BC Hydro
Power smart

6911 Southpoint Drive (B03)
Burnaby, BC
V3N 4X8

July 30, 2024

[redacted]

RE: CEAP IR 47 - Tumbler Ridge Renewable Energy Project - Interconnection Feasibility Study Report

Enclosed is the Interconnection Feasibility study report for the proposed Tumbler Ridge Renewable Energy Project submitted under Attachment M-2: Transmission Service and Interconnection Service Procedures for Competitive Electricity Acquisition Process (CEAP) of the Open Access Transmission Tariff (OATT). This letter provides a non-binding good faith estimate of the cost and time to construct the facilities required to interconnect your project to BC Hydro's Transmission System, being the Network Upgrades, based on the findings of the Interconnection Feasibility study.

Open Access Transmission Tariff

The OATT defines Network Upgrades as additions, modifications, and upgrades to BC Hydro's Transmission System required at or beyond the Point of Interconnection to accommodate the interconnection of the Generating Facility to the BC Hydro's Transmission System. Pursuant to the OATT, BC Hydro will design, procure, construct, install, and own the Network Upgrades. While BC Hydro will pay the costs for the Network Upgrades, the Interconnection Customer provides security for such costs.

Cost Estimate

Based on the Interconnection Feasibility study, the non-binding good faith estimated cost (typical accuracy range of +150%/-50%) for Network Upgrades required to interconnect your project is $9.9 M.

Major Scope of Work Identified:

- Construct one new 230kV 3-pole wood tap structure near str. 09-01 of 2L323
- Construct steel pole structure(s) on 2L323
- Supply and install one 230kV disconnect switch on the constructed steel pole on 2L323
- Construct one dead-end structure on 2L323 as the demarcation point between BC hydro and the customer
- Replace tangent structures with 230kV standard H-frame structures (H2 or above) for telecom fibre addition
- Replace 2 dead-end structures by 230kV standard 3-pole dead-end structure (H2 or above) for telecom fibre addition
- Construct mid span structures (Fibre Optic Only FRP pole, Class C1 or above) for telecom fibre addition
- Supply and install fibre optic cable
- Supply and install protection relays and other required protection equipment

- Other Telecom and Protection work, as required

Exclusions:

- GST
- Right-of-Way or Property costs
- Permits

Key Assumptions:

- Construction will be done by contractor
- Early Engineering and Procurement
- 3 years of construction is considered
- No expansion of station or control building to accommodate new equipment
- No ground improvements will be required
- No contaminated soil will be encountered during construction.
- No piles will be required for construction

Key Risks:

- Transmission routing may be different than assumed, including number of disconnect switches and structure types may change
- Additional right of way or acquisition of more property may be required
- No defined supply chain strategy, construction costs may increase depending on delivery method
- Cost of construction may increase based on geotechnical condition of the actual project site
- Project schedule may be longer than expected, leading to increased costs
- Costs may be affected by market conditions and escalation

Please note that the Revenue Metering requirements and associated costs required to interconnect your project have not been determined at this stage and, therefore, not included in the above estimate. Revenue Metering costs that are attributable to the Interconnection Customer are to be paid in cash. For more details on Revenue Metering requirements and responsibilities, please refer to:

https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/distribution/standards/ds-rmr-complex-revenue-metering.pdf.

Schedule

Based on the Interconnection Feasibility study, the non-binding good faith estimated in-service date for your project's Network Upgrades is Quarter 3, 2029 (calendar year). To achieve this timeline, we may need to expedite certain activities, including engineering design and procurement of long-lead equipment.

