ability to easily expand and the expected operating costs would be higher.

A water-wash system would require a PSA as well to meet the RNG production specifications similar to the membrane system, and it would not have the expansion potential. Therefore, a water wash system could not be used alone.

It is FEI's intent to proceed with a procurement process that indicates a preferred technology type to potential bidders, while being open to considering a single or alternate technology provided that equal or better performance can be guaranteed.

1.6 Please provide examples of LFG-to-biomethane upgrading facilities that use combined membrane separation and PSA technology.

Response:

FEI was able to find the following examples of combined Membrane-PSA technology projects from the survey conducted as part of the evaluation.

Initial Developer	Project Location (State)	In-service date	Equipment Supplier	End User
Bio Energy Washington	Cedar Hills Regional Landfill (Washington)	2010-10-01	Air Liquide	Puget Sound Energy
Keystone Renewable Energy	Seneca Landfill (Pennsylvania)	2011-02-01	Air Liquide	Peoples Natural gas
River Birch LLC	River Birch Landfill, Avondale (Louisiana)	2013-05-01	Air Liquide	Atmos Energy
EDF Renewable Energy	Greentree Landfill, Kersey,Pennsylvania	2007-07-01	Air Liquide	Conectiv Energy Supply
Manufactured Methane Corp (Tengasco)	Carter Valley Landfill, Surgoinsville, Tennessee	2009-04-01	Air Liquide	Eastman Chemical

1.7 Please outline the benefits and risks of using the combined technologies.

Response:

FEI's preliminary assessment is that a combined technology system has benefits that outweigh any risks.

The benefits for using a combined technology include scalability, potential lower maintenance costs and future operational flexibility. More specifically, membrane technology is the best technology on the market for scalability and operating cost. Additional membranes can be added in series without any other major changes being required and cost less to maintain because they have fewer moving parts. The PSA is well-suited specifically to removing nitrogen and complements the membrane system which is very effective at removing carbon dioxide.

The risks of combined systems include higher up-front costs for integration and increased operating costs. Combined systems require additional engineering and time to connect the process steps in series. This can add up-front engineering cost and make troubleshooting more complex during operations. A wider range of spare parts may also be required.

The risks associated with a combined system are lower today than in the past as suppliers are now providing these combined systems for landfills in order to fully meet pipeline specifications.

For example, membrane suppliers such as DMT sell combined membrane-PSA systems for high nitrogen content applications (such as landfills). This means that equipment suppliers to the biogas industry are taking on the integration risk and can provide a complete package if required, which lowers any risk for FEI.

1.7.1 Please explain how the identified risks would be mitigated.

Response:

In order to mitigate the identified risks, FEI has included additional time and associated costs in the capital cost estimate for the Project to account for the increased up-front work on integration of technologies. FEI will also place performance guarantees on any potential suppliers of upgrading equipment and seek to work with contractors and upgrading equipment suppliers that have experience with integration of technologies.

1.8 Please discuss the risks FEI has identified with using a membrane separation technology.

Response:

Please refer to the response to BCUC IR 1.7.1.

1.8.1 Please explain how the identified risks would be mitigated.

Response:

Please refer to the response to BCUC IR 1.7.1.

1.9 Please explain what effects a change in gas composition from those described in the preamble would have on each technology, including the effect on recovery rates and expected operational life.

Response:

The main risk related to gas composition with any of the technologies, is that there will be an increase in nitrogen composition, as nitrogen and methane are difficult gases to separate.

For pressure swing adsorption, an increase in the composition of nitrogen beyond the design point would have a deleterious impact on the recovery rate, but would not have an impact on the operational life of the equipment. In the event of high nitrogen, gas would need to be periodically sent to flare to reduce the buildup of nitrogen in the system.

Membrane and water wash technologies are not able to separate nitrogen. As a result, nitrogen concentrations >2 percent cannot be upgraded effectively to RNG with these technologies alone.

A spike or long term change in carbon dioxide concentration coming from the landfill is unlikely because it is generated from a stable biological process in the landfill. Similarly, a spike in oxygen concentration is unlikely because available oxygen would be used up in microbial decomposition.

An increase in methane content from the landfill over time could also occur. This change would improve the operability of any upgrading technology and would likely be a result of reducing nitrogen concentration.

