



February 19, 2018

Sent via eFile

BC HYDRO WANETA 2017 TRANSACTION EXHIBIT A-17
--

Mr. Fred James
Chief Regulatory Officer
Regulatory & Rates Group
British Columbia Hydro and Power Authority
16th Floor – 333 Dunsmuir Street
Vancouver, BC V6B 5R3
bhydroregulatorygroup@bhydro.com

Re: British Columbia Hydro and Power Authority – Waneta 2017 Transaction Application – Project No. 1598933 – Commission Information Request No. 2

Dear Mr. James:

Further to your October 30, 2017 application of the above-noted matter, enclosed please find British Columbia Utilities Commission (Commission) Information Request (IR) No. 2. In accordance with the regulatory timetable, please file your responses no later than Thursday, March 8, 2018.

On February 16, 2018, BC Hydro filed with the Commission a letter agreement it has signed with FortisBC Inc. (FBC) on how to address concerns FBC had about the possible implications of the Waneta 2017 Transaction on its current transmission arrangements with Teck Metals Ltd. Please be advised that the Commission will be filing additional Information Requests regarding the above agreement by Wednesday, February 21st, 2018.

Sincerely,

Original signed by Ian Jarvis for:

Patrick Wruck
Commission Secretary

/ad
Enclosure



British Columbia Hydro and Power Authority
Waneta 2017 Transaction

INFORMATION REQUEST NO. 2 TO BC HYDRO

Table of Contents	Page no.
A. Risks and Potential Value of the Transaction	1
B. Waneta Lease Agreement	24
C. Co-Possessor and Operating Agreement	27
D. Waneta Transmission Agreement	27
E. Rate Related Requests.....	29
F. Rate Related Requests.....	37
G. Regulatory Matters.....	38

A. RISKS AND POTENTIAL VALUE OF THE TRANSACTION

**65.0 Reference: GEOGRAPHICAL MAP
Exhibit B-1 (Application), Section 2.4, p. 2-15**

On page 2-15 of the Application, BC Hydro provides a logical map of “the location of the key storage, generation and transmission facilities in the region.”

65.1 Please provide a geographical map showing the relative position of the Waneta dam and the transmission assets of BC Hydro, Teck and FortisBC.

**66.0 Reference: POWER EXPORT
Exhibit B-1, Section 4.9, p. 4-21, pp. 4-24–4-25**

In Section 4.9 of the Application, the British Columbia Hydro and Power Authority (BC Hydro) sets out the factors it states “the Commission must consider as a matter of law in its assessment of the Waneta 2017 Transaction under subsection 44.2(5.1) of the *Utilities Commission Act*.”

On page 4-24 of the Application, BC Hydro cites section 2(n) of the *Clean Energy Act* which states:

(n) to be a net exporter of electricity from clean or renewable resources with the intention of benefiting all British Columbians and reducing greenhouse gas emissions in regions in which British Columbia trades electricity while protecting the interests of persons who receive or may receive service in British Columbia;

On page 4-24 and page 4-25 of the Application, BC Hydro states:

Waneta is a "clean or renewable resource" under the Clean Energy Act. The Waneta 2017 Transaction serves this provincial objective by putting Waneta into BC Hydro's hands for ultimate use as a resource that will either assist BC Hydro in meeting its domestic load-serving obligations or will generate incremental export revenues.

- 66.1 How much power from BC Hydro's one-third interest in the Waneta Assets has been exported each year since its acquisition in 2010? Please also specify the price at which the power was exported.
- 66.2 Please explain the role of Powerex, if any, in the Waneta 2017 Transaction.
 - 66.2.1 Please confirm any losses incurred by Powerex, related to Line 71, are ultimately passed on to BC Hydro ratepayers. If not, please explain.
- 66.3 If the power from BC Hydro's two-thirds interest in Waneta were not required to serve domestic customers, please explain why the Waneta 2017 Transaction should be included in ratebase.

**67.0 Reference: TRANSMISSION FACILITIES AGREEMENT BETWEEN TECK AND FORTISBC
Exhibit B-8-2, British Columbia Utilities Commission (Commission, BCUC) IR 1.41.1**

In its response to BCUC IR 1.41.1, BC Hydro did not provide the Transmission Facilities Agreement between Teck and FortisBC.

- 67.1 Please confirm that the Transmission Facilities Agreement between Teck and FortisBC is not available to BC Hydro. If not confirmed, please provide this agreement.

**68.0 Reference: WANETA PLANT EFFICIENCY AND UPGRADES
Exhibit B-8-2 BCUC IR 1.43.3**

In response to BCUC IR 1.43.3, BC Hydro indicated that "Waneta generation was considerably lower at 1573 GWh due to the revised dispatch that favours running the Waneta Expansion Project as it is a more efficient plant." Further, BC Hydro stated:

For example Waneta was dispatched over 400 MW approximately 44 per cent of the time, and over 100 MW approximately 84 per cent of the time. The post Waneta Expansion Project data shows that the Waneta dispatch has changed to be above 400 MW only 14 per cent of the time, and over 100 MW approximately 75 per cent of the time, reflecting the lower preference to run Waneta relative to the Waneta Expansion Project.

- 68.1 Please discuss the likelihood, and associated risks, of the Waneta generation decreasing further in the future due to Waneta being a less efficient plant.
- 68.2 Please discuss the pros and cons of undertaking projects at Waneta to increase the plant's efficiency.

**69.0 Reference: COLUMBIA RIVER TREATY, PACIFIC NORTHWEST COORDINATION AGREEMENT, CANAL
PLANT AGREEMENT
Exhibit B-8-2 BCUC IR 1.45.1**

In response to BCUC IR 1.45.1, with respect to improving coordination of plants on the Pend d'Oreille, BC Hydro stated:

BC Hydro is the Canadian entity under the Treaty, and in that capacity has a number of Treaty-related roles and responsibilities. Those roles and responsibilities do not include the initiation of discussions with either the U.S. entity under the Treaty, or the United States government, regarding Treaty amendment or modernization; those responsibilities lie at the federal level. Similarly, any coordination arrangements between Canadian and American entities regarding streamflows on the Pend d'Oreille River is ultimately within the purview of the respective federal governments.

69.1 Is BC Hydro in discussions with the Canadian federal government regarding the Columbia River Treaty and the Pacific Northwest Coordination Agreement, with respect to improving coordination of plants on the Pend d'Oreille? If not, why not. Please elaborate.

**70.0 Reference: LOCAL OPERATING ORDERS
Exhibit B-8-2, BCUC IR 1.41.7, BCUC IR 1.43.9**

In response to BCUC IR 1.41.7, BC Hydro provides applicable transmission local operating orders.

70.1 Please discuss how the transmission local operating orders will change if BC Hydro receives approval to acquire the Transmission Assets from Teck under the Waneta 2017 Transaction.

In response to BCUC IR 1.43.9, BC Hydro provides the Waneta generating station local operating order.

70.2 Please discuss how the Waneta generating station local operating order will change if BC Hydro receives approval for the Waneta 2017 Transaction.

**71.0 Reference: SENSITIVITY ANALYSIS
Exhibit B-1, Appendix N (Business Case), pp. 29–33, Appendix B, Figure 1 to 3, p. 65;
Exhibit B-8, BCUC IR 1.24.1, Economic Life**

In response to BCUC IR 1.24.1, BC Hydro stated:

Use of a 70-year economic life is unsupportable without increasing the capital investment in the Waneta Assets...BC Hydro has not performed an assessment of capital costs beyond 40 years and as such, the capital cost schedule assume that the only the sustaining capital amounts extend for the additional 30 years.

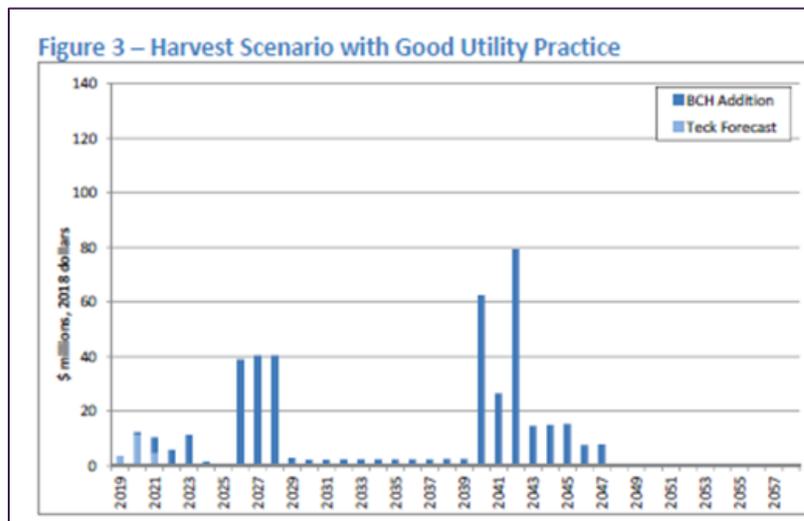
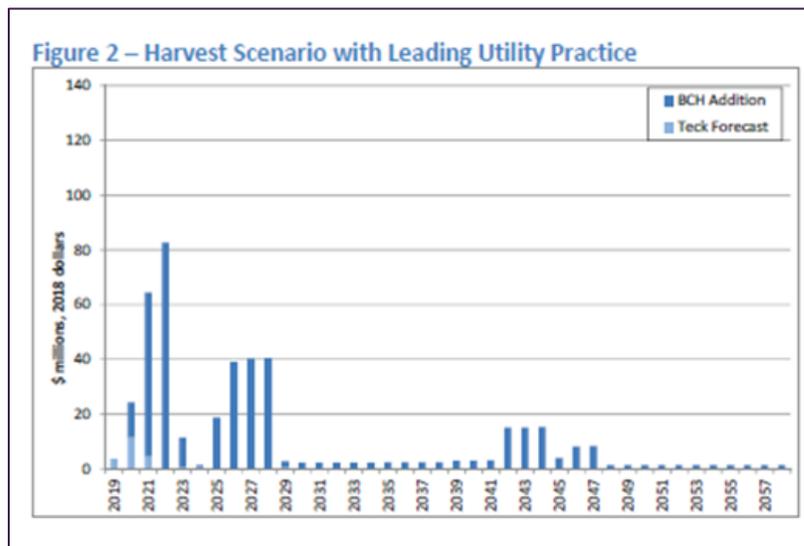
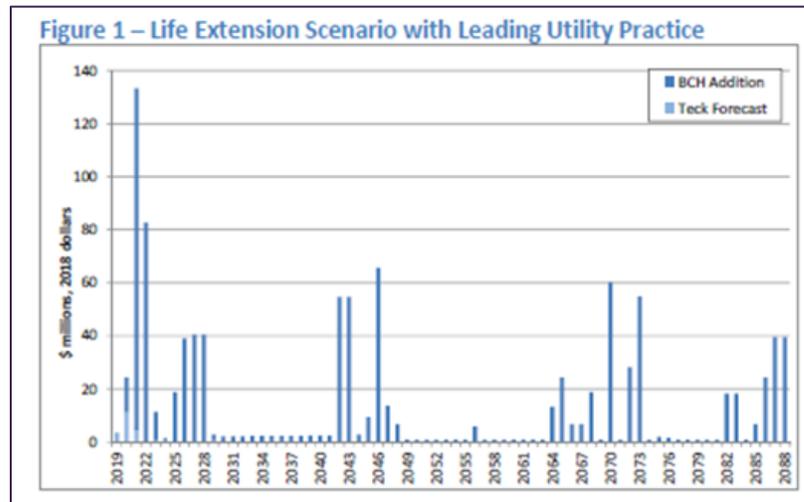
Appendix B to the Business Case states, among other things:

- A 'Harvest' scenario where investments are made to preserve the 40-year economic life, but not extend the life beyond this point...likely that the asset will continue to operate following this 40-year life, however the go-forward present value benefits net of required investments may drop below zero.
- A 'Life Extension' Scenario where investments are made to extend the asset life indefinitely. In such a case we have adopted a 70-year economic planning life as the "extended" life.

Based on these two considerations, BC Hydro identified three capital scenarios for consideration.

1. Life Extension Scenario with Leading Utility Practice for dam safety and water passage items...(Emphasis added)

The projects required under each of the three scenarios are also described in Appendix B:



71.1 Please confirm that Figure 1 provides a good proxy of what BC Hydro would expect as a capital cost schedule going forward indefinitely every 70 years.

71.1.1 If not, what does Figure 1 represent?

- 71.1.2 If not, please provide a general schedule that reflects the periodic capital investments that would be required every 70 years to ensure the asset remains operational.
- 71.1.2.1 Please quantify at a high level the costs and projects required as part of the period capital investments included in a good proxy capital cost schedule.
- 71.2 Please confirm that Figure 2 provides a good proxy of what BC Hydro would expect as a capital cost schedule going forward indefinitely every 40 years.
- 71.2.1 If not, please provide a general schedule that reflects the periodic capital investments that would be required every 40 years to ensure the asset remains operational.
- 71.2.1.1 Please quantify at a high level the costs and projects required as part of the period capital investments included in a good proxy capital cost schedule.
- 72.0 Reference: METHODOLOGY**
Exhibit B-1, Appendix N, p. 57; Exhibit B-8, BCUC IR 1.22.1; Economic Life Sensitivities; Exhibit B-9, CEABC IR 1.8.6; Review of Waneta Capital Expenditure forecasts

On page 57 of the Business Case, BC Hydro states:

A 'Harvest' scenario where investments are made to preserve the 40-year economic life, but not extend the life beyond this point. It remains likely that the asset will continue to operate following this 40-year life, however the go-forward present value benefits net of required investments may drop below zero.

