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September 15, 2016

British Columbia Public Interest Advocacy Centre
Suite 208 – 1090 West Pender Street
Vancouver, B.C.
V6E 2N7

Attention: Ms. Tannis Braithwaite, Executive Director

Dear Ms. Braithwaite:

**Re: FortisBC Inc. (FBC)**

**Project No. 3698883**

**Application for the a Certificate of Public Convenience and Necessity for Replacement of the Corra Linn Dam Spillway Gates (the Application)**

**Response to the British Columbia Public Interest Advocacy Centre representing the British Columbia Old Age Pensioners' Organization, Active Support Against Poverty, Disability Alliance BC, Council of Senior Citizens' Organizations of BC, Together Against Poverty Society, and the Tenant Resource and Advisory Centre *et al.* (BCOAPO) Information Request (IR) No. 1**

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On June 29, 2016, FBC filed the Application referenced above. In accordance with the British Columbia Utilities Commission (Commission) Order G-107-16 setting out the Regulatory Timetable for the review of the Application, FBC respectfully submits the attached response to BCOAPO IR No. 1.

If further information is required, please contact the undersigned.

Sincerely,

**FORTISBC INC.**

***Original signed:***

Diane Roy

Attachments

cc (email only): Commission Secretary
Registered Parties

**1.0 Reference: Exhibit B-1, page 10 (lines 27-30)**

1.1 Does FortisBC receive any compensation from BC Hydro based on the fact that it is the Corra Linn Dam (owned by FortisBC) which enables BC Hydro's Kootenay Canal Generating Station to operate?

**Response:**

BC Hydro's Kootenay Canal Generating Station is able to operate due to the Canal Plant Agreement (CPA), which originally came into effect in 1975 when the Kootenay Canal Plant began operation. The CPA enables BC Hydro and the Entitlement Parties[1], through coordinated use of water flows and storage reservoirs, and through coordinated operation of generating plants, to generate more power from their combined generating resources than they could if they operated independently. Under the CPA, BC Hydro determines the output of the Entitlement Parties' plants and takes all the power actually generated by the plants into its system. In exchange, the CPA contractually entitles the Entitlement Parties to their respective "entitlements" of capacity and energy from BC Hydro. Under the CPA, BC Hydro does not provide direct compensation to FBC, but the entitlements received for Corra Linn provide significant financial benefits to FBC's ratepayers. Please also refer to the response to BCUC IR 1.1.2.

1.2 If yes, what is the basis for the compensation?

**Response:**

Please refer to the response to BCOAPO IR 1.1.1.

[1] FBC, Teck Metals Ltd., Brilliant Power Corporation, Brilliant Expansion Power Corporation and the Waneta Expansion Limited Partnership, as owners of generating plants that are the subject of the CPA (as renewed in 2005 and amended in 2011), are collectively referred to as the "Entitlement Parties".

**2.0 Reference: Exhibit B-1, page 13 (lines 2-4)**

2.1 Apart from routine maintenance, has there been any major refurbishment undertaken of either the spillway gates or the steel superstructure since their initial installation?

**Response:**

To the best of FBC's knowledge, no major refurbishment or upgrades have been completed on the spillway gates or the steel superstructure since their initial installation.

2.2 If yes, please indicate what refurbishment has been undertaken, what the costs were and when it occurred.

**Response:**

Please refer to the response to BCOAPO IR 1.2.1.

**3.0 Reference: Exhibit B-1, page 16 (lines 25-27)**

3.1 Please describe the process by which the "consequence category" for a dam like Corra Linn is established and who specifically establishes the rating.

**<u>Response:</u>**

The process to determine a consequence category for a dam is prescribed by the British Columbia Dam Safety Regulation (BCDSR) in section 3, "Dam failure consequence classification". Please refer to Section 3.2.1.2 of the Application (Page 17 line 9 to Page 20 line 4) for details pertaining to the BCDSR. A link to the current BCDSR is provided at footnote 13 on page 17 of the Application.

Section 3 of the BCDSR states that the dam owner must establish the consequence category and defines the elements that must be considered in determining the consequence category. The BCDSR requires that the consequence category for a dam such as Corra Linn be determined by an engineering professional (licensed by the Association of Professional Engineers and Geoscientists of BC). FBC retained the services of an engineering consultant (Knight Piésold) to complete a Dam Safety Review of the Corra Linn Dam. Through the 2012 Dam Safety Review, Knight Piésold determined that the Corra Linn Dam now met the criteria of a dam with "Extreme" consequence category. Please refer to Section 3.2.1.2.1 of the Application.

