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August 25, 2017

**VIA ELECTRONIC MAIL**

Commission Secretary  
B.C. Utilities Commission  
Sixth Floor, 900 Howe Street  
Vancouver, BC Canada V6Z 2N3

Attention: Mr. Patrick Wruck

Dear Mr. Wruck:

**Re: BCUC – Site C – Due Diligence Questions**

**1. Introduction**

In order to assist the B.C. Utilities Commission's ("BCUC") review of the Site C project, Clean Energy B.C. ("CEABC") has prepared a set of due diligence questions that could be used to assess B.C. Hydro's Site C financial model(s) ("*Site C Model*"). These questions, and they are not exhaustive, are the first part of the submission that the CEABC intends to file by August 30, 2017 ("*Submission*").

The Site C Model assessment is one of the steps in the process that will lead to a level playing field comparative analysis between the partially developed Site C project and a portfolio of commercially feasible generating projects ("Alternative Generation") and demand-side management ("DSM") initiatives as described in the Site C Terms of Reference<sup>1</sup>. The questions are based on the long term experience that independent power producers ("IPPs") have in developing various types of generating projects. While they typically do not develop large run-of-river hydro projects like Site C, their experience is applicable to this type of development.

The Site C Model should produce the plant gate price for the Site C project which can then be compared to the plant gate price of Alternative Generation, and DSM. Unlike for the Site C project, the BCUC does not have to conduct much diligence into Alternative Generation because it is an "all in price" with IPPs taking development and operating risk for the term of the electricity purchase agreement. There are open and transparent competitive bidding processes that can be used to ascertain the plant gate price for Alternative Generation e.g. wind and solar such as those taking place in Alberta and Saskatchewan. There are other data sources such as the U.S. Energy Information Agency. Some due diligence has to be undertaken with respect to U.S. data because of the significant differences in U.S. and Canadian tax and incentive regimes.

<sup>1</sup> Section 3(b)(iv)

The CEABC's comments on the level playing field comparative analysis that is required to be undertaken as between the Site C project and Alternative Generation plant gate prices, DSM, some additional comments about the Site C Model due diligence and other matters will be contained in Part 2 of the Submission. There is no question that for the purposes of the comparative analysis, adjustments have to be made to plant gate prices in order to level the playing field, for example in relation to the provision of dependable capacity, but it is imperative that any adjustments that are made are known; especially those that have been made at the model level in the form of an assumption or otherwise.

Part 1 of the Submission is structured to track what the CEABC can loosely be described as the "headings" in the Site C Model. To date the CEABC does not have access to this model so it is anticipating the contents of it. For example there should be a heading entitled "Electricity Production" with subheadings such as "dependable capacity", "average annual firm generation", "annual non-firm generation" etc. The due diligence questions will be grouped under the appropriate heading and sub-heading but some interpretation may be required to match the postulated headings and sub-headings with the appropriate and actual Site C Model heading and sub-headings.

Not all the sub-headings are referenced herein because at this time the CEABC has no corresponding due diligence question(s). This may change if the CEABC is provided with access to the Site C Model. The answers to the below questions may precipitate follow-up questions.

## **2. Model Heading: Electricity Production**

### **A. Sub-heading: Dependable Capacity**

Can the Site C generation be freely dispatched or is it subject to ramping or other restrictions due for example to downstream ice formation and fisheries restrictions?

How do these restrictions, if any, impact the calculation of dependable capacity?

How do the Site C reservoir drawdown commitments impact the calculation of dependable capacity?<sup>2</sup>

Does the Site C generation generally have to be run in tandem with the upstream Peace River projects?

If yes, how does this impact the calculation of dependable capacity?

What impact, if any, do these minimum flow releases have on the calculation of dependable capacity?

Why/how was the capacity of the Site C generation increased from 900 to 1,100 megawatts?

What impact did this increase have on the calculation of dependable capacity?

How has the stated value of the Site C dependable capacity been calculated and forecast for the apparent 70 year amortization period commencing in 2024 for the Site C Model?