Trace compounds do not tend to vary significantly in LFG. An increase in these compounds would decrease the lifespan of the scrubbing medium, requiring more frequent change-outs.

1.10 For each technology, please explain, using vendor data and industry experience where possible, how the upgrading efficiency of each technology is forecast to change over the expected life of the asset.

Response:

Vendors continue to indicate that, provided their technology is maintained, the performance of the technology will not degrade. Xebec, a PSA supplier, believes that the media in their PSA would only need to be replaced once every 20 years and DMT, a membrane supplier, estimates a service life of 15 to 20 years for membranes.

From operational experience, FEI has not seen a decrease in the recovery rate over time from any of the PSAs that it operates. Routine maintenance of process equipment has been effective at maintaining recovery rates.

2.0 Reference: Risks and Mitigation

Exhibit B-1, Section 5, p. 17; Section 1, p. 2

Facilities

On page 17 of the Application, FEI states:

> The above ground facilities used may be removed and used for other projects. The biogas upgrading facilities owned by FEI will be designed to maximize the ability of FEI to relocate them.

2.1 Please discuss if FEI currently has other projects that the facilities could be used for.

Response:

The above ground facilities for the project include the interconnection station and the upgrading facilities. FEI is currently working to develop a number of projects within British Columbia including five potential landfills. As such, in the unlikely circumstance that it became necessary, FEI believes there are projects where these facilities could be used.

The interconnection station will be designed and built substantially the same as a typical pressure regulation station for conventional natural gas. As a result, the interconnection station would be deployable to either a new biomethane project or, in a less likely scenario, for use as a typical pressure regulating station for conventional natural gas.

The biomethane upgrading facility will be more specifically designed for biogas upgrading. The process for biogas upgrading (to biomethane) is substantially the same for different types of projects including non-landfill based projects. Therefore, the facilities would be deployable at another project.

2.2 Under the scenario that the CoV BPA is terminated prior to the initial term of the BPA and the facilities cannot be used for other projects, would FEI consider the facilities to be “stranded assets.” Please explain why or why not.

Response:

In the unlikely event that no further use for these assets is established and CoV BPA termination occurs prior to the end of the initial term, FEI would evaluate all relevant variables at that time to determine the best alternative to account for the remaining asset value, including

but not limited to considering them as stranded. Regardless of whether the assets are considered stranded, they would have been constructed prudently, in compliance with section 2(3.8)(a) of the GGRR, and with regard to the BC Government's commitment to growing renewable natural gas as outlined in FEI's response to BCUC IR 1.5.7. At the time that the assets became unused, FEI would propose a mechanism to recover their costs aligned with mechanisms FEI has used for prudently incurred costs in the past.

2.2.1 If yes, please discuss if the facilities would remain in rate base and continue to be recovered in the delivery rates of all non-bypass customers. Would the approach be different if the Project was not a prescribed undertaking under section 18 of the Clean Energy Act? Why or why not?

Response:

Please refer to the response to BCUC IR 1.2.2. The approach for the recovery of these assets would be the same regardless of whether the biomethane project was constructed as a prescribed undertaking or not.

3.0 Reference: Biogas Purchase Agreement

Exhibit B-1, Table 5, p. 16, Appendix A, Sections 5.2 & 6.1

Non-compliant biogas

Further to Section 5.2 of the BPA, FEI has the option to accept "Non-Compliant Biogas" into its facilities. Section 6.1 of the BPA provides the reduced base price that FEI shall pay the CoV for "Non-Compliant Biogas" accepted by FEI into FEI's facilities.

3.1 Please discuss the implications to FEI, financial or otherwise, to upgrade "Non-Compliant Biogas" to RNG in FEI's facilities. Please quantify the implications, where possible.

Response:

The most likely cause of non-compliant biogas would be an increase in nitrogen composition. This occurs when more air is able to infiltrate deeper into the landfill. The amount of air infiltration is controllable by landfill operators by controlling the suction pressure from each landfill gas well. In FEI's experience, the operators of the City of Kelowna's landfill have been effective in controlling and limiting the amount of nitrogen in the LFG produced at that landfill through this technique.

The possibility for FEI to upgrade "non-compliant biogas" will form a part of the equipment design and specifications, especially to accommodate higher nitrogen levels. This will ensure that the equipment is capable of processing full design rates of both compliant and non-compliant gas.