Timely actions required from you to minimize risks to the schedule:

- Submission of additional technical data required for the System Impact Study and Facilities Study
- Submission of any required information or document such as demonstration of Site Control
- Execution of Combined Study Agreement and Standard Generator Interconnection Agreement
- Financial commitments and securities

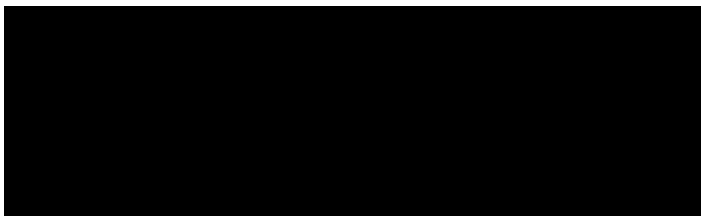
Please note that changes to your interconnection request, delays in data submission, or financial commitments may also impact the target in-service date.

Next Steps

In September 2024, we will issue a final invoice for the Feasibility Study costs. This invoice will reflect the total amount due, taking into account the $15,000 Feasibility Study deposit you have already paid and any remaining amount on the non-refundable $15,000 Interconnection request deposit that we did not spend in reviewing and validating your interconnection request.

If you have any questions, please contact the BC Hydro CEAP Team at ceap2024@bchydro.com.

Sincerely,



Senior Manager, Transmission Interconnections

BC Hydro

Encl.: CEAP2024_IR_47_Tumbler Ridge Renewable Energy_FeS_Report_final.pdf

[redacted]

Tumbler Ridge Wind Renewable

Interconnection Feasibility Study

BC Hydro EGBC Permit to Practice No: 1002449

2024 CEAP IR # 47

Prepared for: [redacted]

[redacted]

1000-APR-00020
2024 Jul 30

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[redacted]

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[redacted]

Revisions

Revision	Date	Description
0	2024 Jul	Initial release

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[redacted]

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Executive Summary

[redacted] the interconnection customer (IC), requests to interconnect its Tumbler Ridge Renewable Energy Center Project (2024 CEAP IR # 47) to the BC Hydro system. Tumbler Ridge Renewable Energy Center has ten (10) [redacted] 7.8 MW type-4 wind turbine generators, adding a total capacity of 78 MW connected to the BC Hydro system at the POI. The Point of Interconnection (POI) is on BC Hydro's 230 kV line 2L323, approx. 9 km from Tumbler Ridge substation (TLR). The IC's proposed commercial operation date (COD) is Oct 1, 2028.

To interconnect the Tumbler Ridge Renewable Energy Center Project and its facilities to the BCH Transmission System at the proposed POI, this Feasibility Study has identified the following conclusions and requirements:

1. The T-tap connection on the BCH's existing circuit 2L323 is acceptable for interconnecting the IC's generating project to the BCH system.

2. The study does not find any performance violation under system normal, such as thermal overload, voltage performance violation or voltage stability concern, caused by the interconnection of the IC's project.

3. The connection of IC's project will exacerbate the pre-existing thermal overloads on 2L308 for loss of 2L312, SLS 2CB11, SLS 2CB12, or SNK 2CB12 and also thermal overloads on 2L312 for loss of 2L308. These overloads are presently addressed by the Peace Region generation shedding remedial action scheme (RAS). The new wind generators at IC's project are required to participate in the existing Peace Region generation shedding RAS.

4. It is identified that SLS 2CB14, SGB 2CB6, or SGB 2CB7 breaker fault would cause overloads on 2L308 because of the interconnection of IC's project. This issue can be addressed by requiring the IC's project to participate in the existing Peace Region generation shedding RAS and by adding these breaker contingencies as input signals to trigger generation shedding. The exact requirements will be determined in subsequent studies if the project proceeds.

5. Tumbler Ridge Renewable Energy Center Project may be islanded with other generations and BC Hydro loads in the area after certain contingencies which may result in unacceptable over-voltages. The IC's

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project is required to participate in the existing Peace region anti-islanding direct transfer trip (DTT) scheme. A list of contingencies is provided in Section 5.1.4. In addition, as a back up the IC is required to install anti-islanding protection within their facility to disconnect the IC's project when an inadvertent island with the local loads forms.