The dam owner must then submit any revision in classification to the BC Ministry of Environment, Dam Safety Office for acceptance by the Dam Safety Officer. The consequence category for the Corra Linn Dam is required to be reviewed annually by the dam owner and reviewed every seven years by an engineering professional.

It is noted that the Corra Linn Dam Consequence Classification was modified to "Extreme" under the past 2011 BCDSR, under this historic regulation written acceptance of the Consequence Classification change was not required.

**4.0 Reference: Exhibit B-1, page 17 (lines 5-6)**

4.1 Please describe the process by which the "design earthquake values" for a specific facility is established and who specifically develops the values.

**<u>Response:</u>**

The Corra Linn Dam "design earthquake values" were determined by Wutec Geotechnical International, a BC based specialist seismic engineering firm. The "design earthquake values" were developed with reference to the National Resources Canada (NRC) probabilistic seismic hazard database and the BC Hydro 'Probabilistic Seismic Hazard Analysis (PHSA) Model'. The methodology utilized by Wutec Geotechnical International to establish the "design earthquake values" is described in Appendix C, Section 2, of the Application.

**5.0 Reference: Exhibit B-1, page 23 (lines 8-15)**

**Exhibit B-1, page 26 (line 21) – page 27 (lines 6)**

**Exhibit B-1, pages 30 – 31 and pages 34-35**

**Preamble:** It is noted that the inspections performed in early 2016 only involved three of the 14 spillway gates.

5.1 Why were inspections not undertaken of all 14 spillway gates?

**<u>Response:</u>**

The 14 spillway gates are of identical vintage and design and are all operating under identical conditions, and therefore a representative sample size of three was chosen for detailed inspection based on a visual assessment of all 14 gates. Additional detailed inspections of the remaining gates would not impact the alternative FBC has selected for the Project and would have incurred additional costs with little incremental benefit. Refer also to the response to CEC IR 1.2.8.

5.2 Does the limited number of gates inspected create any additional risks regarding the scope of work required under the Gate Refurbishment alternative and the associated capital cost estimate?

**<u>Response:</u>**

Please refer to the responses to BCUC IRs 1.2.8 and 1.2.8.2.

5.3 If yes, have the effects on the risks associated with the scope of work actually required and the associated capital costs been accounted for in the contingency allowances used for Alternative 3 (per Table 4-2)?

**<u>Response:</u>**

Please refer to the responses to BCUC IRs 1.2.8 and 1.2.8.2.

The Construction Contingency dollars identified in Table 4-2 for Alternative 3 account for the potential risk of the spillway gates being in a worse condition than that of the three spillway gates which were inspected.

**6.0 Reference: Exhibit B-1, page 31 (lines 7-27)**

6.1 For each of the disadvantages in terms of project risks noted for Alternative 3, explain why the risk is greater under Alternative 3 than Alternative 4.

**Response:**

For each of the disadvantages identified in Section 4.3.1.3 of the Application, FBC considers that Alternative 3 (Gate Refurbishment) will have a higher risk than Alternative 4 (Gate Replacement) for the following reasons:

***Schedule***

The schedule risk is greater for Alternative 3 because the majority of the gate refurbishment work will occur in the field, as compared to Alternative 4 where the majority of the work for the new gates will be done in a controlled environment in a manufacturing plant. Also, as noted in Section 4.3.1.3 of the Application, Alternative 3 involves working in constrained areas that are not easily accessible and would require extensive temporary scaffolding and complex work procedures. As a result of the more complex construction procedures, Alternative 3 has a greater scheduling risk than Alternative 4.

***Scope***

The scope risk is greater for Alternative 3 than Alternative 4 because the extent of the gate refurbishment scope will depend on the actual condition of each gate, as noted in Section 4.3.1.3, page 31 of the Application.

***Environmental***

The environmental risk is greater for Alternative 3 than Alternative 4 because Alternative 3 involves the removal of lead paint, repainting and millwork which will be done on site in close proximity to the river. This could result in an increase to the Project cost because the schedule is likely to be impacted by the various environmental mitigation procedures that are required in the overall construction process. In Alternative 4 the majority of the construction activities will occur in a controlled plant environment that is designed to address environmental risks and which is located away from water sources.