The main implication of processing non-compliant gas is a decrease in production efficiency.

If nitrogen levels exceeded the design point, the pressure swing adsorption (PSA) equipment would need a way to dissipate the build-up of nitrogen. If the high nitrogen level exists for a short period of time, the built-in recycle system will handle the excess until the nitrogen level of the inlet gas falls back under specification. If the nitrogen level continues to be high for a longer period of time, the recycle gas will need to be intermittently flared off to reduce the accumulation of nitrogen.

The exact amount that a PSA could tolerate depends on the media and the design of the recycle system (especially, the size of a recycle buffer tank). As the amount of nitrogen increases, flaring would happen more frequently, decreasing the recovery rate. At a certain amount of nitrogen it would become uneconomic to continue to process the LFG and the process would stop. FEI estimates that the uneconomic point would be at a level of approximately 50 percent more nitrogen than designed tolerance.

3.2 Please discuss whether the RNG production efficiency would be reduced (i.e. a lower recovery rate) if FEI's facilities were to upgrade "Non-Compliant Biogas." If so, please quantify where possible.

Response:

Please refer to the response to BCUC IR 1.3.1.

4.0 Reference: Biogas Purchase Agreement

Exhibit B-1, Table 2, p. 10; Appendix A, Section 5.3(a), Section 5.8(a), pp. 9–11

Supply based and anniversary reviews

The following information is extracted from Table 2 of the Application:

Item	Amount	Contract Clause	Comment
Anniversary Reviews	10 Years and 18 years		10 Year review will re-base expectations with respect to volume and LFG composition. 18 Year review will evaluate Project with
Minimum Volume	[redacted] GJ/6 month period	Clause 5.3 (ii)	The City must meet this amount or a supply-based review is triggered which may result in termination.

Section 5.3(a) of the BPA states:

> 5.3 **Supply Based Reviews.**
>
> (a) Subject to subsection 5.3(d), the parties will undertake a joint review of the Project, to be completed within ninety (90) days of the triggering event, to enable the parties to determine ongoing Project viability, if:
>
> (i) at the 4th anniversary of the Acceptance Date, the First Delivery Date has not occurred despite the Owner having the Supply Minimum available and meeting the Specifications in Schedule A; or
>
> (ii) after the First Delivery Date, the Owner does not deliver at least the aggregate of [redacted] GJ of Biogas meeting the Specifications over any period of six (6) consecutive months (collectively the "**Supply Minimum**") and FEI requests a review be conducted.

Section 5.8 (a) of the BPA states:

> 5.8 **Anniversary Reviews.**
>
> (a) In addition to any reviews conducted pursuant to section 5.3 (*Supply Based Reviews*), at the tenth(10th) and eighteen (18th) anniversaries of the First Delivery Date, the parties will undertake a review of the Project, which review will not exceed 90 days, including quantity, flow and quality of the Biogas made available to FEI throughout the Term, and the future projections of quantity, flow and quality (the "**10th Anniversary Review**" and the "**18th Anniversary Review**" respectively). The purpose of the 10th Anniversary Review is to determine Project financial viability for the balance of the Term based on historic and projected supply of Biogas at the then current pricing. The purpose of the 18th Anniversary Review is to determine Project financial viability for the balance of the Term and whether to extend this Agreement beyond the Term.

4.1 Under the scenario that an anniversary review or a supply-based review results in an acquisition cost greater than $30/GJ for the CoV RNG, would FEI still consider the Project to be a prescribed undertaking under section 18 of the Clean Energy Act (CEA). Please explain why or why not.

Response:

Yes, FEI believes that if the Project is a prescribed undertaking it remains a prescribed undertaking indefinitely, subject to any conditions or constraints for the prescribed undertaking set out in the GGRR. Since the prescribed undertaking in the GGRR for RNG has no expiry date or set period of time during which the undertaking must be carried out, FEI concludes that RNG projects qualifying as prescribed undertakings retain that status indefinitely.

The primary purpose of the supply-based reviews (including the 10th Anniversary Review) are to provide a structured opportunity for the CoV to adjust its current LFG management practices with the intention of increasing flow and/or improving gas quality. One of the options for the CoV is to reduce its price for raw LFG. In the event that a supply-based review determined that the acquisition price is close to or over $30/GJ, then other measures could be taken to lower this price. Improving the quality of LFG, increasing the quantity of LFG, and reducing the price that FEI pays to the CoV for raw biogas all have the potential to lower the acquisition price.