6. According to BC Hydro's TIR, the IC's project must have sufficient reactive power capability over full MW operating range including at the zero MW output level. The IC's project does not meet the reactive power capability requirement specified in the TIR. Power flow study shows the addition of at least 5 MVAr shunt capacitors on the 34.5 kV side is required. The exact requirement will be determined in subsequent detailed studies.

7. At the POI, BCH will design and build the tap that will include a tap structure and a switch structure on the tap side. A 253kV rated disconnect switch will be installed to isolate the IC's facilities from the BCH system. Additional Right-of-Way (ROW) may be required to accommodate the tap.

8. For successful integration of the IC's project, the line protection relays at BC Hydro's TLR substation for 2L323 will be replaced. As part of the line protection replacement, telecommunication facilities will be required between TLR and the IC's project substation P47.

The above conclusions are made based on the IC's input data and study assumptions listed in Section 4, which represent the best available information on May 22, 2024.

A non-binding good faith estimated cost and time to construct the Network Upgrades required to interconnect the proposed project will be provided in a separate letter to the IC.

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Contents

Appendices

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Acronyms

The following are acronyms used in this report.

BCH	BC Hydro
CEAP	Competitive Electricity Acquisition Process
COD	Commercial Operation Date
DTT	Direct Transfer Trip
ERIS	Energy Resource Interconnection Service
ET3	Tower 03-07 Substation
FeS	Feasibility Study
FVO	Fraser Valley Office
IBR	Inverter-Based Resources
IC	Interconnection Customer
LAPS	Local Area Protection Schemes
MPO	Maximum Power Output
NERC	North American Electric Reliability Corporation
NRIS	Network Resource Interconnection Service
OATT	Open Access Transmission Tariff
PCN	Peace Canyon Substation
PLD	Parkland Substation
POI	Point of Interconnection
P47	IC's Tumbler Ridge Renewable Energy Center Substation
RAS	Remedial Action Scheme
SIO	South Interior Office
TIR	BC Hydro "60 KV to 500 kV Technical Interconnection Requirements for Power Generators"
TLR	Tumbler Ridge Substation
TPL	Transmission Planning
WECC	Western Electricity Coordinating Council
WTG	Wind Turbine Generator

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1 Introduction

Table 1-1 below summarizes the project reviewed in this Feasibility Study.

Table 1-1 Summary of Project Information

Project Name	Tumbler Ridge Renewable Energy Center	
Name of Interconnection Customer (IC)	[redacted]	
Point of Interconnection (POI)	on 2L323 at 9 km from TLR	
IC's Proposed COD	1st October 2028	
Type of Interconnection Service	NRIS ☒	ERIS ☐
Maximum Power Injection [1] (MW)	78 MW (Summer)	78 MW (Winter)
Number of Generator Units	10 x 7.8 MW WTGs	
Plant Fuel	Wind	
Note 1: The maximum achievable power injection at the POI is approx. 76.9 MW after accounting for MW losses and service load which is lower than the IC proposed 78 MW.		

[redacted] the interconnection customer (IC), requests to interconnect its Tumbler Ridge Renewable Energy Center Project (2024 CEAP IR # 47) to the BC Hydro system. Tumbler Ridge Renewable Energy Center Project has ten (10) [redacted] 7.8 MW type-4 wind turbine generators, adding a total capacity of 78 MW into the BC Hydro system. The Point of Interconnection (POI) is on BC Hydro's 230 kV line 2L323, approx. 9 km from Tumbler Ridge substation (TLR).

Figure 1-1 shows the Peace region 138/230 kV transmission system diagram including P47 interconnection. The study area – south Peace region 230/138 kV network has six existing IPPs, several transmission voltage customers, and BC Hydro distribution substations. The 230kV transmission lines 2L337, 2L313, 2L309, and 2L308 deliver surplus power from QTY, P47, MLW, MKL, ZBE and DKW to GMS. The surplus power is also delivered to the Peace 230/138kV area loads via 2L312. 1L377 is normally open which separates the north Peace 138 kV regional network from the south 230/138kV regional network.