In response to BCUC IR 1.22.1, BC Hydro stated:

BC Hydro believes an assumption of a remaining economic life of at least 40 years is appropriate. It is expected that the Waneta Dam will have an operating life beyond this period; with the planned maintenance capital expenditures and experience with these sorts of assets, it is reasonable to assume a positive net economic value in 40 years. However no "terminal value" has been included in the Waneta Business Case, which is the basis for the comment that the assumption is conservative... aligning the economic life with this arbitrary term would not be appropriate without also including a terminal value adjustment for the post-Lease Period. (Emphasis added)

In response to CEABC 1.8.6, BC Hydro stated:

BC Hydro's selection of a 40-year economic life is not the same as a 40-year asset life. BC Hydro expects the asset to operate in perpetuity, and has not prepared an estimate of the cost of decommissioning.

- 72.1 Does the use of a terminal value adjustment assist in determining the value of the Waneta Dam in 40 years? Why or why not?
- 72.2 In stating that the "go-forward present value benefits net of investments may drop below zero" following the 40-year economic life, does this mean that the Waneta Dam will be re-evaluated towards the end of its 40-year economic life?
- 72.2.1 If yes, would this evaluation include or exclude a cost of decommissioning?
- 72.2.2 If no, please explain.

**73.0 Reference: BUSINESS CASE
Exhibit B-8, BCUC IR 1.1.2, BCUC IR 1.3.3 Attachment 1, BCUC IR 1.16.4; Exhibit B-8-2,
BCUC IR 1.5.5 Attachment 1
Load resource balance**

In response to BCUC IR 1.1.2, BC Hydro stated that:

The planning view (lines 17b, 19b and 20b) should be used to understand the need (in GWh) for new energy resources in the mid gap, small gap and large gap scenarios, respectively. The operational view (lines 17, 19 and 20) should be used to understand the expected operational surplus/deficit volumes based on the scenarios shown. Both views are used to evaluate the Waneta 2017 Transaction. (Emphasis added)

73.1 Please indicate all instances where BC Hydro used the operational view to evaluate the Waneta 2017 Transaction versus the instances where it used the planning view.

In BCUC IR 1.3.3 Attachment 1, BC Hydro forecasts Teck's load from F2039 to F2058 at 1,783 GWh, leaving an energy surplus of 48 GWh during the post Lease period. In BCUC IR 1.5.5 Attachment 1, Teck provides its load forecast for the next 20 years. For the period 2023 to 2037, Teck forecasts its load at 1,856 GWh.

73.2 Please explain why BC Hydro forecasts Teck's post-Lease load to be 1,783 GWh, that is 73 GWh less than the 1,856 GWh forecasted by Teck during the 15-year period preceding the post-lease period.

73.3 Please confirm, otherwise explain, that if Teck's post-Lease load is closer to Teck's forecast of 1,856 GWh, the energy amount from the 2/3 Interest (1,831 GWh) would not be sufficient to serve Teck's load.

73.3.1 If so, please confirm, otherwise explain, that BC Hydro would not have an extra 48 GWh/year to offset expected future new resource requirements.

In response to BCUC IR 1.16.4, BC Hydro stated:

The post-lease transaction value at BC Hydro's Industrial Tariff assumes that BC Hydro uses its two-thirds portion of energy and capacity to serve Teck's smelter load. This energy amount is less than the total entitlement associated with the two-thirds interest in Waneta by approximately 48 GWh/year. In the "BC Hydro Industrial Tariff" scenario BC Hydro assumes this extra 48 GWh/year offsets expected future new resource requirements consistent with the pricing used in the LRM-Clean scenario.

73.4 Please confirm, otherwise explain, that the Industrial Tariff Scenario results in a higher transaction value due to BC Hydro attributing an Long-Run Marginal Cost (LRMC) (Clean) value to the "48 GWh" annual surplus, an amount that would not be collected if Teck's load is greater than the energy from the 2/3 Interest.

**74.0 Reference: BUSINESS CASE
Exhibit B-1, Appendix N, p. 27; Exhibit B-8-2, BCUC IR 1.5.1, BCUC IR 1.5.3
Counterparty risk**

On page 27 of the Business Case, BC Hydro states: "BC Hydro evaluated the cost or benefit of Teck default in each year of the 20-year term. The sum of the probability-weighted value over this 20-year term represents the risk-adjusted value of the transaction."

In response to BCUC IR 1.5.1, BC Hydro stated:

The probabilities provided by Moody's represent the probability of an entity defaulting in a particular year in the future. The cumulative default probabilities were calculated using these as an input. As an example, the cumulative default probability for a three-year period are based on the individual year default probabilities for years one, two and three. [...] These extrapolated probabilities were used to calculate the cumulative default probabilities out to the twenty year.

- 74.1 Please confirm, otherwise explain, that BC Hydro has used the cumulative default probability when calculating the sum of the probability-weighted transaction value over the 20-year Lease Term.

In response to BCUC IR 1.5.3, BC Hydro stated:

While production at Red Dog is expected to continue well beyond the end of the current mine plan (2031), Trail could potentially need to source a significant amount of concentrate post-2031 in order to continue operating at full capacity. [...] As an integrated smelter operation, Teck actively seeks concentrates that the Trail smelter is best suited to refine, and from which it is possible to earn higher margins. While the Trail operations are positively correlated with zinc prices, the smelter operations have been profitable in all but two of the past 16 years (2002 and 2003) and have shown improved overall results based on a number of efficiencies resulting from capital expenditure and process improvements. In the event that Red Dog were to suffer an unexpected or early closure, the ability for the Trail operations to remain profitable and/or continue to produce could be impacted.

- 74.2 How easy/difficult would it be for the Trail operations to find a significant source of concentrates of the type the smelter is best suited to refine in case Red Dog could no longer supply the concentrates, in the short-term, medium-term or post 2031? Please discuss.
- 74.3 Please provide a graph showing the annual zinc prices and annual profits for the Trail operations over the last 16 years. Please provide the coefficient of correlation.
- 74.3.1 On the same graph, please provide a forecast of zinc prices during the Lease Period, and provide the source material for this forecast.
- 74.3.2 On the same graph, please provide a forecast of the annual profits of the Trail operations during the Lease Period, and provide the source material for this forecast or the assumptions used in calculating the forecast.

**75.0 Reference: BUSINESS CASE
Exhibit B-8, BCUC IR 1.6.1, BCUC IR 1.6.2, BCUC IR 1.7.4 Attachment 1 (Excel file)
LRMC values**

In response to BCUC 1.6.1, "BC Hydro notes that in the default scenarios we also use the LRMCs from Tables 3-10 and 3-11 for 'Demand-Side Management and Electricity Purchase Agreement renewals' and Revelstoke Unit 6, respectively, for the stated periods of applicability."

Marginal Resources	Period of Applicability	LRMC	
		Clean + Gas	Clean Only
Energy: EPA Renewals and DSM	F2029 to F2033	\$85/MWh (\$F2013)	\$85/MWh (\$F2013)
Energy: Greenfield IPPs	F2034 and beyond	\$100/MWh (\$F2015)	\$106/MWh (\$F2015)
Capacity: Revelstoke Unit 6	F2022 to F2028	\$55/kW-year (\$F2013)	\$55/kW-year (\$F2013)
Capacity: SCGT or Pumped Storage	F2029 and beyond	\$88/kW-year (SCGT) (\$F2018)	\$221/kW-year (pumped storage) (\$F2018)

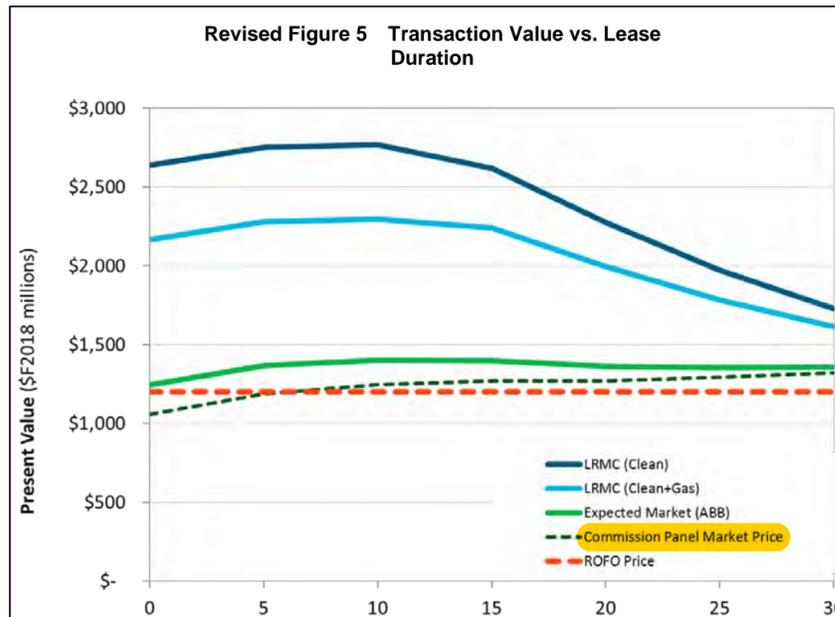
- 75.1 Please confirm, otherwise explain, that the period of applicability to use the energy LRMC for DSM and EPA renewals is from F2029 to F2033.
- 75.1.1 If so, please also confirm that the only instance where BC Hydro would have used the LRMC for DSM and EPA is under the large gap Load-Resource Balance (LRB) (Line 20b, Table 3-8, BCUC IR 1.1.2 Attachment 1), where BC Hydro is in an energy deficit position as of F2022. If not, please explain why not.
- 75.1.2 Please clarify which LRMC is used for periods of deficit before F2029 (*i.e.*, lines 19 to 28, columns K, L, R and S in BCUC IR 1.7.4 Attachment 1 (Excel file)).
- 75.2 The above table shows an energy LRMC (Greenfield IPPs) of \$100/MWh (\$F2015) for LRMC C + G and \$106/MWh (\$F2015) for LRMC Clean, whereas Table 3 of the Business Case (page 19 of 90) shows an energy LRMC (Greenfield IPPs) of \$106/MWh (\$F2018) for both LRMC C + G and LRMC Clean. Based on BCUC IR 1.7.4 Attachment 1 (Excel file), the correct values seem to be those of Table 3 in the Business Case. Please confirm, otherwise clarify.

	Unit Energy Cost (Energy Only)	
Levelized	LRMC-C+G	LRMC-C
2029	52.07	52.07
2030	55.31	55.31
2031	58.89	58.89
2032	62.32	62.32
2033	64.88	64.88

- 75.3 The above snapshot is taken from BCUC IR 1.7.4 Attachment 1 (Excel file). Please explain how the energy LRMC value of \$85/MWh (\$F2013) from the table provided in BCUC IR 1.6.1 agrees with the annual values ranging from \$52.07/MWh to \$64.88/MWh in F2029 to F2033.
- 75.4 Please convert all LRMC values in the table provided in BCUC IR 1.6.1 to \$F2018, and include any corrections as required.

**76.0 Reference: BUSINESS CASE
Exhibit B-8, BCUC IR 1.6.3, Revised Figure 5; BCUC IR 1.6.5, Revised Figure 5a, 5b, 5c;
BCUC IR 1.6.7
Counterparty risk**

In response to BCUC IR 1.6.3, BC Hydro provided the following Revised Figure 5:



In response to BCUC IR 1.6.5, BC Hydro provided Revised Figures 5a, 5b and 5c.

In response to BCUC IR 1.6.7, BC Hydro provided the following table:

Basis for Post-Lease Value	Scenarios #'s in Waneta Valuation Model	Teck Default after 5 years	Teck Default after 10 years	Teck Default after 15 years
LRMC – Clean only	7, 8, 9	1,549	1,567	1,413
LRMC – Clean + Gas	14, 15, 16	1,075	1,093	1,039
BCH Industrial Tariff	35, 36, 37	405	315	239
Market Prices (ABB)	21, 22, 23	164	199	194
Extrapolated Prices	28, 29, 30	■	■	■

- 76.1 Please add the “un-risked transaction value range with 20-Year and 20-Year Post-Lease Value @ LRMC & Commission Panel Market Price”, assuming a mid-gap LRB for the valuation of the surplus/deficit, similarly to what BC Hydro presented in Figure 5 of Exhibit B-1-1.
- 76.2 Please explain how BC Hydro calculates the high and low value of this range.
- 76.3 Please explain why BC Hydro provided the NPV of the Transaction valued at “BC Hydro Industrial Tariff” for various default scenarios when footnote 4 on page 27 of the Business Case states “no counterparty risk adjustment is done for the tariff scenario”.
- 76.4 Please revise the table provided in BCUC IR 1.6.7 titled “Net Present Value of Transaction for Various Defaults Scenarios” by adding a third market price scenario, corresponding to the “Panel Mid-C market price.”
- 76.5 Using the information from the Revised Figure 5 from BCUC IR 1.6.3 and the table from BCUC IR 1.6.7, please describe what happens to the value of the Waneta Transaction (under the LRMC Clean, LRMC Clean + Gas, ABB and Panel Mid-C pricing scenarios), if Teck defaults in Year 5, 10 or 15 versus the scenario where Teck does not default before the end of the lease and the lease

is not extended.