Regardless of the opportunity to improve the acquisition cost in the future, FEI believes that this is an unlikely scenario because FEI has based its projections on conservative numbers for LFG volume, LFG quality, technology performance, and capital costs.

4.1.1 If yes, please discuss if the entire acquisition cost or only the acquisition cost up to $30/GJ should be recovered.

Response:

Please refer to the response to BCUC IR 1.5.4.

4.1.2 If no, please discuss how the Project costs should be treated for the remainder of the agreement term.

1 **Response:**

2 Please refer to the response to BCUC IR 1.4.1.

3

5.0 Reference: Legislative and Regulatory Context

Greenhouse Gas Reduction (Clean Energy) Regulation (GGRR), section 2(3.8)(a); Exhibit B-1, Section 2, pp. 2–6; Section 4, p. 8

Acquisition price

On page 3 of the Application, FEI states:

> Section 18 of the CEA establishes the concept of a 'prescribed undertaking' for the purposes of the CEA as follows:
>
> > 18 (1) In this section, 'prescribed undertaking' means a project, program, contract or expenditure that is in a class of projects, programs, contracts or expenditures prescribed for the purpose of reducing greenhouse gas emissions in British Columbia.

On pages 4–5 of the Application, FEI states:

> OIC 161/2017 approved an amendment to the GGRR which, among other things, classified renewable natural gas as a prescribed undertaking. Sections 2(3.7) and 2(3.8) of the GGRR, as amended by OIC 161/2017, state that:
>
> (3.7) A public utility's undertaking that is in the class defined in subsection (3.8) is a prescribed undertaking for the purposes of section 18 of the Act.
>
> (3.8) The public utility acquires renewable natural gas
>
> (a) for which the public utility pays no more than $30 per GJ, and
>
> (b) that, subject to subsection in a calendar year, does not exceed 5% of the total volume of natural gas provided by the public utility to its non-bypass customers in 2015.

FEI states on page 6:

> The CoV BPA meets the two criteria for RNG projects as prescribed undertakings as set out in section 2(3.8)(a) and 2(3.8)(b) of the GGRR in terms of total cost to acquire RNG and total volume threshold.

5.1 Please provide FEI's interpretation of "pays no more than $30 per GJ," clearly explaining what costs FEI believes can be included in the $30 per GJ calculation and why.

Response:

FEI interprets "pays no more than $30 per GJ" to mean the total levelized cost of biomethane delivered to the FEI system, including all costs associated with upgrading and interconnection of the Project to the FEI system. Therefore:

- In the case of a contract to acquire raw biogas, the maximum price of $30 per GJ would include the purchase price of raw biogas plus the upgrading and interconnection costs.
- In the case of a contract to acquire pipeline quality biomethane, the maximum price of $30 per GJ would include the purchase price of biomethane plus the interconnection costs for the project.

The costs of upgrading and interconnection are included because these costs are ultimately necessary to acquire the biomethane. The levelized cost is a reasonable means of determining a portion of the acquisition cost because it averages the effects that the change in annual cost of service has on the cost per GJ of produced biomethane in any one year.

The inclusion of the levelized cost, including upgrading and interconnection, was also the method that FEI used to determine the delivery price of biomethane for the purposes of complying with the BCUC's maximum price for biomethane, before the maximum price in the GGRR was in place. The maximum price in the GGRR replaced the BCUC's maximum price for delivered biomethane, and should be interpreted in this context.

5.2 Please confirm, or explain otherwise, that if the Project is deemed a prescribed undertaking, all raw LFG, capital and O&M costs related to the Project would be included in FEI's calculation of rate base.

Response:

FEI confirms that all the items identified in the question are included in calculating FEI's revenue requirement for the Project. Only the capital items are included in the calculation of rate base. The raw LFG and O&M are included as an addition to FEI's Biomethane Variance Account (BVA).

5.2.1 If not confirmed, please explain.

Response:

Please refer to the response to BCUC IR 1.5.2.

5.3 If the Project is deemed a prescribed undertaking, does the Project remain a prescribed undertaking indefinitely? If not, please discuss scenarios where the Project would no longer be a prescribed undertaking and what should happen with cost recovery in such an event.