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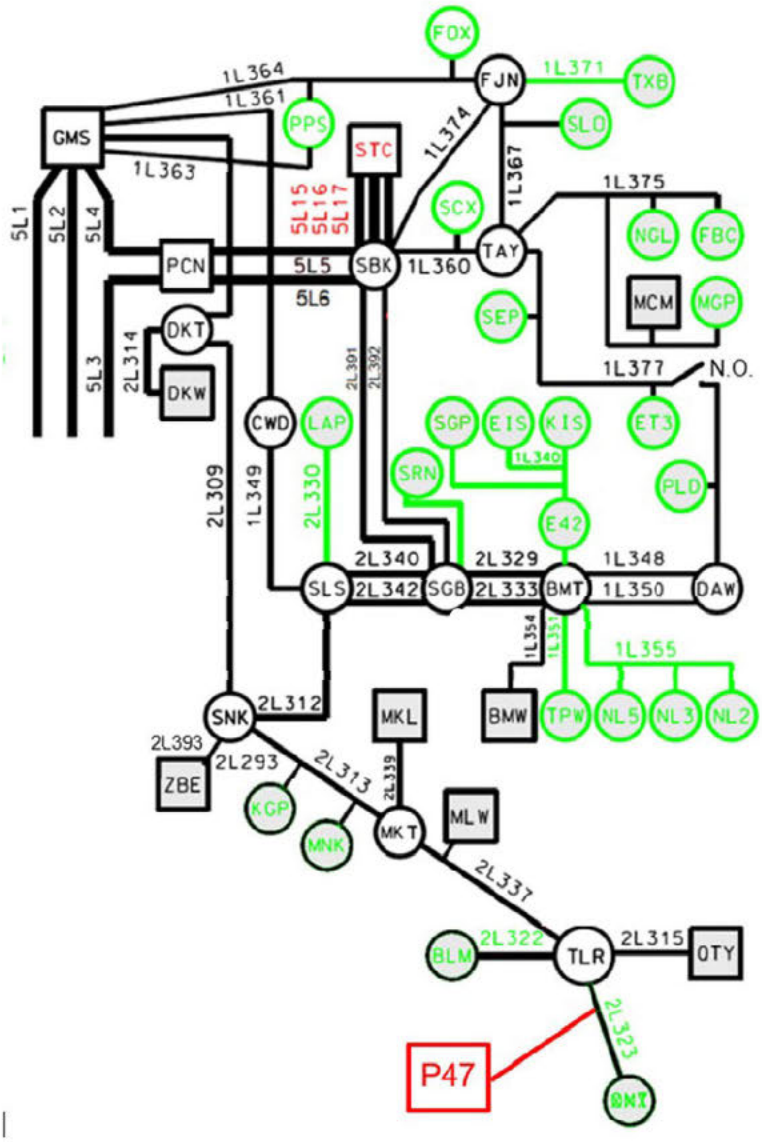

Figure 1-1: Peace Region 138/230 kV Transmission System Diagram

The existing wind farms are as follows:

- Moose Lake Wind Farm (MLW) has a total capacity of 15 MW and is tap connected on the line 2L337
- Zonnebeke Wind Farm (ZBE) has a total capacity of 30 MW and is connected to SNK via the line 2L393.
- Meikle Wind Farm (MKL) has a total capacity of 184.6 MW and is connected to MKT via 2L339.

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- Quality Wind Farm (QTY) has a total capacity of 142.2 MW and is connected to TLR via 2L315.
- Dokie Wind Farm (DKW) has a total capacity of 144 MW and is connected to DKT via 2L314.
- Bear Mountain Wind Farm (BMW) has a total capacity of 105.4 MW and is connected to BMT via 1L354.