76.6 Please add the “Panel Mid-C energy price forecast” to the Revised Figures 5a, 5b and 5c provided in BCUC IR 1.6.5.

**77.0 Reference: BUSINESS CASE
Exhibit B-8, BCUC IR 1.8.5; BC Hydro F2017-F2019 RRA, Exhibit B-1-1, p. 1-17
Industrial tariff**

In response to BCUC IR 1.8.5, BC Hydro stated:

Table 1 below provides the 20-year (post-Lease) blended levelized valuation indices for the five main valuation indices from the Waneta 2017 Business Case. In addition there are two additional rows (in grey) that demonstrate a high- and low- tariff value using an industrial tariff with annual rate increases of 1 per cent and 3 per cent, respectively, for years beyond fiscal 2024.

As discussed in BC Hydro’s response to BCUC IR 1.8.2, the base 20-year blended levelized valuation indices for BC Hydro’s industrial tariff assumes annual rate increases from the 2013 10 Year Rates Plan to the end of fiscal 2024, followed by annual rate increases of 2 per cent for years beyond fiscal 2024.

BC Hydro modelled an arbitrary reduction of 1 per cent for the low tariff scenario and an arbitrary 1 per cent increase for the high tariff scenario for years beyond 2024.

Valuation Index	Levelized Blended Valuation Index (\$/MWh, \$2018)
LRMC (Clean)	145
LRMC (Clean + Gas)	122
Example High Industrial Tariff (3% in Fiscal 2025 and beyond)	87
Industrial Tariff (RS 1823)	69
Market Prices (ABB)	65
Example Low Industrial Tariff (1% in Fiscal 2025 and beyond)	55
Extrapolated Forecast	■

On page 1-17 of the BC Hydro F2017-F2019 RRA, BC Hydro states: “The final five years of the 2013 10 Year Rates Plan target rate increases of 2.6% in each of fiscal 2020 to fiscal 2024, subject to BCUC review and approval.”

77.1 Please recalculate the Low Industrial Tariff, assuming a tariff freeze for the last five years of the 10 Year Rates Plan, and 1% in F2025 and beyond.

Further, in response to BCUC IR 1.8.5:

BC Hydro notes that Table 1 demonstrates that the two example levelized valuation indices fall within the low and high range of the valuation indices and therefore these additional scenarios would not warrant additional sensitivity analysis to the results provided in the Waneta 2017 Business Case.

77.2 In light of the revised Low Industrial Tariff, please indicate whether the above statement is still valid. If not, please provide the additional sensitivity analysis.

77.3 Please update Table 1 with the revised Low Industrial Tariff and add the Panel Mid-C Market Price forecast.

**78.0 Reference: BUSINESS CASE
Exhibit B-8, BCUC IR 1.9.3, BCUC IR 1.9.4, BCUC IR 1.10.2; BCUC IR 1.10.4
IPP financing rate**

In response to BCUC IR 1.9.3, BC Hydro stated that “The only difference between the CCGT LRMCs is the financing cost assumption. The financing cost was assumed to be 7 per cent (real) if built by an IPP and 5 per cent (real) if built by BC Hydro.”

In response to BCUC IR 1.10.2, BC Hydro stated that “The UECs shown are calculated based on the IPP financing assumption of 6.4 per cent (real) weighted average cost of capital, an update from the 7 per cent used in the F17-F19 RRA and the Waneta 2017 Business Case.”

In response to BCUC IR 1.10.4, BC Hydro stated that “The financing cost assumption underlying the energy LRMC of \$100/MWh (fiscal 2015\$) in the F17-F19 RRA and the Waneta 2017 Business Case is based on the IPP cost of capital of 7 per cent (real). This assumption has since been updated to 6.4 per cent to reflect reductions in interest rates.”

78.1 Please confirm, otherwise explain, that since the Waneta Business Case is based on an IPP cost of capital of 7 per cent (real) and the revised energy LRMCs (in BCUC IR 1.10.2 and BCUC IR 1.10.3) are based on an IPP cost of capital of 6.4 per cent (real), the LRMC’s are not comparable.

78.1.1 Please identify and update all Tables and Figures of the Waneta 2017 Business Case, and all responses to IR No. 1 that would be affected by a reduction from 7 per cent (real) to 6.4 per cent (real) of the IPP financing cost assumption.

In response to BCUC IR 1.9.4, BC hydro stated:

The financing cost assumption underlying the combined energy and capacity LRMCs assumes the weighted average cost of capital to be seven per cent real for all of the resources used in the calculation. The LRMC difference between the \$122/MWh and \$145/MWh is based upon the use of gas capacity versus pumped storage capacity. (Emphasis added)

78.2 Please confirm, otherwise explain, that the statement in BCUC IR 1.9.4 implies that IPPs would build all new energy and capacity resources, including the pump storage capacity.

**79.0 Reference: BUSINESS CASE
Exhibit B-1, Section 4.1.5, p. 4-4 and Business Case, p. 46; Exhibit B-8, BCUC IR 1.9.3
BC Hydro financing rate**

On page 46 of the Business Case, BC Hydro states:

The effect of this change [the de-coupling of the link between BC Hydro’s return on equity and its asset base] is that the financing of new investments is effectively done at the cost of debt from a ratepayer perspective and does not include a return on equity component.

Basis for Post-Lease Value	Free Cash Flow Un-risked (6% financing)	Ratepayer Benefits (3.4% financing)
LRMC – Clean only	1,071	1,502
LRMC – Clean + Gas	794	1,224
BCH Industrial Tariff	175	589
Market Prices (ABB)	159	570
Extrapolated Prices	29	436

(Note: in both cases costs/benefits are discounted at 6% nominal)

In footnote 113 on page 4-4 of the Application, it is stated that:

The 3.4 per cent used for the financing rate is based on forecasted Fiscal 2019 interest rates provided by the Ministry of Finance. This is the rate BC Hydro expects to issue debt at the time of the Waneta purchase and therefore was used to estimate the incremental interest costs BC Hydro would incur on the new debt issued. The rate of 4.01 per cent used in the cost of debt component in BC Hydro’s WACC, calculation in section 4.1.2, is based on a five year average of interest rates provided by the Ministry of Finance. (Emphasis added)

In response to BCUC IR 1.9.3, BC Hydro stated:

The only difference between the CCGT LRMCs is the financing cost assumption. The financing cost was assumed to be 7 per cent (real) if built by an IPP and 5 per cent (real) if built by BC Hydro. (Emphasis added)

79.1 Please explain why BC Hydro uses three different cost of debt rates for: 1) ratepayer impact analysis (3.4%); 2) the calculation of BC Hydro’s WACC (4.01%); and 3) the calculation of the CCGT LRMC (5%).

79.2 Please indicate which part(s) of the Application would be impacted if financing rates were made consistent throughout and state which of these rates would be applicable.

**80.0 Reference: BUSINESS CASE
Exhibit B-8, BCUC IR 1.10.1; AESO Renewable Electricity Program Round 1 Results
Wind cost estimates**

In response to BCUC IR 1.10.1, BC Hydro stated:

The wind cost estimates used by BC Hydro to derive the \$100/MWh (fiscal 2015\$) are based on forward looking technology and reflects specific development challenges in B.C. (such as good wind resources being located in remote, mountainous terrain that generally results in higher development costs). BC Hydro sets the greenfield IPP LRMC based on this estimate because it represents a cost that can be achieved in B.C. with reasonable certainty. The data sources and assumptions behind the wind cost estimates of \$100/MWh are listed below. It should be noted that the inputs and assumptions were discussed with industry experts and consultants as well as vetted with external stakeholders (primarily IPPs) through an engagement process, covering the period September 2014 to June 2015. (Emphasis added)

The Alberta Electric System Operator’s website provides information on the results of the Renewable Electricity Program Round 1¹:

REP Round 1 results

On Dec.13, 2017, the Government of Alberta [announced](#) the results of Round 1 of the Renewable Electricity Program (REP).

REP Round 1 successfully delivered nearly 600 MW of wind generation at a weighted average bid price of \$37/MWh – setting a new record in Canada for the lowest renewable electricity pricing. Successful companies receive support using an [Indexed Renewable Energy Credit](#) in exchange for a project’s renewable attributes. The success of this competition represents a major milestone toward meeting the Government of Alberta’s target of 30 per cent renewable electricity by 2030.

80.1 Please discuss the reasonableness of BC Hydro’s wind cost estimate of \$106/MWh in \$F2018 compared to the weighted average bid price of \$37/MWh for newly awarded wind projects in Alberta in 2017.

80.1.1 In particular, please discuss whether the remote location of wind resources in BC and the mountainous terrain can account for the entire \$69/MWh price differential.

80.2 In light of rapidly decreasing wind costs, please explain why BC Hydro escalated the \$F2015 100/MWh estimate by 2 per cent over the entire evaluation period of the Waneta Transaction.

**81.0 Reference: BUSINESS CASE
Exhibit B-8, BCUC IR 1.12.1
LRMC – combined energy and capacity**

In response to BCUC IR 1.12.1, BC Hydro provided the following table:

Marginal Resources	Period of Applicability	LRMC (2018 real dollars)			
		Clean + Gas (Requested)	Clean + Gas (Business Case)	Clean Only (Requested)	Clean Only (Business Case)
Energy: Greenfield IPPs	F2034 and beyond	\$88/MWh	\$106/MWh	\$88/MWh	\$106/MWh
Capacity Resources	F2029	\$75/kW-year (Industrial Load Curtailment)	\$88/kW-year (SCGT)	\$75/kW-year (Industrial Load Curtailment)	\$221/kW-year (pumped storage)
Capacity Resources	F2030 and beyond	\$88/kW-year (SCGT)	\$88/kW-year (SCGT)	\$221/kW-year (pumped storage)	\$221/kW-year (pumped storage)
Combined Cost of Energy & Capacity	Effective for F2034 and beyond	\$104/MWh	\$122/MWh	\$127/MWh	\$145/MWh

81.1 In light of the steep declines in wind costs, as shown by the recent Alberta projects, please re-calculate the combined energy and capacity LRMC using \$60/MWh (\$F2018) for Energy

¹ Alberta Electric System Operator, Alberta’s Renewable Electricity Program (REP) Round 1 Results, date December 31, 2017: <https://www.aeso.ca/market/renewable-electricity-program/rep-round-1-results/>

Greenfield IPPs for F2034 and beyond, using the 6.4 per cent (real) financing cost assumption provided in BCUC 1.10.4.

81.2 Please indicate whether the new range of LRMCs are still within the LRMC range of \$104/MWh to \$167/MWh utilized in the Waneta 2017 Business Case per Table 11 of the Business Case. If not, please revise Table 11 - Sensitivity to LRMC to include the lower combined LRMC and the associated net value of the transaction.

**82.0 Reference: BUSINESS CASE
Exhibit B-8, BCUC IR 1.13.2
Discount rate**

In response to BCUC IR 1.13.2, BC Hydro stated:

It is apparent from the foregoing that BC Hydro’s “annual rate of return on deemed equity” has since fiscal 2017 (calendar 2016) and for each year since then been a rate of return that is calculated after-the-fact in order to achieve specified distributable surpluses and not, as it once was, 11.84 per cent. In the circumstances of the current regulatory framework, the use of the BCUC-determined benchmark rate of return on equity of 8.75 per cent is the only appropriate rate of return currently available to BC Hydro for the purpose of calculating its WACC, and thus its discount rate, as described in section 4.1.2 of the Application.

- 82.1 Please provide BC Hydro’s calculated rate of return in fiscal 2017 and each year since.
- 82.2 Please re-calculate the WACC using the above calculated rate of return.
- 82.3 Please indicate whether the re-calculated WACC is already included in the discount rate sensitivities provided in Table 9 of the Business Case. If not, please ensure that the sensitivity analysis includes the re-calculated WACC.
- 82.4 Please discuss the pros and cons of using the above re-calculated WACC over a WACC based on the BCUC-determined benchmark ROE of 8.75.

**83.0 Reference: BUSINESS CASE
Exhibit B-1-3, Errata No. 1, Table 8, p. 29
Consolidated valuation**

On page 29 of BC Hydro’s Errata No. 1 to the Application, BC Hydro provided the following table:

Basis for Post-Lease Value	Value of Assets / Lease to BC Hydro					
	Un-risked Lease Period	Default Risk Adj.	Post-Lease Value	Extension Option	Total Value	Value net of purchase
LRMC (Clean)	792	107	1,482	(291)	2,090	887
LRMC (Clean + Gas)	792	64	1,206	(196)	1,865	662
Industrial Tariff	792	n/a	586	(93 45)	1,285 1,334	82 131
Market Prices (ABB)	792	1	570	(45 93)	1,317 1,269	114 66
Extrapolated Prices	792	(54)	440	(6)	1,172	(31)

- 83.1 Please confirm, otherwise explain, that the “LRMC (Clean)” and “LRMC (Clean + Gas)” scenarios in Table 8 would be more accurately described as “LRMC (Clean) + ABB Market Price” and “LRMC (Clean + Gas) + ABB Market Price”.
- 83.2 Please confirm, otherwise explain, that the “Industrial Tariff” scenario in Table 8 would be more accurately described as “Industrial Tariff + LRMC (Clean).”

- 83.3 Please update Table 8 by revising the post-lease value of the “Industrial Tariff” scenario, assuming that the entire 2/3 interest’s generation will serve Teck’s load (*i.e.*, BC Hydro will not have 48 GWh of surplus energy to offset its requirements @ LRMC Clean prices).
- 83.4 In the same updated Table 8, please add the following three scenarios:
- 83.4.1 LRMC (Clean) less 15 per cent;
- 83.4.2 LRMC (Clean) less 40 per cent;
- 83.4.3 A third “market price” scenario where the entire 2/3 interest’s generation is sold into the electricity markets at the “Panel Mid-C energy price forecast” from the BCUC Site C Inquiry Final Report.