Response:

Yes, FEI believes that if the Project is a prescribed undertaking it remains a prescribed undertaking indefinitely, subject to any conditions or constraints for the prescribed undertaking set out in the GGRR. Since the prescribed undertaking for RNG in the GGRR has no expiry date or set period of time during which the undertaking must be carried out, FEI concludes that RNG projects qualifying as prescribed undertakings retain that status indefinitely.

5.4 If the Project is deemed a prescribed undertaking, please explain how FEI would recover costs in the event that:

(a) increases in actual construction costs resulted in the cost to acquire RNG exceeding $30/GJ;

(b) initial operating costs resulted in the cost to acquire RNG exceeding $30/GJ after completion of the Project ; and

(c) the cost to acquire RNG exceeded $30/GJ as a result of increased annual operating costs due to upgrade system efficiency and/or LFG quality deviating from assumptions used by FEI.

Response:

Based on the estimated construction costs, initial operating costs, and ongoing operating costs filed in the Application, the resulting total acquisition cost is $22.24/GJ. If the BCUC approves the Project as a prescribed undertaking based on those cost estimates, then the Project

remains a prescribed undertaking. The required engineering accuracy level for the capital costs has been included in the Application which provides confidence that the estimates are reasonable. FEI also believes the initial and ongoing operating cost estimates are reasonable, particularly given the conservative assumptions used. However, in the very unlikely event that increases in actual construction costs, initial operating costs, or annual operating costs result in the cost to acquire RNG exceed $30/GJ, all prudently incurred project costs, even costs in excess of $30/GJ, would be recovered through the BVA in the same manner as existing biomethane projects, first from voluntary RNG or Biomethane program customers.

As noted above, the construction cost estimates provided in the Application have been developed with the required accuracy level to provide confidence that the costs are reasonable. As a result, FEI believes it is unlikely that the actual construction costs will result in a cost to acquire RNG exceeding $30/GJ. Even at the high-end of the cost estimate range, the cost of acquisition remains below $30/GJ.

The initial operating costs were developed based on a combination of industry estimates and FEI's experience. There may be fluctuations in costs at any time during the life of the Project, but FEI is confident that these costs, when examined as part of the levelized cost of service, are reasonable.

FEI based its ongoing cost of service on conservative assumptions regarding upgrader efficiency and existing data provided by the CoV. As such, FEI believes the annual operating cost estimates are also reasonable.

5.5 Please confirm, or explain otherwise, whether in FEI's view, section 2(3.8)(a) of the GGRR is satisfied if the levelized cost of the Project is below $30 per GJ. Please explain why or why not.

Response:

Confirmed. It is FEI's view that, based on the language in the GGRR, if the Project cost estimates show a levelized cost below the prescribed undertaking maximum of $30/GJ, then section 2(3.8)(a) of the GGRR is satisfied. This means that section 2(3.8)(a) of the GGRR is satisfied even if the non-levelized cost per GJ is greater than $30/GJ at any time during the term of the CoV BPA.

As discussed in FEI's response to BCUC IR 1.5.1, the levelized cost is a reasonable means of determining the acquisition cost because it averages the effects that the change in annual cost

of service has on the cost per GJ of produced biomethane in any one year. Annual variations in the cost of service and resultant cost per GJ could be due to the impact of taxes, such as capital cost allowance, or the initial ramping up of volumes during the start-up period of a project. Due to temporary or variable factors such as these, it would not be reasonable to use a non-levelized acquisition price for the purpose of the GGRR. For reasons such as these, a levelized cost approach has been used and accepted by the BCUC when evaluating FEI's prior biomethane upgrading projects as well as for setting FEI's CNG and LNG station rates. It is therefore a well-established approach.

As FEI explained in its December 11, 2018 submission (Exhibit B-2), the words of any Act are to be read in their entire context and, in the case of section 2(3.8) of the GGRR, the relevant context is FEI's well-established RNG supply side model for its Biomethane Program. The maximum price in the GGRR replaced the BCUC's maximum price for delivered biomethane, and should be interpreted in this context. The levelized cost approach was the method that FEI used to determine the delivered price of biomethane for the purposes of complying with the BCUC's maximum price for biomethane, before the maximum price in the GGRR was in place. It is reasonable to apply the same approach for compliance with the GGRR.