There are major network upgrades being planned in the Peace region as follows.

- Site C generating project is the major capital project under construction, which will add six hydroelectric generators with a total installed capacity of 1200 MW. The transmission component of this project, which includes two parallel 500 kV lines (5L5 and 5L6) to Peace Canyon substation (PCN), was in service in 2023. Based on the schedule available at the time of study, the Site C project will be completed by the end of 2025.
- A new 230 kV/138 kV transformer at BMT (i.e. BMT T4) is planned to be installed in June 2026 to accommodate load addition.

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2 Purpose and Scopes of Study

This Feasibility Study is a preliminary evaluation of the system impact of interconnecting the proposed project to the BC Hydro system based on power flow and short circuit analysis in accordance with BCH's Open Access Transmission Tariff (OATT). A non-binding good faith estimated cost of required Network Upgrades and estimated time to construct will be provided.

Per OATT, the feasibility study is performed individually for each of the participating projects in the CEAP process and focuses specifically on the BC Hydro regional transmission system where the proposed generating project is proposed to be constructed. An assessment of the incremental effect on the 500kV bulk transmission system is beyond this study scope.

This is a "limited scope" study which is restricted to power flow studies of P0, P1 and P2 planning events as defined in TPL-001-4 and short circuit analysis. The study does not address other technical aspects such as transient stability and switching transients and impact of multiple contingencies. These subjects would be addressed in subsequent System Impact Study if the project is a Successful Participant of the CEAP.

In case impact to the adjacent external systems to BC Hydro is observed, such impact would be addressed in subsequent detailed and coordinated studies with the relevant adjacent entities if the proposed interconnection proceeds further.

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3 Standard and Criteria

The Feasibility Study is performed in compliance with the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) reliability standards, and the BCH interconnection requirements in the TIR, and upon the ratings of the existing BCH transmission facilities described in Operating Orders, specifically:

- NERC standards: TPL-001-4 and FAC-002-3 relevant to the scope of this Feasibility Study.
- WECC criteria TPL-001-WECC-CRT-4 Transmission System Planning Performance, July 1, 2023.
- BC Hydro's 60 kV to 500 kV Technical Interconnection Requirements for Power Generators.
- BC Hydro Operating Order 5T-10, Ratings for All Transmission Circuits 60 kV or Higher, April 16, 2024.
- BC Hydro Operating Order 5T-14, Ratings for All Transmission and Distribution Transformer, November 8, 2022.
- BC Hydro System Operating Order 7T-22 System Voltage Control, September 19, 2023.

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4 Assumptions and Conditions

This Feasibility Study is performed based on the IC's submitted data and information available to BC Hydro on May 22, 2024 for the study purpose. Appendix A shows the plant single line diagram for the IC's project used in the study model. Certain assumptions were, as set out below, made to the extent required.

The power flow study cases used in this Feasibility Study are established based upon the BC Hydro's base resource plan and load forecasts available at the time of performing the study, which includes existing and future generations, transmission facilities, and loads in addition to the subject interconnection project in this study. Applicable seasonal conditions and the appropriate study years for the study planning horizon are also incorporated.

Additional assumptions are listed as follows.

1) The regional generation are dispatched to the patterns that stress the transmission system in the study area. In these patterns, the regional generations are typically set to their Maximum Power Outputs (MPO) unless otherwise specified.

2) Based on the latest information at the time of this study, the projected in-service date for BMT T4 project is June 2026, which is before the projected in-service date of this IC's project.

3) Based on the schedule available at the time of this study, the Site C project will be completed by the end of 2025.

4) 1L377 is normally open between ET3 and PLD. Change of this configuration could affect the study results.

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5 System Studies and Results

5.1 Power Flow Study Results

Power flow studies were performed to evaluate whether the IC's project would cause any unacceptable system performance (e.g. equipment overloads, steady-state voltage violation and voltage instability) and to determine the reinforcement requirement based on steady state performance analysis.