***Safety***

The safety risk is greater for Alternative 3 than Alternative 4 because in Alternative 3 the workers will be working at heights in locations above or close to the river, requiring scaffolding and working in constrained areas which would likely increase the risks to workers' safety. Also more complex work procedures are required for Alternative 3 and additional safety procedures will be needed, increasing the schedule risk. In Alternative 4 the gates will be manufactured in a controlled plant environment that is designed to protect the workers and does not contain the risks associated with working from heights, working above water, or working in constrained spaces.

***Financial***

The financial risk is greater for Alternative 3 than Alternative 4 because Alternate 3 is more complex to construct and contains more scope uncertainties, as outlined above.

**7.0 Reference: Exhibit B-1, page 31 (lines 33-34)**

7.1 Please confirm which three Project Technical Criteria Alternative 3 is considered to achieve.

**<u>Response:</u>**

As outlined in Table 4-1 "Corra Linn Dam Spillway Gate Project Alternatives Comparison" of the Application, Alternative 3 achieves the following three Technical Criteria:

1 – Ability to Withstand the Design Flood and Design Earthquake Events;

2 – Ability of the Spillway Gate to Remain Operational Post Earthquake; and

4 – Reliability of Gates and Associated Equipment.

With respect to Criterion 4, FBC would like to clarify that while FBC considers this criterion to be achieved by Alternative 3, there is the potential for latent defects to remain following refurbishment. Specifically, as is identified in Section 4.3.1.3 of the Application:

> Refurbishment would minimize the number of possible failure modes and replace aging and obsolete equipment to minimize the risk of failure to the auxiliary equipment such as electrical power supply, hoists and towers (Criteria 4), however, there is the potential for latent defects to remain following refurbishment [35]
>
> [35] the skin plate stresses are inversely proportional to the square of the thickness and significantly increase as the material loss increases

Please also refer to the response to BCUC IR 1.4.2.

**8.0 Reference: Exhibit B-1, page 35 (Table 4-2)**

**Exhibit B-1, page 61 (lines 24-25)**

8.1 How did FortisBC determine that the BC CPI was the appropriate inflation rate to use for all costs associated with the Project?

**<u>Response:</u>**

Given the Project will involve a wide range of industries including tradespeople, subcontractors, and manufacturers (i.e. with respect to the spillway gates, hoists and hoist towers, electrical & control systems, temporary/permanent site civil work, temporary gantry & scaffoldings, etc.), and the duration of the Project necessitates a price forecast into year 2022, FBC considers BC CPI to be a reasonable inflation indicator. It is a broad indicator of the economy-wide inflation measure and provides a forecast widely used to represent the rate of price increase across all industries in BC.

FBC acknowledges that actual inflation rates for the duration of the project (i.e. 2017 to 2022) are likely to be different than the forecasts available today; as such, FBC included a provision to the contingency for higher than anticipated material and labour inflation. This provision is shown in Exhibit B-1-1, Confidential Appendix H – Risk Register.

8.2 Is there any provision in the contingency allowances for inflation being higher?

**<u>Response:</u>**

Yes, there is a provision in the contingency for higher than forecast inflation. Please refer to the response to BCOAPO IR 1.8.1.

**9.0 Reference: Exhibit B-1, page 36 (line 9) - page 37 (line 16)**

9.1 What was the discount rate used to establish the NPV values for the 2032 and 2045 replacements?

**Response:**

The after-tax weighted-average cost of capital (WACC) for FBC is used as the discount rate to establish the NPV values for 2032 and 2045 replacements. The approved 2016 after-tax WACC for FBC is 5.90%, which is equivalent to the Allowance for Funds Used During Construction (AFUDC) rate. The same discount rate is also used to evaluate the NPV of all alternatives (i.e. Alternative 3: Gate Refurbishment versus Alternative 4: Gate Replacement).

**10.0 Reference: Exhibit B-1, page 45 (lines 2-10)**
**Exhibit B-1, page 51 (lines 16-24)**
**Exhibit B-1, page 59 (Table 6-1)**
**Exhibit B-1, page 61 (lines 3-16)**

10.1 Does the choice of contracting approach (i.e., alliance agreement versus design build tender) affect whether the risk responsibility (per page 51) resides with FBC or the Contractor?