**84.0 Reference: BUSINESS CASE
Exhibit B-8, BCUC IR 1.18.2; BCUC IR 1.24.1
Consolidated valuation**

In response to BCUC IR 1.18.2, BC Hydro provided the following table:

Revised Table 1 Consolidated Value of Transaction (Risky present value to 2018, \$ millions)						
	Value of Assets / Lease to BC Hydro					
	Un-risked Lease Period	Default Risk Adj.	Post-Lease Value	Extension option	Total Value	Value net of purchase
Panel Mid-C Prices from Site C Final Report & LRMC (Clean) - use Small Gap Surplus/Deficit in Line 19 Table 3-8 RRA	792	(8)	1,249	(291)	1,742	539
Panel Mid-C Prices from Site C Final Report & LRMC (Clean) - use Base RRA in Line 18 Table 3-8 RRA	792	94	1,482	(291)	2,077	874
Panel Mid-C Prices from Site C Final Report & LRMC (Clean) - use Large Gap Surplus/Deficit in Line 20 Table 3-8 RRA	792	194	1,482	(291)	2,177	974

In response to BCUC IR 1.24.1, BC Hydro stated that the Waneta 2017 Transaction has a positive value of approximately \$606 million in the Commission’s “Base Case”. BC Hydro also provided the following table:

Input Variable	Low Value [A]	[A] less Base Case value	High Value [B]	[B] less Base Case value	Low Value	Base Case	High Value
Discount Rate (nominal)	(82)	(688)	1,782	1,176	8%	6%	4%
Energy LRB Gap growth	361	(245)	681	75	Small Gap Line 19 Table 3-8 RRA	Base RRA Line 18 Table 3-8 RRA	Large Gap Line 20 Table 3-8 RRA
LRMC	159	(447)	874	268	40% decrease in LRMC (Clean)	15% decrease in LRMC (Clean)	LRMC (Clean)
Market Prices	559	(47)	618	12	Flat/Real	"Panel Mid-C" in Site C Report	ABB Market price
Capital Cost	457	(149)	680	74	Leading Utility Practice + 100% (AAACE Class 5 estimate high point)	Leading Utility Practice	Leading Utility Practice – 50% (AAACE Class 5 estimate low point)
Economic Life	(340)	(946)	1,280	674	20 years	40 years	70 years

- 84.1 Please confirm, otherwise explain, that the value of \$874 million (middle line of Revised Table 1 in BCUC IR 1.18.2) can be calculated from the response to BCUC IR 1.24.1 by adding \$268 million to the value of the Base Case: \$606 M + \$268 M = \$874 M (i.e., moving the "Base Case" to LRMC Clean)
- 84.2 Please confirm, otherwise explain, that the value of \$539 million (top line of Revised Table 1 in BCUC IR 1.18.2) should be: \$606 - \$245 + \$268 = **\$629** million instead.
- 84.2.1 If so, please update the response to BCUC IR 1.25.1
- 84.3 Please confirm, otherwise explain, that the value of \$974 million (bottom line of Revised Table 1 in BCUC IR 1.18.2) should be: \$606 + \$75 + \$268 = **\$949** million instead.

**85.0 Reference: BUSINESS CASE
Exhibit B-8, BCUC IR 1.23.3, BCUC IR 1.23.6, BCUC IR 1.24.1
Financial risk**

In response to BCUC IR 1.23.3, it stated:

BC Hydro discusses interest rates in section 4.1.5 of the Application, including noting the use of 3.4 per cent as an assumed financing rate for the Waneta 2017 Transaction. We also noted the consequences of lower or higher interest rates: "the use of a lower interest rate would have increase the cost-effectiveness of the transaction (and vice versa)." ... BC Hydro notes that, as part of its debt management activities and in anticipation of the Waneta 2017 Transaction and other borrowing requirements, it hedged \$1.25 billion of future long-term debt in September and October 2017 at a rate of 3.18 per cent. The underlying debt would be borrowed in August 2018, approximately the time of the expected financial close of the Waneta 2017 Transaction, if approved. Though this debt would not be specifically allocated to Waneta, as BC Hydro does not do project- specific financing, it provides some mitigation to the risk of rising interest rates. (Emphasis added)

In response to BCUC IR 1.24.1, which asked BC Hydro to show the result of the sensitivity analysis

around the interest rates, BC Hydro stated:

Financing Cost Sensitivities: Financing costs can impact the discount rate used in BC Hydro’s analysis but are not directly used in investment analysis. As a result, these sensitivity scenarios have no effect (although they will have an effect on the ratepayer impact analysis) on their own and are rather addressed through the discount rate sensitivities.

85.1 Please explain why lower/higher interest rates would only impact the cost-effectiveness of the transaction via the discount rate used in the analysis.

BC Hydro provided the following table in response to BCUC IR 1.23.6, which asked BC Hydro to perform a sensitivity analysis around various levels of interest rates.

Change in financing cost	-0.5%	0%	+0.5%	+1.0%	+2.0%
Discount rate	5.50%	6.00%	6.25%	6.50%	7.00%
LRMC – Clean only	1,163	887	762	645	434
LRMC – Clean + Gas	894	662	558	460	282
BCH Industrial Tariff	263	131	70	13	(90)
Market Prices (ABB)	196	66	7	(49)	(150)
Extrapolated Prices	78	(31)	(80)	(127)	(212)

85.2 Please confirm, otherwise explain, that the transaction values shown in the above table represent the consolidated value of the transaction over the 40-year term, *i.e.*, taking into account default risk, post-lease value and extension option.

85.3 Please confirm, otherwise explain, that the “LRMC (Clean)” and “LRMC (Clean + Gas)” scenarios in the above table would be more accurately described as “LRMC (Clean) + ABB Market Price” and “LRMC (Clean + Gas) + ABB Market Price”.

85.4 Please confirm, otherwise explain, that the “Industrial Tariff” scenario in the above table would be more accurately described as “Industrial Tariff + LRMC (Clean).”

85.5 Please update the above table by revising the post-lease value of the “Industrial Tariff” scenario, assuming that the entire 2/3 interest’s generation will serve Teck’s load (*i.e.*, BC Hydro will not have 48 GWh of surplus energy to offset its requirements @ LRMC Clean prices).

85.6 In the same updated table, please add the following three scenarios:

85.6.1 LRMC (Clean) less 15 per cent;

85.6.2 LRMC (Clean) less 40 per cent;

85.6.3 a third “market price” scenario where the entire 2/3 interest’s generation is sold into the electricity markets at the “Panel Mid-C energy price forecast” from the BCUC Site C Inquiry Final Report.

86.0 Reference: BUSINESS CASE
Exhibit A-4, BCUC IR 1.24.1, Exhibit B-8, Table 1, BCUC IR 1.24.1, BCUC 1.10.4
Sensitivity analysis

In BCUC IR 1.24.1, BC Hydro was requested to complete the following table (Table 1):

Base Case Present Value Net of Purchase Price: [please fill in] 2018 \$ millions

Input Variable	Low Value [A]	[A] less Base Case value	High Value [B]	[B] less Base Case value	Low Value	Base Case	High Value
Discount Rate (nominal)					8%	6%	4%
Energy LRB Gap growth					Small Gap Line 19 Table 3-8 RRA	Base RRA Line 18 Table 3-8 RRA	Large Gap Line 20 Table 3-8 RRA
LRMC					40% decrease in LRMC (Clean)	15% decrease in LRMC (Clean)	LRMC (Clean)
Market Prices					Flat/Real	"Panel Mid-C" in Site C Report	ABB Market price
Capital Cost					Leading Utility Practice – 50% (AACE Class 5 estimate low point)	Leading Utility Practice	Leading Utility Practice + 100% (AACE Class 5 estimate high point)
Economic Life					20 years	40 years	70 years
Financing cost with debt and equity financing					(3.43%X30%) + (11.84%X70%)	6%	5.5%
Debt rate with 100% debt financing					5.4%	3.4%	2.9%

- 86.1 For ease of understanding Table 1, please add the Base Case transaction value of \$606 million in the highlighted area just above Table 1. Please remove the last two lines of the Table 1.
- 86.2 Please clarify whether the LRMC (Clean) used in this sensitivity analysis is based on the updated IPP financing cost assumption of 6.4 per cent (real) (per BCUC IR 1.10.4) or the 7.0 per cent (real) used in the Business Case.
 - 86.2.1 If the LRMC values were based on 7 per cent, please update Table 1 with an IPP financing cost of 6.4 (real). What is the impact on the Base Case transaction value?
- 86.3 Based on the results of the updated Table 1, please complete the following table:

Scenarios	Net Value of Transaction (million \$2018)
Base Case (Table 1, BCUC IR 1.24.1)	\$606
Updated Based Case (per this IR)	
Variants from the Base Case assumptions (Keep all other variables per Base Case)	
40% decrease in LRMC (Clean)	Updated Base Case value + Δ = ____
Small Gap + 40% decrease in LRMC (Clean)	Updated Base Case value + Δ + Δ = ____
Small Gap + 40% decrease in LRMC (Clean) + Flat/Real Market Prices	
Discount Rate @ 7%	
Discount Rate @ 7%, Small Gap	
Discount Rate @ 7%, Small Gap, 40% decrease in LRMC (Clean)	
Large Gap, 40% decrease in LRMC (Clean)	
Large Gap, 40% decrease in LRMC (Clean), Flat/Real Market Prices	

86.3.1 Please add to the above table any other scenarios that BC Hydro would find plausible.

86.4 To what extent can the LRMC value decrease (in percentage from the LRMC Clean value) for the transaction value to become zero, assuming a 6% discount rate, the Base RRA (mid Gap), the “Panel Mid-C market prices”, Leading Utility Practice for capital costs and 40-year economic life.

86.5 To what extent can the LRMC value decrease (in percentage from the LRMC Clean value) for the transaction value to become zero, assuming a 6% discount rate, the Base RRA (mid Gap), the ABB market prices, Leading Utility Practice for capital costs and 40-year economic life.

**87.0 Reference: BUSINESS CASE
Exhibit B-1, Business Case, pp. 25, 30
LRB sensitivity analysis**

On page 30 of the Business Case, BC Hydro explains that it expects to be in a capacity and energy surplus position for the majority of the next 20 years and to revert to a deficit position in F2034 for energy and F2029 for capacity. Changes to the timing of LRB gap growth will change the valuation of the Transaction. BC Hydro reviewed scenarios where the LRB gap grew quicker and slower than expected.

On page 25 of the Business Case, BC Hydro explains that the market price scenario is one where load does not grow appreciably over the 40-year evaluation term and the smelter load is not served by BC Hydro following the Lease Agreement.

87.1 Please confirm, otherwise explain, that the “market price scenario” is effectively a sensitivity analysis around load resource balances (LRB), representing one end of the LRB spectrum while the Large Gap represents the other end of the spectrum.

**88.0 Reference: BUSINESS CASE
Exhibit B-1, Business Case, p. 39, Exhibit B-8, BCUC IR 1.29.3
LRB sensitivity analysis**

On page 39 of the Business Case, in Table 14 there were two price forecasts used in all of the four scenarios: Renewed and Not Renewed 3808 Power Purchase Agreement.

In response to BCUC IR 1.29.3, BC Hydro stated: "BC Hydro Industrial Tariff: Our industrial tariff is used to value the net changes in revenue from the addition of Teck smelter load and/or the removal of FortisBC load from the LRB;"

88.1 Please explain why BC Hydro used its Industrial Tariff instead of the tariff under the 3808 New PPA to value net changes in revenue from the removal of FBC load from the LRB.

**89.0 Reference: BUSINESS CASE
Exhibit B-1, Appendix N-1, Figures 6 and 8, p. 4; Exhibit B-1, Business Case, Figure 7,
p. 45; Exhibit B-8, BCUC 1.33.1; Exhibit B-7, Rate Impact Models 1 to 9 PUBLIC
Annual versus cumulative rate impact analysis**

In the nine public Rate Impact Models provided in Exhibit B-7, the line graph (in tab "Line Graph") refers to the data series on Line 15 "Estimated Incremental Impact on Future Rates" and not Line 20 "Estimated Incremental Cumulative Rate Impact" (in tab 1.0 Summary).

In response to BCUC IR 1.33.1, BC Hydro stated that "the rate decreases as set out in Figure 6 on page 44 of the Waneta 2017 Business Case are cumulative incremental (not annual) rate impacts for the core scenarios discussed in section 5.1 of the Waneta 2017 Business Case." (Emphasis added)

89.1 Please clarify why Figure 6/8 and Figure 7 would show cumulative incremental rate impacts, as stated in BCUC IR 1.33.1, when the line graphs from the Excel models are not based on the incremental cumulative rate impacts data.

In the Rate Impact Models, lines 26 and 27 on Tab 5.0 relate to "Change in New Acquisitions" and "Change in LT Capacity."

89.2 Are these values related to the energy LRMC and capacity LRMC indices provided in BCUC IR 1.7.4 Attachment 1 (Excel file)? If not, please explain how these values are derived.