The study focuses on the 2029 light summer (29LS) system load condition which is typically a stressed condition for a generation interconnection project, taking into considerations of factors such as load conditions, seasons and generation patterns. The 2029 heavy summer (29HS) and 2028 heavy winter (28HW) cases are also checked at a high level to capture any possibility of performance violations under high load conditions.

5.1.1 Branch Loading Analysis

Table 5-1 shows a summary of branch loading analysis under system normal and single contingencies (P1, P2) for various load conditions.

The study finds no transformer or line overload under system normal conditions for all three load conditions studied.

In the light summer condition (29LS) and heavy summer condition (29HS), the study finds pre-existing branch overloads on 2L308 under single contingencies (i.e., 2L312, SLS 2CB11, SLS 2CB12, SNK 2CB12). 2L312 could be thermally overloaded for loss of 2L308. The connection of the IC's project will aggravate these pre-existing overloads, which is currently addressed by Peace Region generator shedding Remedial Action Scheme (RAS). The IC's project is required to participate in the existing Peace Region generation shedding RAS[1].

The study also identified that SLS 2CB14, SGB 2CB6 or 2CB7 breaker fault tripping both 2L340 and 2L342 would cause thermal overloads on 2L308 because of the interconnection of the IC's project. This issue can also be addressed by

[1] The Peace regional transmission system is developed with generation shedding capability to mitigate the impact of various contingencies. Loss of certain transmission element(s) under certain generation, loading and network conditions, will trigger the selected generations to be shed to prevent performance violations.

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requiring the IC's project to participate in the existing Peace Region generator shedding RAS and by adding these breaker contingencies as input signals to trigger generation shedding. The exact requirements will be determined in subsequent studies if the project proceeds.

The study results are summarized in Table 5-1 below.

Table 5-1: Summary of Branch Loading Analysis Results

Case	IC's Plant Output	Contingency Identified		Branch Loading		
				2L308	2L309	2L312
		Cate-gory	Description	GMS-DKT	DKT-SNK	SNK-MKT
Summer Rating				427.5 MVA	427.5 MVA	424.7 MVA
29LS	78 MW	P0	System Normal	60 %	28 %	69 %
		P1	Loss of 2L308	n/a	n/a	129 %
		P1	Loss of 2L312	129 %	97 %	n/a
		P2	Loss of SNK 2CB12	122 %	90 %	n/a
		P2	Loss of SLS 2CB11	129 %	97 %	n/a
		P2	Loss of SGB 2CB6 or SGB 2CB7 or SLS 2CB14	108 %	76%	n/a
29HS	78 MW	P0	System Normal	58 %	26 %	71.4 %
		P1	Loss of 2L308	n/a	n/a	129 %
		P1	Loss of 2L312	129 %	97 %	n/a
		P2	Loss of SNK 2CB12	122 %	90 %	n/a
		P2	Loss of SLS 2CB11	129 %	97 %	n/a
		P2	Loss of SGB 2CB6 or SGB 2CB7 or SLS 2CB14	107 %	75 %	n/a

5.1.2 Steady-State Voltage Analysis

With the connection of the IC's project, the voltage performance under system normal condition and single contingencies is acceptable for all the three load conditions (29LS, 29HS, 28HW). Voltage study results for the most limiting contingency for loss of 2L312 under 28HW load conditions are presented in the following Table 5-2.

Table 5-2: Summary of Steady-State Voltage Study Results

Case	IPP's Generator Output	Contingency		Bus Voltage (PU)		
		Cate-gory	Description	SNK 230	MKT 230	TLR 230
28HW	78 MW	P0	System Normal	1.031	1.042	1.052
		P1	Loss of 2L312	1.020	1.041	1.052

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5.1.3 Reactive Power Capability Evaluation

The BC Hydro TIR requires IBR power plant to have the dynamic reactive power capability at a minimum of +/- 33% of its MPO at the high voltage side of the IC's switchyard over the full MW operating range.