**Response:**

Please refer to the response to BCUC IR 1.2.3. As noted in that response, FBC is not contemplating a contractor alliance model but an ECI model. The choice of project delivery method (ECI or Design Build Tender) would affect whether the risk responsibility (per page 51 of the Application) resides with FBC or the contractor, as follows.

In the ECI model, the construction risks are collaboratively identified upfront and the risks are allocated to the party best able to manage or control the occurrence of the risk event, as indicated in the Risk Register at Confidential Appendix H.

Whereas, in the Design Build (DB) Tender, the contractor typically has full responsibility for all aspects of construction including: project management, managing, design and construction of the project, determining construction means and methods and selecting subcontractors and suppliers. The DB contractor would therefore best be able to manage all of the construction risks and allocates an amount in the lump sum contract price to account for the possibility of the risk occurrence. The owner pays for all risk allowances made by the DB contractor, regardless of whether the risk transpires or not.

10.2 If so, please indicate which approach results in more risk responsibility for FBC.

**Response:**

In the DB Tender, the construction risk generally lies with the contractor and will form a component of their fixed bid price. In contrast, in an ECI model, FBC would bear some of the known construction risks, as shown in the Project Risk Register at Confidential Appendix H. In this approach risk quantification and the contingency amount is transparent. Please refer to the response to BCUC 1.2.3 and BCOAPO 1.10.1.

10.3 If so, how was this accounted for in establishing the Contractor's costs versus FBC Owner's costs and contingency allowances in Table 6-1?

**Response:**

As discussed in Section 6.3.1.2 of the Application, the Project contingency was determined based on the Risk Register that was established by FBC and HMI collaboratively for the known risk elements that were identified for the Project. The Risk Register is included in the Application as Confidential Appendix H. These risks were identified, in part, based on HMI's extensive experience in recent similar spillway rehabilitation work in the Province and FBC's experience on past projects.

The Risk Register also identifies which of the known risks are most likely to be held by a contractor and the financial impacts of the contractor related risks. The sum of these financial impacts was included in the cost estimate as Construction Contingency, as shown in Table 6-1 of the Application. All of the other known risks identified in the Risk Register that are not likely to be held by a contractor will be held by the owner (owner's known risks). The financial impact of the owner's known risks was included to the Project Contingency under FBC Owner's Costs, as shown in Table 6-1 of the Application.

In addition to the owner's known risks identified in the Risk Register, FBC also established a contingency for those risks that are commonly called unknown risks to account for possible scope changes or unknown future events which cannot be anticipated and which were not quantified in the Risk Register. This additional contingency is added to the owner's known risks, as described above, and they together comprise the Project Contingency shown in Table 6-1 of the Application.

In establishing the total Project capital cost, contingencies for both known and unknown risks were added to the Class 3 estimate so the overall Project capital cost presented in the Application is applicable to either project delivery method. If a DB model is chosen, however, instead of the ECI model, it is likely that the contingencies would be allocated differently than shown in Table 6-1.

10.4 Does the choice of contracting approach impact the estimated overall cost of the project and, if so, how was this accounted for in establishing the overall project costs set out in Table 6-1?

**Response:**

Please refer to the response to BCOAPO IR 1.10.3.

**11.0 Reference: Exhibit B-1, page 57 (lines 9-18)**

11.1 Does the fact only three spillway gates were inspected impact at all on either the likely accuracy of the cost estimate for Alternative 4 or other project risks associated with Alternative 4?

**Response:**

The fact that only three spillway gates were inspected does not impact either the accuracy of the cost estimate or other project risks associated with Alternative 4 because Alternative 4 is the Gate Replacement option and all of the gates will be replaced under this alternative. That is, the condition of the gates is not a factor in the Alternative 4 cost estimate. The condition of the gates, however, is a factor in Alternative 3, the Refurbishment option, and an additional contingency of $375 thousand was included.

11.2 If yes, have these been accounted for in the project cost contingency (per Table 6-1)?

**Response:**

Please refer to the response to BCOAPO IR 1.11.1.

11.3 If yes, why were more spillway gates not inspected?

**Response:**

Please refer to the response to BCOAPO IR 1.11.1.