**90.0 Reference: BUSINESS CASE
Exhibit B-1, Business Case, pp. 46–47; Exhibit B-8, BCUC 1.13.2
Rate impact analysis**

On page 46 of the Business Case, BC Hydro states:

In cases where BC Hydro's financing rate is equivalent to the discount rate applied to the analysis, these two cost/benefit streams will result in approximately the same present value result. However, recent changes made to the calculation of BC Hydro's net income result in these two methods providing divergent results. The main change was as a de-coupling of the link between BC Hydro's return on equity and its asset base:

- Previously when BC Hydro invested capital and added to its asset base, a portion of this asset base would be "deemed" to be equity and earn a regulated rate of return. This is despite the true financing of the investment being fully debt-based through Government borrowings.

- Under the 10-year Rates Plan, BC Hydro's return on equity is fixed and no additional return is earned upon capital investment.

- The effect of this change is that the financing of new investments is effectively done at the cost of debt from a ratepayer perspective and does not include a return on equity component." (Emphasis added)

In response to BCUC IR 1.13.2, BC Hydro stated "This IR refers to a previous, outdated version of Direction No. 7 (OIC 097) that has been amended by Order in Council No. 590, removing the reference to a rate of return on deemed equity of 11.84 per cent."

90.1 Please confirm, otherwise explain, that the "recent changes" mentioned by BC Hydro at page 46 of the Business Case refers to OIC 590 dated July 28, 2016.

90.2 Please confirm, otherwise explain, that prior to this change, BC Hydro's financing rate would have been a 6.25% WACC as calculated in BCUC IR 1.13.2.

90.3 Please re-do Table 19 of the Business Case and add a column with "Ratepayer Benefits @ 6% financing."

90.3.1 Are the NPV results from the free cash flow and revenue requirement analyses approximately the same? If not, please explain why not.

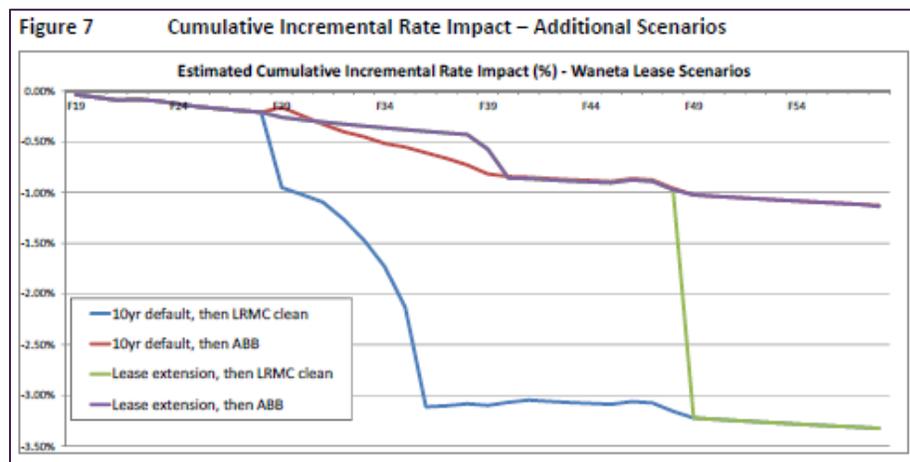
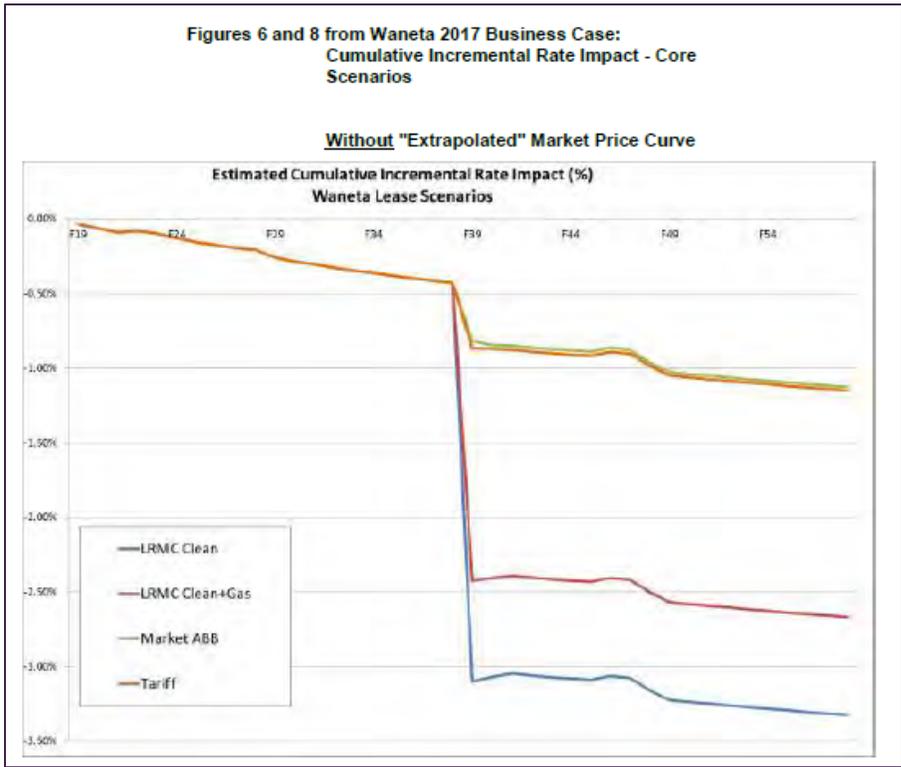
**91.0 Reference: BUSINESS CASE
Exhibit B-1, Appendix N-1, Figures 6 and 8, p. 4; Exhibit B-8, BCUC 1.6.2 and BCUC IR 1.16.3, BCUC IR 1.16.4
Rate impact analysis**

In response to BCUC IR 1.6.2, BC Hydro stated:

For the "Market Prices (ABB)" and the "Extrapolated Prices" scenarios, it is assumed that the energy and capacity from the two-thirds interest in Waneta would be sold at market prices regardless of BC Hydro's LRB position. For the "LRMC (Clean)" and "LRMC (Clean + Gas)" scenarios, the disposition of the energy and capacity from the two-thirds interest in Waneta depends on BC Hydro's LRB position. For years in which BC Hydro is forecast to be in surplus, the energy and/or capacity is sold at market prices. For years in which BC Hydro is forecast to be in deficit, the energy and/or capacity replaces new resources.

In response to BCUC 1.16.3, BC Hydro stated:

As discussed in BC Hydro's response to BCUC IR 1.6.2, the valuation of energy and capacity following the Lease Term depends on BC Hydro's LRB position. Under BC Hydro's expected LRB gap scenario, we expect to require new energy resources in fiscal 2034 and capacity resources in fiscal 2029. As expiry of the Lease occurs after those dates, we therefore expect the energy and capacity from the two-thirds interest in Waneta to replace new resources following the Lease Term. In default and LRB sensitivity scenarios this may not be the case, and the energy and capacity may be sold at market prices for a period of time before being used to offset new energy and capacity resources.



- 91.1 Please confirm, otherwise explain, that the statements made in the preamble apply to Figure 6/8.
- 91.2 Please confirm, otherwise explain, that the statements made in the preamble apply to Figure 7.
 - 91.2.1 If so, please clarify how BC Hydro took into account its LRB when it states “10 year default, then LRM Clean”.
 - 91.2.2 If so, please clarify how BC Hydro took into account its LRB when it states “10 year default, then ABB”.

In response to BCUC IR 1.16.4, BC Hydro stated:

The post-lease transaction value at BC Hydro's Industrial Tariff assumes that BC Hydro uses its two-thirds portion of energy and capacity to serve Teck's smelter load. This energy amount is less than the total entitlement associated with the two-thirds interest in Waneta by approximately 48 GWh/year. In the "BC Hydro Industrial Tariff" scenario BC Hydro assumes this extra 48 GWh/year offsets expected future new resource requirements consistent with the pricing used in the LRMC-Clean scenario.

91.3 Please confirm, otherwise explain, that the above statement applies to the "Tariff" scenario shown in Figure 6/8.

91.3.1 If confirmed, please revise the "Tariff" scenario assuming that the entire 2/3 Interest's generation is sold to Teck at the industrial tariff price (Revised Figure 6/8).

91.4 In the Revised Figure 6/8, please add a third market price scenario using the "Panel Mid-C market price" from the Site C Report. Please also add a line representing a 40% decrease in LRMC (Clean).

91.5 Please provide a Revised Figure 7 adding four lines to Figure 7, replacing "ABB market price" with "Panel Mid-C market price" and replacing LRMC Clean with a 40% decrease in LRMC Clean.

91.6 Please provide additional versions of the Revised Figure 6/8 and Figure 7 (those from the questions immediately above) using the Small Gap LRB and Large Gap LRB.

91.7 Please provide additional versions of the above Revised Figure 6/8 and Figure 7 using 2.9%, 5.4% and 6.0 per cent financing, based on Mid Gap LRB.

**92.0 Reference: 10 YEAR EXTENSION OPTION
Exhibit B-8, Section 1.17.3, p. 161**

In response to BCUC IR 1.17.3, BC Hydro stated: "The 58 per cent probability of Teck exercising its extension option was calculated using the Black-Scholes model, which is a broadly used approach to value options and determine implied volatility."

92.1 Please provide all supporting assumptions and inputs in determination of the 58% probability.

92.2 As Black-Scholes is a widely used option pricing model, please provide the rationale for utilization Black-Scholes as an approach to determine probability.

92.3 Please provide any other alternative approaches to probability considered by BC Hydro.

**93.0 Reference: 10 YEAR EXTENSION OPTION
Exhibit B-8, Section 1.17.4, p. 162**

In response to BCUC IR1.17.4, BC Hydro stated:

BC Hydro has calculated that the probabilities of Teck exercising its extension option for the other two price scenarios are:

- Industrial Tariff pricing scenario: 52 per cent; and
- Extrapolated pricing scenario: 11 per cent.

93.1 Please provide all calculations and supporting assumptions and inputs in determining these two probabilities.

**94.0 Reference: COUNTERPARTY RISK
Exhibit B-8-2; BCUC IR 1.5.1 Attachment 1, Page 1 of 1**

In response to BCUC IR 1.5.1, BC Hydro stated in Attachment 1: “(from Moody’s CreditEdge as of Feb 28).”

94.1 Please provide Moody’s CreditEdge as of Feb 28

**95.0 Reference: COUNTERPARTY DEFAULT RISK
Exhibit B-1-1, Business Case, p. 27**

On page 27 of the Business Case, BC Hydro states:

As shown, the impact of counterparty risk varies depending on the valuation index used. For lower valuation indices (e.g. the extrapolated pricing scenario) counterparty risk is expected to have a net negative impact as the value of energy in a default scenario is less than the price paid under the Lease. For higher valuation indices (e.g. LRMC) counterparty risk is expected to have a net positive impact as the value of energy in a default scenario is greater than the price paid under the Lease.

95.1 In the event of a default by Teck and Teck ceased operations, please provide the quantum of any discount to the price under the valuation indices due to the following:

95.1.1 BC Hydro agreeing to a lower price due to the need to secure customers

95.1.2 Price reductions due to the effect on the market price from additional supply previously provided to Teck

95.1.3 Any other reasons contemplated by BC Hydro

95.2 Specifically, please provide price reductions, and duration of reduction, as follows:

Valuation Index	Price Reduction(%)	Duration of Reduction (months)
LRMC (Clean)		
LRMC (Clean + Gas)		
Market Prices (ABB)		
Extrapolated Prices		

B. WANETA LEASE AGREEMENT

**96.0 Reference: COST TO TECK ON BC HYDRO REGULATED TARIFF RATE
Exhibit B-1, p. 1-14; Exhibit B-8-2, BCUC IR 1.50.6.1**

In response to BCUC IR 1.50.6.1, BC Hydro stated:

...there is no transaction before the Commission, or otherwise, under which Teck buys energy from BC Hydro, and any such scenario would require an assumption by BC Hydro of an obligation to serve Teck’s load which it does not currently have... the most BC Hydro can say about a scenario in which it sold energy to Teck but the transaction was otherwise the same, is that it would expect Teck’s per unit energy rate to be different than the equivalent lease payments under the current transaction. If the only additional

difference is that if Waneta is in private hands and unavailable to serve Teck’s smelter load, then the per unit energy rate could be expected to be different again. Both of these scenarios would be inconsistent with charging Teck RS 1823 rates.

On page 1-14 of the Application, BC Hydro states that “In May 2017, Teck informed BC Hydro that it had reached an agreement to sell its two-thirds interest in Waneta and related transmission assets to Fortis Inc. for \$1.2 billion (the Fortis Transaction).”

96.1 Under the hypothetical scenario in which BC Hydro sells energy to Teck (i.e. no lease payments) but the transaction is otherwise the same, and assuming BC Hydro has an obligation to serve Teck’s load, please tabulate:

- the annual energy payments to BC Hydro for each of the next 20 years based on BC Hydro’s current regulated tariff and Teck’s 2017 demand.
- any additional costs that BC Hydro would incur for each of the next 20 years

96.1.1 Please discuss how the above scenario compares with the proposed lease payments under the Waneta 2017 Transaction.

96.2 If Teck chooses to sell all the power from the two-thirds interest in Waneta that it would be leasing from BC Hydro under the Waneta 2017 Transaction, would Teck be able to simultaneously purchase this power at the regulated tariff rates from BC Hydro or another energy source? Please discuss.

97.0 Reference: ANNUAL LEASE PAYMENT Exhibit B-1, Business Case, p. 10; Exhibit B-8, BCUC IR 1.51.1; Exhibit B-9, BCSEA IR 1.16.6, 1.34.5, 1.34.5.1

In response to BCUC IR 1.51.1, BC Hydro stated:

The lease payments were determined based on a notional amount when this amount is divided by Teck’s Entitlement Energy...due to the cessation of the energy-capacity swap in 2035...