Based on the PSS/E power flow data submitted for this project and the power flow study, the proposed generating project can not meet the BC Hydro's reactive capability requirement at the plant's maximum MW output. Installation of at least 5 MVAr shunt capacitors on the 34.5 kV side is required. The capability would be further verified at the next stage of interconnection study.

Furthermore, the BCH TIR requires the IC's project to provide sufficient reactive power capability over full MW operating range including at zero MW output level. According to the IC-provided reactive capability curve, the proposed WTG has +/- 3.75 MVAr reactive capability at zero MW output, which needs to be re-confirmed adequate if the IC's project proceeds further.

5.1.4 Anti-Islanding Requirements

For various contingencies, the IC's project may be inadvertently islanded with other generations and BC Hydro loads resulting in potential over-voltages and possible equipment damage which is not allowed.

1. Loss of 2L313
2. Loss of 2L337
3. Loss of 2L308 or 2L309 with 2L312 OOS
4. Loss of GMS T13 with GMS T14 and 2L312 OOS
5. Loss of GMS T14 with GMS T13 and 2L312 OOS
6. Loss of 2L312 with 2L308 or 2L309 OOS, or GMS T13 & T14 OOS

The IC's project is required to participate in the existing Peace region anti-islanding direct transfer trip (DTT) scheme.

In addition, as a back up the IC is required to install anti-islanding protection within their facility to disconnect the Tumbler Ridge Renewable Energy Center when an inadvertent island with the local load forms.

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5.2 Fault Analysis

The short circuit analysis in the FeS is based upon the latest BC Hydro system model, which includes the generating facility information and associated impedance data provided by the IC. A more detailed study will be performed at the system impact study stage if needed.

5.3 Stations Requirements

The POI of the Tumbler Ridge Renewable Energy Centre is a tap connection on 230 kV 2L323 (QNT-TLR) transmission line.

No station work is required.

5.4 Transmission Line Requirements

At the POI, BCH will design and build the tap that will include a tap structure and a switch structure on the tap side. A 253kV rated disconnect switch will be installed to isolate the IC's facilities from the BCH system. Additional Right-of-Way (ROW) may be required to accommodate the tap.

For telecommunication purpose, furnish and install 48-strand single mode fibre optic cable on 2L323 from the customer POI to TLR is required (approximately 9 km). Structure replacements and mid span structures maybe required due to this fibre addition on 2L323.

5.5 Protection & Control Requirements

For successful integration of the IC's project, the line protection relays at BC Hydro's TLR substation for 2L323 will be replaced. As part of the line protection replacement, telecommunication facilities will be required between TLR and the IC's Tumbler Ridge Renewable Energy Centre substation (P47).

The IC is to provide the following for the interconnection of the IC's project:

- Entrance protection that complies with the latest version of the "60 kV to 500 kV BC Hydro Technical Interconnection Requirements for Power Generators."
- Provide two SEL-411L-1 relays (firmware and options specified by BC Hydro) relays at the entrance of Tumble Ridge Wind to provide protection

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coverage for 2L323. BC Hydro P&C Planning will provide settings for these relays.

- The IC is responsible for NERC PRC-related tasks, settings to compliance standards within their facilities.
- The IC is responsible for providing a communications link for remote interrogation of the line protection relays and PPIS equipment by BCH servers.
- Tumbler Ridge Renewable Energy Center project must participate in the existing Peace Region generation shedding RAS.
- The IPP is required to participate in the existing Peace region anti-islanding direct transfer trip (DTT) scheme.
- Provide anti-islanding protection as stated in Section 5.1.

The runback schemes or RAS requirements stated in Section 5.1 are mainly to address the overloading concerns under contingencies, which are preliminary. These RAS requirements may utilize the communication channels required for protection purposes included in the cost estimate. If the proposed project proceeds through the CEAP process, subsequent System Impact Studies may identify additional RAS requirements for this interconnection. These RAS functional requirements will include initiating events, control actions, and latency times. Depending on these supplementary requirements, additional telecommunication facilities may be needed to facilitate signal transmission between the BC Hydro substations and customer facilities.