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<sup>2</sup> BC Hydro Information Sheet, Site C Reservoir, January 2016, "The Site C reservoir will be one of the most stable in the BC Hydro system with relatively little fluctuation in water levels during typical operations. The proposed maximum normal operating range for the Site C reservoir will be 1.8 metres – between 460.0 and 461.8 metres. However during typical operations the reservoir is expected to fluctuate within a smaller range."

## **B. Sub-Heading: Energy**

What, if any, minimum flow releases are required to be made from the Site C project?

What impact, if any, do these minimum flow releases have on the calculation of annual firm energy?

Given the inflows into the Site C reservoir from the Halfway and Moberly Rivers in the spring freshet and the very limited storage capacity of the Site C reservoir, is the energy produced from these flows, assuming the water isn't spilled, characterized as firm or non-firm energy?

Of the 5,100 GWh of average annual energy being estimated, what is the breakdown by month and by high load and low load time periods.

How much of the 5,100 GWh of average annual energy for the Site C project is being classified as Firm Energy and how much as Non-Firm Energy?

Is the 5,100 GWh of average annual energy being estimated on the basis of maximizing the energy production from the Site C project, or on the basis of maintaining the existing downstream waterflows, or on the basis of some other criteria? What are the details of the assumptions?

If, after the Site C project is operational, the upstream Peace generating facilities (GMS and Peace Canyon) continued to be operated in exactly the same way they are currently operated, then what would be the average annual energy generated by the Site C project be?

## **3. Model Heading: Capital Cost**

### **A. Sub-Heading: Dam**

Does the cost to complete the dam include the cost of the delays identified in BC Hydro's Site C Quarterly Progress Report No. 7 as filed with the BCUC?

If yes what is the total cost including current delays?

Does the cost to complete include the cost of all change orders issued by BC Hydro to the Acciona led consortium and change orders issued by this consortium to BC Hydro to date?

If yes, what is the total cost of these change orders?

Does the cost to complete include capitalized overhead costs?

As BC Hydro is the prime or main contractor for the Site C project as well as the owner, are the contingencies in the Site C Model sufficient to cover the risk of BC Hydro being the prime or main contractor? Or put another way: *"Does the cost to complete include contingencies sufficient for prime or main contractor caused delays and hand-off risks?"*

If the geotechnical baseline established for the dam turns out to be worse than expected how will the design of the dam be affected?

Is there any dam or other structure anchoring system that is based on this baseline?

If the baseline is worse than expected, does the cost to complete include contingencies sufficient to cover the cost of altering or finding another solution to any anchoring system including time, equipment, labour and materials?

Will only commercially proven methods be used to remedy any problems?

If the mass of the dam, the size of foundation area or any other feature needs to be altered because of a worse than expected geotechnical baseline, does the cost to complete include contingencies sufficient including time, equipment, labour and materials to cover this risk?

Will only commercially proven methods be used to remedy any problems?

If this baseline is worse than expected, and additional grouting measures are required does the cost to complete include contingencies sufficient including time, equipment, labour and materials to cover this risk?

Will only commercially proven methods be used to remedy any problems?

#### **B. Sub-Heading: Diversion Tunnels**

If this baseline is worse than expected and problems are incurred in constructing the diversion tunnels does the cost to complete include contingencies sufficient including time, equipment, labour and materials to cover this risk?

#### **C. Sub-Heading: Cofferdam**

If the geotechnical baseline is worse than expected and problems are encountered in constructing the cofferdam, does the cost to complete include contingencies sufficient including time, equipment, labour and materials to cover this risk?

If the cofferdam is overtopped does the cost to complete include contingencies sufficient including time, equipment, labour and materials to cover this risk?

#### **D. Sub-Headings: Spillway, Intake and Penstock**

In Table 14 of the Report of the Joint Review Panel<sup>3</sup> the cost estimate for the “*Dam and associated structures (earthfill dam, approach channels and RCC buttress, spillway, intakes and penstock, left bank stabilization, cofferdams, dikes and diversion tunnels)*” is \$1.79 billion. The Site C Main Civil Contract award for \$1.7 billion did not include the spillway, intake and penstock. Are the contingencies sufficient, including time, equipment, labour and materials to cover the cost of the spillway, intake and penstock?