The response to BCUC IR 1.51.1 also included the below table:

				Inflator	2.0%
Year	Period	Lease Payment (\$)	Entitlement Energy (GWh)	Lease Payment (\$/MWh)	Real Lease Payment (\$/MWh)
2018	1	\$74,180,644	1,855	\$40.00	\$40.00
2019	2	\$75,664,256	1,855	\$40.80	\$40.00
2020	3	\$77,177,542	1,855	\$41.62	\$40.00
2021	4	\$78,721,092	1,855	\$42.45	\$40.00
2022	5	\$80,295,514	1,855	\$43.30	\$40.00
2023	6	\$81,901,425	1,855	\$44.16	\$40.00
2024	7	\$83,539,453	1,855	\$45.05	\$40.00
2025	8	\$85,210,242	1,855	\$45.95	\$40.00
2026	9	\$86,914,447	1,855	\$46.87	\$40.00
2027	10	\$88,652,736	1,855	\$47.80	\$40.00
2028	11	\$90,425,791	1,855	\$48.76	\$40.00
2029	12	\$92,234,306	1,855	\$49.74	\$40.00
2030	13	\$94,078,993	1,855	\$50.73	\$40.00
2031	14	\$95,960,572	1,855	\$51.74	\$40.00
2032	15	\$97,879,784	1,855	\$52.78	\$40.00
2033	16	\$99,837,380	1,855	\$53.84	\$40.00
2034	17	\$101,834,127	1,855	\$54.91	\$40.00
2035	18	\$103,870,810	1,855	\$56.01	\$40.00
2036	19	\$103,140,303	1,805	\$57.14	\$40.00
2037	20	\$105,203,109	1,805	\$58.28	\$40.00

In response to BCSEA 1.34.5, BC Hydro stated: “BC Hydro...has no information regarding the basis for the size of the Lease payment.”

In response to BCSEA 1.34.5.1, BC Hydro stated: “BC Hydro does not agree that the Lease price is equivalent to the ABB Forecast.”

97.1 Please add a column to the table above that reflects the capacity portion of the energy-capacity swap in each year of the lease, as demonstrated in the table below.

Year	Period	Lease Payment (\$)	Entitlement Energy (GWh)	Capacity (GWh)	Lease Payment (\$/MWh)
2018	1	\$74,180,644	1,855		\$40.00
2019	2	\$75,664,256	1,855		\$41.62

...

2035	18	\$103,870,810	1,855		\$56.01
2036	19	\$103,140,303	1,805		\$57.14

In response to BCSEA IR 1.16.6, BC Hydro stated:

...there may be a reduction in Waneta energy entitlement up to 100 GWh/a....A redetermination, however, would affect the amount of entitlement energy available to Teck through their leasehold interest in Waneta.

On page 10 of the Business case, it is also stated that “If more recent information is used as desired by BC Hydro the entitlement volumes will be reduced.”

97.2 Assuming the potential reduction in 100GWh/a occurred, please confirm that that Teck’s 2/3 interest would be reduced by ~67 GWh/a.

97.2.1 In what year would the potential reduction to entitlement energy volumes occur?

97.2.1.1 Please recalculate the Annual Lease Payment (\$/MWh), as per the table submitted in the response to BCUC IR 1.51.1 for each year of the Lease Period, assuming that Teck’s 2/3 interest is reduced due to the potential reduction in Waneta energy entitlement by 100 GWh/a.

97.2.2 Please quantify how a reduction in Waneta entitlement energy would affect the capacity after the cessation of the energy-capacity swap.

97.2.3 Please quantify how a reduction in Waneta entitlement energy would affect the capacity prior to the cessation of the energy-capacity swap.

**98.0 Reference: WANETA LEASE AGREEMENT
Exhibit B-8, BCUC IR 1.50.5; Exhibit B-8, BCUC IR 1.51.1 Economic life**

In response to BCUC IR 1.50.5, BC Hydro stated: “...lease payments are specified amounts, and are not on a \$/MWh basis. However, when the lease payments are divided by the energy amounts for each year the rate is approximately \$40/MWh....”

In response to BCUC IR 1.51.1, BC Hydro stated:

The lease payments were determined based a notional amount when this amount is divided by Teck's Entitlement Energy, it is effectively a rate of approximately \$40/MWh...and then escalating at a rate of 2 per cent per year...Teck has applied the year 19 rate of \$57.14 to the reduced Energy Entitlement...which results in a lease payment of \$103,140,303.

98.1.1 By applying "the rate the year 19 rate of \$57.14 to the reduced Energy Entitlement volume of 1,831GWh...which results in a lease payment of \$103,140,303", please explain how year 19 lease payment is not calculated on a \$/MWh basis ? Please explain the rationale for the change in lease payment methodology.

C. CO-POSSESSOR AND OPERATING AGREEMENT

D. WANETA TRANSMISSION AGREEMENT

**99.0 Reference: WANETA TRANSMISSION AGREEMENT
Exhibit B-13, BC Hydro Revised Draft Order
BCUC approval**

BC Hydro filed a revised draft order under Exhibit B-13 with the following revised Directives:

NOW THEREFORE the Commission orders as follows:

1. Pursuant to section 44.2(3)(a) of the *UCA*, the expenditure schedule contained in the Filing, consisting of a \$1.203 billion payment to Teck to acquire a two-thirds interest in Waneta; a \$20 million payment to Teck to acquire the Transmission Assets; and transaction costs up to \$50 million, is in the public interest and is accepted;
2. Pursuant to sections 58-61 of the *UCA*, approval of the Teck Wheeling Agreement and ~~Waneta Interconnection Agreement~~, as filed;

99.1 Please confirm, otherwise explain, that BC Hydro is not requesting Commission approval of the Waneta Transmission Agreement.

99.2 Please confirm, otherwise explain, that BC Hydro is not requesting Commission approval of the Waneta Interconnection Agreement.

**100.0 Reference: WANETA TRANSMISSION AGREEMENT
Exhibit B-12, Attachment 2, Schedule A, Section 9
Regulatory support**

Under the Waneta Transmission Agreement, the following is stated:

9. REGULATORY SUPPORT

9.1 Interconnection between Line 71 and BPA System

BC Hydro shall support Teck's efforts prior to the Transmission Purchase Closing (or, if earlier, the Line 71 Purchase Closing) to maintain the interconnection between Line 71 and the Bonneville Power Administration ("BPA") system (for example, by way of discussions with BPA or letters of support), provided that nothing shall require BC Hydro to intervene in BPA regulatory processes.

- 100.1 Please explain why efforts by Teck are required to maintain the interconnection between Line 71 and the BPA system.
- 100.2 Does BC Hydro expect that these efforts need to be sustained during the entire period until the Transmission Purchase Closing or the Line 71 Purchase Closing? Why or why not?

**101.0 Reference: WANETA TRANSMISSION AGREEMENT
Exhibit B-12, Attachment 2, Schedule A, Section 10
BC Hydro purchase of Teck transmission assets**

- 101.1 In Section 10.2, please confirm, otherwise explain, that "all of the conditions precedent to completing the sale and purchase of the Teck Transmission Assets" are those included in Section 10.9 (Closing Matters).
- 101.2 In Section 10.7, please confirm, otherwise explain, that the "further services contemplated by this Agreement to Teck" are those referenced in Sections 15.1 and 15.4 in relation to Imbalance Services and Back Up Service respectively.
- 101.3 In light of the Government of Canada's plan to modernize the National Energy Board and to create the Canadian Energy Regulator, please clarify whether the reference to the National Energy Board in Section 10.9 is also a reference to its successor. If not, please clarify how Teck would obtain material consent for assignment of the CPCN for Line 71 if the National Energy Board no longer exists.
- 101.4 Please clarify the pre-existing environmental liability associated with Emerald Switching Station and the nature of the indemnity Teck shall provide to BC Hydro under Section 10.9(e)(iii).

**102.0 Reference: WANETA TRANSMISSION AGREEMENT
Exhibit B-12, Attachment 2, Schedule A, Section 10, 11
BC Hydro purchase of Line 71 assets**

- 102.1 In Section 11.2, please confirm, otherwise explain, that "all of the conditions precedent to completing the sale and purchase of the Line 71 Assets" are those included in Section 11.7 (Closing Matters).
- 102.2 In Section 10.5(b), please confirm, otherwise explain, that the "further services contemplated by this Agreement" are those referenced in Sections 15.1 and 15.4 in relation to Imbalance Services and Back Up Service respectively.
- 102.3 In light of the Government of Canada's plan to modernize the National Energy Board and to create the Canadian Energy Regulator, please clarify whether the reference to the National

Energy Board in Section 10.7 is also a reference to its successor. If not, please clarify how Teck would obtain material consent for assignment of the CPCN for Line 71 if the National Energy Board no longer exists.

**103.0 Reference: Waneta Transmission Agreement
Exhibit B-12, Attachment 2, Schedule A, Section 15
Imbalance services and backup service**

103.1 Please explain why the Parties are of the view that the Energy Imbalance Service under the Open Access Transmission Tariff (OATT) does not currently meet the requirements for Imbalance Services outlined in Section 15.1(a) and (b).

103.2 Please confirm that Backup Service as contemplated in Section 15.4 is not currently provided by BC Hydro under the OATT.

**104.0 Reference: Waneta Transmission Agreement
Exhibit B-12, Attachment 2, Schedule A, Section 16
Alternative to BC Hydro wheeling**

In the Waneta Transmission Agreement, the following is stated:

16.3 Intent of Sections 16.1 and 16.2

BC Hydro acknowledges that the intent of Sections 16.1 and 16.2 is for BC Hydro to have the option of replacing the Wheeling Agreement with a tariff service, but for Teck to be no worse off pursuant to the tariff service, including in terms of reliability and cost, than it would otherwise reasonably experience during the whole of the period when Teck would continue to require electrical supply for the Industrial Operations and would otherwise have been entitled to take wheeling service under the Wheeling Agreement. BC Hydro shall not attempt to circumvent that effect or intent by taking advantage of temporary or seasonal fluctuations in reliability or cost in an attempt to establish terms and conditions for the tariff service that are inconsistent with that effect or intent. If Teck believes that BC Hydro is not complying with the provisions of this Agreement, with the effect that Teck is being offered alternate supply that will leave Teck worse off than it would have been if wheeling service was still available under the Wheeling Agreement, Teck may submit the matter for dispute resolution in accordance with Section 19.1.

104.1 Please explain what makes Teck “entitled” to take wheeling services under the Wheeling Agreement.

104.1.1 Is it not within the BCUC jurisdiction to determine such entitlement? Why or why not?

E. RATE RELATED REQUESTS

**105.0 Reference: TECK WHEELING AGREEMENT
Exhibit B-8-2, BCUC IR 1.60.3**

In response to BCUC 1.60.3, BC Hydro stated it:

...is generally unwilling to speculate on the regulatory implication of the Fortis Transaction. One exception would be the contemplated provision of a wheeling service to Teck pursuant to a Wheeling Agreement [...]. In the absence of an applicable exemption order, BC Hydro expects that the provision of that service by Waneta Power Limited Partnership (counterparty to Teck under that agreement) would ultimately have rendered it a regulated public utility in respect of that service. (Emphasis added)

105.1 Please clarify why the Waneta Power Limited Partnership would have needed such an exemption order while BC Hydro would not need one.

**106.0 Reference: LINE 71
Exhibit B-8, BCUC 1.3.5 Attachment 1; Exhibit B-8-2, BCUC IR 1.36.6 Attachment 1, IR 1.38.1, BCUC IR 1.38.2 & BCUC IR 1.5.5, Attachment 1; Exhibit B-12, Teck Wheeling Agreement, Section 2.5 and Waneta Interconnection Agreement, Section 2.4.5
Teck's import rights and wheeling demand nominations**

In response to BCUC IR 1.38.1, BC Hydro stated that "The 300 MW of import rights was tabled by Teck as a condition of the sale for the Waneta Assets. Teck's current load is approximately 226 MW, and BC Hydro assumes that 300 MW was chosen by Teck as a reasonable growth number in production."

In BCUC IR 1.5.5 Attachment 1, Teck forecast its capacity load to be ~211-212 MW from 2023 to 2037. Teck's data also shows that the load for the 2015-2017 period was just over 200 MW. In BCUC IR 1.3.5 Attachment 1, BC Hydro forecasts Teck's capacity load to be 222 MW from F2039 to F2043.

"(a) The initial Nominated Wheeling Demand for each Contract Year is 227 MW, being the amount of the peak load of the Industrial Operations as of the Effective Date of this Agreement." (Section 2.5, Teck Wheeling Agreement)

106.1 Given that Teck forecasts a flat load of 211-212 MW for the 15-year period from 2023 to 2037, please clarify why 300 MW was selected by Teck as a condition of the sale.

106.2 Please explain why the initial Nominated Wheeling Demand is set at a higher capacity (227 MW) than both BC Hydro and Teck's forecast for the time period when the Wheeling Term is expected to start, respectively 222 MW and 211-212 MW.

In response to BCUC IR 1.36.6, BC Hydro stated:

The limitations on Teck's import scheduling rights under the WA are set out in Section 2.6 of Schedule A of the WA. The upper limit of 370MW of rights has been reduced to a maximum of 300MW of wheeling service available under the WA (see paragraph 2.6(a)).