As FEI also explained in its December 11, 2018 submission (Exhibit B-2), the words of any Act are to be interpreted harmoniously with its object and intention. Further, as required by section 8 of the Interpretation Act: "Every enactment must be construed as being remedial, and must be given such fair, large and liberal construction and interpretation as best ensures the attainment of its objects." It is, therefore, significant that the object and intention of section 2(3.8) of the GGRR is to increase FEI's ability to obtain RNG supply for its Biomethane Program.

Interpreting section 2(3.8)(a) of the GGRR to apply to the non-levelized cost per GJ over the life of the CoV BPA would be contrary to the object and purpose of the GGRR, as it would decrease FEI's ability to obtain RNG supply for its Biomethane Program:

- The non-levelized cost will vary from year to year of the CoV BPA, with some years being higher and some years being lower than the levelized costs. It would be impractical to evaluate a project's non-levelized variable annual costs. The non-levelized cost approach is, therefore, a stricter test than previously applied by the BCUC and would decrease FEI's ability to obtain RNG.
- A non-levelized cost approach is more uncertain than a levelized cost approach. It is a relatively straightforward exercise to derive the levelized cost of a project. Consistent with how FEI considers all projects, FEI considers the overall cost to the customer and spreads those over the life of the project. Determining the fluctuations in the acquisition cost year over year is a more difficult and uncertain exercise. Introducing this uncertainty would decrease FEI's ability to receive approval to obtain RNG supply.
- A non-levelized cost approach would create differences between how purchases of biomethane and biogas are judged, which would be inappropriate. When purchasing

biomethane, the contract price is levelized over the length of the contract, and does not vary from year to year based on the third party's upgrading costs. Purchases of biogas should be considered on the same basis as this supply model is necessary or preferable for the development some sources of supply, including with the CoV. Hampering FEI's ability to proceed with the purchase of biogas would, therefore, reduce FEI's ability to obtain RNG supply.

It is, therefore, consistent with the context, purpose and object of the GGRR to interpret the price in section 2(3.8) of the GGRR as applying to the levelized acquisition cost over the life of the BPA. This approach is a reasonable means of determining the acquisition cost and well-established in the context of biomethane and CNG and LNG station projects.

5.6 In FEI's view, would section 2(3.8)(a) of the GGRR be satisfied if the non-levelized cost per GJ is greater than $30/GJ at any time during the term of the CoV BPA? Please explain why or why not.

Response:

In FEI's view, section 2(3.8)(a) of the GGRR applies to the estimated levelized cost of a project and, therefore, is satisfied even if the non-levelized cost per GJ is greater than $30/GJ at any time during the term of the CoV BPA. Please refer to the responses to BCUC IRs 1.5.1 and 1.5.5.

5.7 In the event that the Project is not deemed to be a prescribed undertaking, please discuss how FEI would proceed with the Project and the Application.

Response:

For the reasons outlined in FEI's Application, December 11, 2018 submission (Exhibit B-2) and various IR responses, FEI believes that the Project clearly qualifies as a prescribed undertaking.

Further, subsequent to FEI's filing of this Application, the BC Government has issued its CleanBC climate action and energy plan in early December 2018 in which its policy commitment to growing renewable natural gas as a carbon-reducing resource has been strengthened. In the CleanBC plan the BC Government indicates its intention to establish a requirement that at least

15 percent of the fuel supply for residential, commercial and industrial gas consumption comes from renewable gas[1]. Since the CleanBC planned target of 15 percent renewable gas is much higher than the RNG supply cap currently allowed by the GGRR, FEI believes that the Province's policy intentions add further weight to the notion that the Project qualifies as a prescribed undertaking.

Notwithstanding the foregoing comments, in the event that the BCUC found on some basis that the Project does not qualify as a prescribed undertaking under the GGRR, FEI would analyze the reasons of the BCUC and either seek to adjust the current application or CoV BPA as needed to address the BCUC's concerns, or potentially prepare and file an application for a Certificate of Public Convenience and Necessity (CPCN) for the Project.

[1] https://cleanbc.gov.bc.ca/app/uploads/sites/436/2018/12/CleanBC_Full_Report.pdf, pages 64 and 65.