Why was the plan date for the Generating Station and Spillway Civil Works contract award changed to a forecast/actual date of December 2017 (Limited Notice to Proceed)? Does the cost to complete include contingencies sufficient, including time, equipment, labour and materials to cover this change?

There are numerous provisions in the redacted version of Schedule 11 to the Site C Main Civil Contract that could result in increased payments to the contractor e.g. change in quantities. Does the cost to complete include contingencies sufficient to cover this risk?

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<sup>3</sup> May 1, 2014, Page 279

If the geotechnical baseline is worse than expected and problems are encountered in constructing the spillway, intake and/or intake, does the cost to complete include contingencies sufficient including time, equipment, labour and materials to cover this risk?

Will only commercially proven methods be used to remedy any problems?

**E. Sub-Heading: Transmission**

Does the cost to complete include all transmission system expansions and upgrades to the point of interconnection?

**F. Sub-Heading: First Nations Settlement Costs**

Does the cost to complete include all First Nation's accommodation and settlement costs, including crown land transfers and any carried equity interests?

Does the cost to complete include contingencies sufficient to cover any court awarded damages for potential breach of treaty claims?

**4. Heading: Operating and Maintenance Costs**

What base annual amount has been used for school, municipal and property taxes?

How is the annual amount adjusted over the apparent amortization period to take into account increases?

Do the costs to operate the Site C project include adequate refurbishing and replacement costs such as major maintenance over the amortization period? How are these costs forecast over the apparent amortization period?

Does the cost to operate the Site C project include the cost of insurance? How is this cost forecast over the amortization period?

Is there a decommissioning cost for the Site C project?

If yes what is it?

**5. Heading: Financing**

What is the assumed debt to equity ratio for the Site C project?

Is it constant over the apparent amortization period?

Is all the debt long term debt i.e. 40 year maturity period or is it a combination long, medium and short term debt?

Will any combination be constant over the apparent amortization period?

What rate of interest has been assumed for long term debt? Medium term debt? Short term debt?

How are these rates forecast over the apparent amortization period?

How is the risk of variance from these forecasts dealt with?

Will all the debt be in Canadian dollars?

If no, how is the foreign currency risk dealt with?

What return on equity has been assumed over the apparent amortization period?

Is it constant over the apparent amortization period?

## **6. Heading: Revenue**

How is the domestic revenue from the energy generated by the Site C project forecast over the apparent amortization period?

Is there any difference in the forecast revenue for energy produced at the different times of year, months or times of the day including the spring freshet?

How is the export (beyond the borders of B.C.) revenue from the energy generated by the Site C project forecast over the apparent amortization period?

How is the currency risk associated with sales in U.S. dollars dealt with over the apparent amortization period?

How is the export (beyond the borders of B.C.) revenue from the capacity provided by the Site C project forecast over the apparent amortization period?

How is the currency risk associated with these sales in U.S. dollars dealt with over the apparent amortization period?

How are wheeling charges for export energy and capacity forecast over the apparent amortization period?

How is the currency risk associated with wheeling charges in U.S. dollars dealt with over the apparent amortization period?

**7. Heading: Unit Energy Cost Calculation (Plant Gate Price)**

What are the annual cash flow forecasts over the apparent amortization period, broken down by years, and by expenditure and revenue categories, such as:

Capital expenditures by category;

Operation and maintenance expenditures – including future capital maintenance requirements;

Cash inflows from debt financing and outflows for debt repayments in the form of principal and interest payments;

Cash inflows from equity financing and outflows for payments for return on, and return of, equity;

Revenues from sales of surplus energy from time to time (or costs for purchases of energy, if and when necessary);


Any other costs or revenues affecting the unit energy calculation.

What is the discounting applied to both the annual cash flow forecasts and the energy production forecasts, in arriving at the levelized unit energy cost for the Site C project?

All of which is respectfully submitted.

Yours truly,

**CLARK WILSON LLP**

Per: 

David Austin

DAA/lmd