106.3 Since the Wheeling Agreement will continue to grandfather Teck's right to use Line 71 scheduling rights for import load-serving purposes, please clarify why the upper limit of 370 MW in the Line 71 Agreement was reduced to a maximum of 300 MW in the Wheeling Agreement.

In Section 2.4.5 of the Interconnection Agreement, it is stated that:

Without limiting the foregoing, if Teck proposes an increase in the load of the Industrial Operations from 227MW to a maximum of 300MW, and so often as it does, Teck will provide adequate notice to BC Hydro for planning purposes, and so that BC Hydro can carry out any required studies and estimate the costs of upgrades, which Teck will be required to pay. At Teck's request, the Parties will negotiate in good faith if Teck is then willing to accept a lesser degree of reliability in exchange for less costly upgrades than might otherwise be required. The Parties acknowledge that any increase beyond 300MW will be subject to BC Hydro's tariff processes in effect at the time.

106.4 Please explain why BC Hydro would need to carry out studies and potentially upgrade Line 71, which currently has a capacity of 370 MW, whenever Teck proposes to increase its load from the initial Nominated Wheeling Demand of 227 MW to the maximum 300 MW.

106.5 Please discuss Line 71's current reliability at various levels of capacity if BC Hydro does not carry upgrades.

In response to BCUC IR 1.38.2, BC Hydro stated:

By “sufficient rights”, BC Hydro means there will be sufficient transmission capacity on Line 71, in most hours of the year, to accommodate the Waneta generation output to the BC Hydro system. This is not the same as “scheduling rights”, as referred to in the context of wheeling services, as such rights are contractual in nature and do not necessarily reflect physical flows.

106.6 How much capacity would be “sufficient transmission capacity on Line 71” to accommodate the Waneta generation output to the BC Hydro system?

106.6.1 Would the Line 71 require upgrades to accommodate such generation?

106.7 Would BC Hydro also require scheduling rights in order to move the Waneta generation output to the BC Hydro system? If not, why not?

**107.0 Reference: TECK WHEELING AGREEMENT
Exhibit B-8-2, BCUC IR 1.55.3; Exhibit B-12, Attachment 2, Schedule B, Sections 3.1-3.2
Teck’s wheeling charge**

In response to BCUC IR 1.55.3, BC Hydro stated:

However, assuming BC Hydro acquired the Transmission Assets unencumbered with the Teck Wheeling Agreement at the end of 20 years, the upper bound opportunity cost is approximately \$98 million based on a long-term BC Hydro OATT firm reservation for 300 MW. This estimate does not take into consideration costs that Teck is obligated to pay to BC Hydro under the Teck Wheeling Agreement and assumes BC Hydro’s incremental costs of providing the wheeling service are zero.” (Emphasis added)

In the Teck Wheeling Agreement, attached as Schedule B to Exhibit B-12, it states “**Wheeling Charge.** The charge applicable to the Wheeling Service (the “**Wheeling Charge**”) shall be equal to \$1/month during the Wheeling Term plus Teck’s O&M Share.” (Bold in the original)

107.1 Please confirm that the cost that Teck is obligated to pay to BC Hydro under the Wheeling Agreement is the Wheeling Charge, per the preamble above.

107.2 Please explain why there is a wheeling charge of \$1/month during the Wheeling Term.

107.3 Please provide the O&M Share formula on the same page (it currently appears on two pages and may be confusing).

107.4 If the Nominated Wheeling Demand is 300 MW, please confirm that Teck’s share of O&M would be equal to 40.5% of the O&M costs (*i.e.*, $300 \text{ MW} \div 370 \times 2$).

107.4.1 Based on a Teck use of 300 MW and BC Hydro’s expected O&M cost for the Line 71, please estimate Teck’s share of O&M and revise the upper bound of the opportunity cost provided in BCUC IR 1.55.3.

107.5 Please indicate whether BC Hydro’s OATT customers also contribute to O&M costs in addition to paying OATT tariffs for the transmission services they get.

**108.0 Reference: ANALYSIS OF WANETA TRANSMISSION OPTIONS – COSTS AND REVENUES
Exhibit B-1, Business Case, Appendix C, pp. 71 and 74; Exhibit B-8-2, BCUC IR 1.38.1.1;
Rate impact analysis**

On page 71, BC Hydro provides a summary of the costs and revenues, as well as the net present value of the cashflow streams and on page 74, it provides the results of two sensitivities.

In response to BCUC IR 1.38.1.1, BC Hydro states “[...] the transmission capacity associated with the remainder of the Line 71 scheduling rights was then assumed to be available under BC Hydro’s OATT. This would be 370 MW of export transmission capacity and 70 MW of import capacity.”

108.1 Please confirm, otherwise explain, that the costs and revenues presented in Table 2 and Table 4 include the revenues from the 370 MW of export transmission capacity and 70 MW of import capacity on Line 71, as well as Teck’s share of O&M costs.

108.2 Please provide a rate impact analysis for the purchase of the Transmission Assets, similar to the rate impact analysis provided by BC Hydro in Section 5 of the Business Case.

**109.0 Reference: TECK WHEELING AGREEMENT
Exhibit B-12, Attachment 2, Schedule B, Section 1.8, p. 85; Exhibit B-1, Appendix N,
pp. 44, 45, 49
Effect of this agreement**

In the Teck Wheeling Agreement attached as Schedule B to Exhibit B-12, on page 85 it is stated:

The Parties acknowledge that BC Hydro has obligations under the OATT to provide transparent non-discriminatory transmission service and that the obligation of BC Hydro to provide the Wheeling Service under this Agreement represents an exception to its obligations under the OATT that is justified because it serves the public interest as determined by the BCUC.

On page 49 of the Business Case, BC Hydro states “This assessment indicated that the Transaction is cost-effective under all but the most risk-averse assumptions.”

On page 44 of the Business Case, BC Hydro states “As shown, for the Transaction scenarios without default there is a beneficial impact on rates for the full evaluation period.”

On page 45 of the Business case, BC Hydro states “As shown, under both default and Lease extension scenarios the transaction provides lower rates.”

109.1 By “it serves the public interest”, is BC Hydro referring to the Wheeling Agreement or the Waneta 2017 Transaction as a whole.

109.1.1 If the former, please explain why the Wheeling Agreement serves the public interest.

109.1.2 If the latter, please discuss whether, by “serving the public interest”, BC Hydro refers to its assessment that the Transaction is cost-effective under all but the most risk-averse assumptions (no material load growth over 40 years and market prices well below new build) and has a beneficial impact on rates across all scenarios (without default, with default and with extension)? If this is not what BC Hydro is referring to, please discuss what BC Hydro is referring to instead.

109.1.2.1 Are there other aspects or impacts of the Transaction which can be described as “serving the public interest”?

109.2 How would BC Hydro reduce rates across customer classes? Would it apply the same percentage reduction across all customer classes or choose a different methodology? Please justify.

109.3 Would BC Hydro’s OATT customers benefit from lower rates as a result of the Transaction? Why or why not?

109.3.1 If so, would they be “entitled” to a greater share of the rate decreases as a result of the Wheeling Agreement not conforming to BC Hydro’s OATT provisions?

Further on page 85 of the Teck Wheeling Agreement, it is stated that “Accordingly, the Parties acknowledge that BC Hydro will provide the Wheeling Service, but will attempt to do so in a manner that does not interfere with the rights of its customers to receive service under the OATT.” (Emphasis added)

109.4 Please describe the difference between a manner that does and a manner that does not interfere with the rights of other OATT customers to receive service under the OATT.

Further on page 85 of the Teck Wheeling Agreement, it is stated that:

The Parties also acknowledge that BC Hydro will publish (including in the system(s) BC Hydro uses to advise third parties of the amount of transmission capacity available for exports and imports of power) any business practices that it develops specific to the Wheeling Service to be provided pursuant to this Agreement.

109.5 Please clarify why BC Hydro would need to develop new business practices specific to this Wheeling Agreement and provide examples of such business practices.

**110.0 Reference: TECK WHEELING AGREEMENT
Exhibit B-12, Attachment 2, Schedule B, Section 2.1, pp. 85–86
Wheeling service**

On page 85 and 86 of the Teck Wheeling Agreement, it states:

(b) For clarity, Teck may only use Received Power for the purposes of compensating BC Hydro for transmission losses as provided for in Section 2.1(d) or for the Industrial Operations, and for no other purpose (including the trading or marketing of electricity or the resale of transmission rights or capacity to third parties). (Emphasis added)

...

(d) Teck’s share of transmission losses associated with the Wheeling Service in any month, in respect of the Wheeling Facilities, will be 0.23% of Received Power. Teck shall compensate BC Hydro for Teck’s share of transmission losses either, at Teck’s option, with energy in kind or with a cash equivalent payment based on the average of the daily ICE Indices (averaging On-Peak and Off-Peak indices each day, based on the number of On-Peak and Off-Peak hours in the day) for the applicable month. The Parties shall develop an operating procedure to determine the applicable methodology for transmission loss accounting and settlement for purposes of this provision.

110.1 Since Teck can only use Received Power for two purposes, one of which is compensating BC Hydro for transmission losses, and since Teck can compensate BC Hydro for its share of transmission losses with energy in kind, does that mean that Teck could engage in the activities listed in parenthesis in section 2.1(b) explicitly for the purpose of compensating BC Hydro for its share of transmission losses? Please explain.

110.2 Please provide the justification for setting Teck’s share of transmission losses at 0.23% of Received Power.

110.2.1 How different is this calculation from Schedule 10 of the OATT providing for Real Power Losses?

Section 2.1(c) of the Teck Wheeling Agreement lists the ancillary services that Teck will be responsible to obtain and indicates that some of these services will be provided by BC Hydro at no cost to Teck and others at tariff rates.

110.3 Please explain why some ancillary services would be provided by BC Hydro at no cost to Teck while others would be provided at tariff rates.

110.4 When will the Parties develop the operating procedure to determine the applicable methodology for transmission loss accounting and settlement?

110.4.1 Will the Parties require BCUC approval of such operating procedure?

111.0 Reference: **TECK WHEELING AGREEMENT
 Exhibit B-12, Attachment 2, Schedule B, Section 2.6; Exhibit B-9, BCSEA IR 1.12.2
 Load resource forecasts**

On page 91 of the Teck Wheeling Agreement under Section 2.6, it is stated that:

On or before the date that is six months after the first day of each Contract Year, Teck shall provide BC Hydro with a forecast for the next ten Contract Years of the anticipated load of the Industrial Operations and Teck's resource plan to meet the load requirements of the Industrial Operations. Each such forecast shall include programs for resource acquisition, transmission, and firm loads, to the extent then determined by Teck, and shall contain such detail as BC Hydro may reasonably require for purposes of planning. While Teck will use reasonable efforts to provide accurate information, any information provided by Teck will be relied on by BC Hydro at its sole risk and Teck will have no liability for any inaccuracy in the information provided.

In response to BCSEA IR 1.12.2, BC Hydro stated that it:

...would generally expect Teck to opt for the most cost-effective source of supply from the following three options:

- BC Hydro supply (as available);
- External market imports; and
- Supply from a third party such as FortisBC (as available).

BC Hydro's forecast industrial tariff for the 20-year period following the initial Lease Period (\$69/MWh, real dollars) is lower than forecast market import prices for this period (\$80/MWh, real dollars). As a result we expect Teck utilizing BC Hydro supply following the Lease to be more likely than them utilizing external market imports.

111.1 Does the Wheeling Agreement prevent Teck to change its source of electricity supply from year to year between BC Hydro supply or external market imports depending on the price differential between BC Hydro industrial tariff and the market import prices?

111.1.1 If so, please indicate which section(s) would prevent Teck to behave in this manner.

**112.0 Reference: TECK WHEELING AGREEMENT
Exhibit B-12, Attachment 2, Schedule B, Section 7.10, pp. 97–98
Permitted assignment by Teck**

On page 97 to 98 of the Teck Wheeling Agreement, it is stated that:

Notwithstanding Section 7.9, Teck will be entitled to assign its interest in this Agreement, upon notice to and without the consent of BC Hydro:

(a) in the course of a bona fide internal reorganization of Teck’s Industrial Operations amongst Teck and its Affiliates as long as Teck’s Industrial Operations and the Teck Transmission Assets continue to be owned and operated by Teck or by its Affiliates following the reorganization;

(b) to a purchaser of Teck’s Industrial Operations, in conjunction with and contemporaneously with the sale of all of Teck’s Industrial Operations and the Teck Transmission Assets to the same purchaser; or

(c) to a purchaser of Teck’s Industrial Operations, in conjunction with and contemporaneously with the sale of all of Teck’s Industrial Operations to the same purchaser, at any time after the acquisition by BC Hydro of the Teck Transmission Assets,... (Emphasis added)

112.1 Is this section enforceable before or during the Wheeling Term?

112.1.1 If during the Wheeling Term, please confirm that BC Hydro would own the Teck Transmission Assets, not Teck.

**113.0 Reference: TECK WHEELING AGREEMENT
Exhibit B-12, Attachment 2, Schedule B, Appendix A to the Wheeling Agreement,
Section 2.6, page 101
Import scheduling**

On page 101 of the Teck Wheeling Agreement, under section 2.6 it states:

- | | |
|-----|--|
| (a) | 300 MW; or |
| (b) | the applicable Nominated Wheeling Demand; |
| (c) | subject to section 2.7, the capacity of the Wheeling Facilities at the time of service; or |

113.1 Please confirm whether there should be a “or” at the end of (b). If not, please explain why.

**114.0 Reference: TECK WHEELING AGREEMENT
Exhibit B-12, Attachment 2, Schedule B, Appendix A to the Wheeling Agreement,
Section 3.2
Teck information to be provided to BC Hydro**

On page 103 of the Teck Wheeling Agreement, it is stated that “3.2.3 Teck will provide information for Teck Import Schedules to BC Hydro consistent with the timelines set out under BC Hydro’s Business Practices.”

114.1 Please clarify whether this clause is for same-day basis.

**115.0 Reference: TECK WHEELING AGREEMENT
Exhibit B-12, Attachment 2, Schedule B, Appendix A to the Wheeling Agreement,
Section 3.3
Released scheduling rights**

On page 103 of the Teck Wheeling Agreement, it is stated that:

3.3.1 2 Day-Ahead Release: Teck releases to BC Hydro, on a 2 day-ahead or earlier basis, those portions of the transmission capacity that are in excess of the amounts that Teck has requested BC Hydro to reserve pursuant to section 3.2.1.

...

3.3.2 1 Day-Ahead Release: Teck also releases to BC Hydro, on a 1 day-ahead basis, those portions of the transmission capacity that are in excess of the amounts that Teck has requested BC Hydro to reserve pursuant to section 3.2.2.”

- 115.1 Is it possible that Teck’s advice pursuant to section 3.2.1 (requesting transmission capacity on a 2-day ahead basis) be done simultaneously as Teck’s release of Scheduling Rights pursuant to section 3.3.1? If so, how would that work?
- 115.2 Is it possible that Teck’s advice pursuant to section 3.2.2 (requesting transmission capacity on a day-ahead basis) be done simultaneously as Teck’s release of Scheduling Rights pursuant to section 3.3.2? If so, how would that work?

**116.0 Reference: TECK WHEELING AGREEMENT
Exhibit B-12, Attachment 2, Schedule B, Appendix A to the Wheeling Agreement,
Section 3.4, p. 103
Subsequent schedules after release**

On page 103 of the Teck Wheeling Agreement, it is stated that:

Any request by Teck for BC Hydro to implement a schedule for an Import for a day, or for certain hours within a day, within the Import Scheduling Rights that cannot be implemented after transmission capacity has been released to BC Hydro by Teck pursuant to section 3.3, will be accommodated by BC Hydro without cost to Teck...:

- 116.1 Please clarify whether, in accommodating such a request, BC Hydro would treat Teck in priority over other OATT customers. If so, why?

**117.0 Reference: TECK WHEELING AGREEMENT
Exhibit B-12, Attachment 2, Schedule B, Appendix A to the Wheeling Agreement,
Section 5.1, p. 104
Curtailement priority**

On page 104 of the Teck Wheeling Agreement, it is stated that:

Teck Import Schedules that have been arranged in accordance with section 3.2 will be the last schedules between British Columbia and the United States curtailed by BC Hydro. All other schedules of energy made by Teck will be curtailed by BC Hydro in accordance with BC Hydro’s Business Practices. (Emphasis added)

- 117.1 Please confirm that all other schedules of energy made by Teck would be under Section 3.4. If not, please indicate under which other section(s) of the Wheeling Agreement would Teck be able to schedule imports.

**118.0 Reference: TECK WHEELING AGREEMENT
Exhibit B-12, Attachment 2, Schedule B, Appendix A to the Wheeling Agreement,
Section 6.2, p. 104
WHS-NLY and WHS-BDY configurations**

On page 104 of the Teck Wheeling Agreement, it is stated that:

In advance of the beginning of the Wheeling Term, the Parties will develop operating procedures for the planned or unplanned reconfiguration of Line 71 from the WHS-NLY configuration to the WHS-BDY configuration (and vice versa), including procedures to minimize unplanned reconfigurations and minimize the duration of any reconfiguration.

118.1 What is the frequency at which Line 71 is expected to be reconfigured from WHS-NLY to WHS-BDY and vice versa?

118.2 Will the Parties need to obtain BCUC approval for the operating procedures developed under section 6.2? Why or why not?

F. RATE RELATED REQUESTS

**119.0 Reference: REQUESTING ACCOUNTING ORDERS
Exhibit B-1, Section 1.5.3; Exhibit B-9, BCSEA IR 1.3.1; BC Hydro Fiscal 2017 – Fiscal 2019 Revenue Requirements Application (RRA) proceeding, Exhibit B-1 (F2017–2019 RRA); Exhibit B-1-1; Section 7.5.1; Direction No. 7 to the BCUC, Section 7(a) and (c); Exhibit B-8, BCUC IR 1.50.1**

In the Application, BC Hydro states: “BC Hydro seeks an order approving three adjustments to the Non-Heritage Deferral Account (NHDA) as described in this section.”

In response to BCSEA IR 1.3.1, BC Hydro stated:

The two-thirds interest in Waneta BC Hydro is acquiring under the Waneta 2017 Transaction will become a “heritage asset” upon completion of the Waneta 2017 Transaction.

In the BC Hydro F2017 – F2019 RRA, BC Hydro states:

British Columbia Utilities Commission approved the Non-Heritage Deferral Account to capture variances between the forecast and actual energy costs that are not associated with heritage assets.

Direction No. 7 to the Commission states:

7. When regulating and setting rates for the authority, the commission

(a) must allow the authority to continue to defer to the heritage deferral account the variances between the actual and forecast heritage payment obligation,

...

(c) must, in regard to the non-heritage deferral account, allow the authority to

(i) continue to defer to that account the variances between actual and forecast cost of energy arising from differences between actual and forecast domestic customer load....

In response to BCUC IR 1.50.1, BC Hydro stated:

The Lease is not an agreement in respect of a “rate” for “service” and the Lease payments BC Hydro will receive are not “rates” for “service”, and so the sections are as a matter of law inapplicable. The Lease does not establish a service relationship between Teck and BC Hydro, but instead continues, for the term of the Lease, an existing proprietary relationship.

119.1 Since Waneta is a “heritage asset”, please explain why BC Hydro is not proposing adjustments to the Heritage Deferral Account.

119.2 Please explain why in BC Hydro’s view that the NHDA is the appropriate deferral account to adjust to considering Waneta is a “heritage asset”.

119.3 Please explain if there are any differences to the amount of the adjustments that can be deferred and/or the amount, timing, or recovery mechanism of the adjustments if they were deferred to the Heritage Deferral Account versus the NHDA.

119.3.1 Please comment if, in BC Hydro’s view, there are any reasons that would prevent the Commission to order the adjustments proposed by BC Hydro to be captured in the Heritage Deferral Account as opposed to the NHDA.

119.4 Please clarify, in BC Hydro’s view, if the Commission must allow BC Hydro to adjust to either the Heritage Deferral Account or the NHDA as requested by BC Hydro regarding the Waneta 2017 Transaction based on Government’s directions in Direction No. 7.

119.5 Please explain how the Waneta Assets are related to BC Hydro’s energy costs if BC Hydro is not using the Waneta Assets to generate energy to serve its domestic customer load, but is instead leasing the Waneta Assets to continue “an existing proprietary relationship” during the term of the Lease.

119.5.1 Please comment on any issues with respect to transparency of regulatory accounts if the adjustments were captured in the NHDA as proposed by BC Hydro.

119.6 If the Commission were to order a new deferral account to capture the adjustments that BC Hydro is proposing to capture in the NHDA for the Waneta 2017 Transaction, please comment on the pros and cons of this approach, as well as any issues that may occur from this approach.

119.6.1 If the Commission were to order a new deferral account to capture the adjustments that BC Hydro is proposing to capture in the NHDA for the Waneta 2017 Transaction, please provide, in BC Hydro’s view, a proposed recovery mechanism and why that mechanism is appropriate.

G. REGULATORY MATTERS

**120.0 Reference: REGULATED ACTIVITIES
Exhibit B-8-2, BCUC IR 1.60.1; Exhibit B-8, 1.50.1; Utilities Commission Act (UCA),
Section 1**

In response to BCUC IR 1.60.1, BC Hydro stated:

No, none of BC Hydro’s proposed purchase of the Waneta Assets, its obligations as a lessor pursuant to the Lease, nor its future purchase of the Transmission Assets would be regulated activities.... Similar to its requested relief in the Waneta 2010 Transaction, BC Hydro is not proposing that the Commission regulate its proposed purchase of the Waneta Assets, or the Transmission Assets, other than through acceptance of the expenditure schedule under section 44.2(3)(a) of the UCA.

In response to BCUC IR 1.50.1, BC Hydro stated:

BC Hydro does not seek Commission orders specific to the Lease payments to be made by Teck under the Lease, or the Lease itself, under any section of the UCA... Sections 58 to 61 of that statute establish, among other things, the obligations on public utilities with respect to “rates” for “service”, and the Commission’s powers with respect to such “rates”, as those words are defined. The Lease is not an agreement in respect of a “rate” for “service” and the Lease payments BC Hydro will receive are not “rates” for “service”, and so the sections are as a matter of law inapplicable. The Lease does not establish a service relationship between Teck and BC Hydro, but instead continues, for the term of the Lease, an existing proprietary relationship.

In Section 1 of the UCA, “rate” and “service” are defined as:

"rate" includes

- (a) a general, individual or joint rate, fare, toll, charge, rental or other compensation of a public utility,
- (b) a rule, practice, measurement, classification or contract of a public utility or corporation relating to a rate, and
- (c) a schedule or tariff respecting a rate;

"service" includes

- (a) the use and accommodation provided by a public utility,
- (b) a product or commodity provided by a public utility, and
- (c) the plant, equipment, apparatus, appliances, property and facilities employed by or in connection with a public utility in providing service or a product or commodity for the purposes in which the public utility is engaged and for the use and accommodation of the public;

120.1 Please provide BC Hydro’s analysis concluding that “the Lease is not an agreement in respect of a ‘rate’ for ‘service’” as defined in the UCA. Please also include in the analysis references to sources of regulatory principles, if necessary and applicable.

120.2 Please confirm that as a non-regulated activity, BC Hydro would not need Commission approval to change the terms of the Lease, such as the amount and timing of the payments.

120.2.1 If not confirmed, please explain.

120.2.2 If confirmed, should the Commission impose a condition for approval of the Waneta 2017 Transaction Application that amendments to the Lease Agreement require Commission approval? Please explain how this hypothetical condition would impact the Waneta 2017 Transaction.

120.3 Please confirm that if the Commission were to accept the proposed expenditure schedule under section 44.2(3)(a) of the UCA, then the Waneta Assets would be added to BC Hydro’s ratebase and BC Hydro would have the ability to recover those assets’ cost of service from BC Hydro’s ratepayers. If not confirmed, please explain.

120.3.1 Please confirm that BC Hydro’s ratepayers will not have access to the energy generated by the Waneta Assets during the Lease period. In other words, the energy will not be added to BC Hydro’s resource stack to serve its customers during the Lease

period. If not confirmed, please explain.

120.3.2 Please confirm that under a scenario where the Waneta Assets' cost of service is greater than the lease payments received from Teck, then the shortfall would be recovered from ratepayers during the Lease period. If not confirmed, please explain.

120.4 Please confirm that after the lease period the energy generated from the Waneta Assets will be either added to BC Hydro's resource stack to serve domestic load or sold in the energy market through BC Hydro's subsidiary, Powerex. If not confirmed, please explain.

120.4.1 Please confirm that after the lease period and only when the energy from those assets are added to BC Hydro's resource stack and used to serve domestic load, would BC Hydro need to seek Commission approval under sections 58 to 61 of the UCA through BC Hydro's revenue requirement application process to recover the Waneta Assets' cost of service. If not confirmed, please explain.

120.5 In response to BCUC IR 1.50.2, BC Hydro confirmed that it is proposing to include the Waneta Assets and transaction costs into BC Hydro's rate base. It is Commission Staff's understanding that rate base represents an entity's investment in regulated operations. Does BC Hydro agree with this interpretation of "rate base"? Please elaborate. If BC Hydro does not agree, please provide BC Hydro's interpretation of "rate base" and explain the rationale.

120.6 Please provide examples of where the Commission has approved under section 44.2(3)(a) of the UCA expenditures for assets for inclusion in rate base that is planned to be used for non-regulated activities.

120.7 If the Commission were to direct the Waneta Assets to be "ring-fenced" or otherwise segregated during the Lease period and brought into rate base once the lease has ended, in BC Hydro's view, what are the potential pros and cons of this approach?

120.7.1 How does BC Hydro propose "ring-fencing" or otherwise segregating the Waneta Assets during the Lease period and then bringing the assets into rate base in the post-lease period? Please list the steps required.

120.8 Please confirm that the assets in the Waneta 2010 Transaction are used for BC Hydro's regulated activities. If not confirmed, please explain.

On page 1-3 of the Application, BC Hydro states it "will purchase Teck's remaining two-thirds interest in Waneta for \$1.203 billion."

On page 4-1 of the Application, BC Hydro states:

...the Waneta 2017 Transaction largely maintains the status quo during the Lease Period in regard to water flows, operating and maintenance practices, the use by Teck of the electricity generated from its (leased) two-thirds interest in the dam, and so on. For these reasons, the Waneta 2017 Transaction can be understood as being a fundamentally economic transaction.

120.9 Please explain why BC Hydro is proposing that the \$1.203 billion costs be added to ratebase for an economic transaction.

120.10 If the Waneta 2017 Transaction is not approved, what effects would this have on BC Hydro's one-third interest in the Waneta dam and the benefits ratepayers derive from it?

120.11 What mechanisms does BC Hydro envision to protect ratepayers from potential losses as a result of the Waneta 2017 Transaction?