5.6 Telecommunications Requirements

BC Hydro performed a high-level feasibility assessment of a telecom solution to meet the following requirements:

Teleprotection Requirements for Telecom

- Provide WECC Level 3 64 kbps synchronous circuits between TLR and P47 for “TLR-P47 2L323 PY DIGITAL TELEPROT” and “TLR-P47 2L323 SY DIGITAL TELEPROT” with C37.94 interfaces.

Telecontrol Requirements for Telecom

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- Provide P47 SCADA circuit off FVO & SIO.

Other Requirements for Telecom

- None identified.

Certain assumptions were made for determining a potential telecom solution. Details of the telecom solution (e.g. assumptions made, alternatives investigated and work required for BCH and the IC) would be provided at the next study stage.

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6 Cost Estimate and Schedule

The non-binding good faith estimated cost and time to construct the Network Upgrades required to interconnect the proposed project will be provided in a separate letter to the IC.

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7 Conclusions

To interconnect the IC's Project and its facilities to the BCH Transmission System at the POI, this Feasibility Study has identified the following conclusions and requirements:

- The T-tap connection on the BCH's existing circuit 2L323 is acceptable for interconnecting the IC's generating project to the BCH system.
- The study does not find any performance violation under system normal, such as thermal overload, voltage performance violation or voltage stability concern, caused by the interconnection of Tumbler Ridge Renewable Energy Center Project.
- The connection of IC's Project will exacerbate the pre-existing thermal overloads on 2L308 for loss of 2L312, SLS 2CB11, SLS 2CB12, or SNK 2CB12 and also thermal overloads on 2L312 for loss of 2L308. These overloads are presently addressed by the Peace Region generation shedding remedial action scheme (RAS). The new wind generators at IC's Project are required to participate in the existing Peace Region generation shedding RAS.
- It is identified that SLS 2CB14, SGB 2CB6, or 2CB7 breaker faults which trips both 2L340 and 2L342 would cause overloads on 2L308 because of the interconnection of the IC's project. This issue can be addressed by requiring the Tumbler Ridge Renewable Energy Center to participate in the existing Peace Region generation shedding RAS and by adding these breaker contingencies as input signals to trigger generation shedding. The exact requirements will be determined in subsequent studies if the project proceeds.
- Tumbler Ridge Renewable Energy Center Project may be islanded with other generations and BC Hydro loads in the area after certain contingencies which may result in unacceptable over-voltages. The IC's project is required to participate in the existing Peace region anti-islanding direct transfer trip (DTT) scheme. A list of contingencies is provided in Section 5.1.4. In addition, as a back up the IC is required to install anti-islanding protection within their facility to disconnect the IC's project when an inadvertent island with the local loads forms.

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- According to BC Hydro's TIR, the IC's project must have sufficient reactive power capability over full MW operating range including at the zero MW output level. The wind farm does not meet the reactive power capability requirement specified in the TIR. Power flow study shows the addition of at least 5 MVAr shunt capacitors on the 34.5 kV side is required. The exact requirement will be determined in subsequent detailed studies.
- At the POI, BCH will design and build the tap that will include a tap structure and a switch structure on the tap side. A 253kV rated disconnect switch will be installed to isolate the IC's facilities from the BCH system. Additional Right-of-Way (ROW) may be required to accommodate the tap.
- For successful integration of the IC's project, the line protection relays at BC Hydro's TLR substation for 2L323 will be replaced. As part of the line protection replacement, telecommunication facilities will be required between TLR and P47.

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Appendix A
Plant Single Line Diagram Used for Power Flow Study

Figure A-1 shows IC's Project single line diagram used for power flow study.

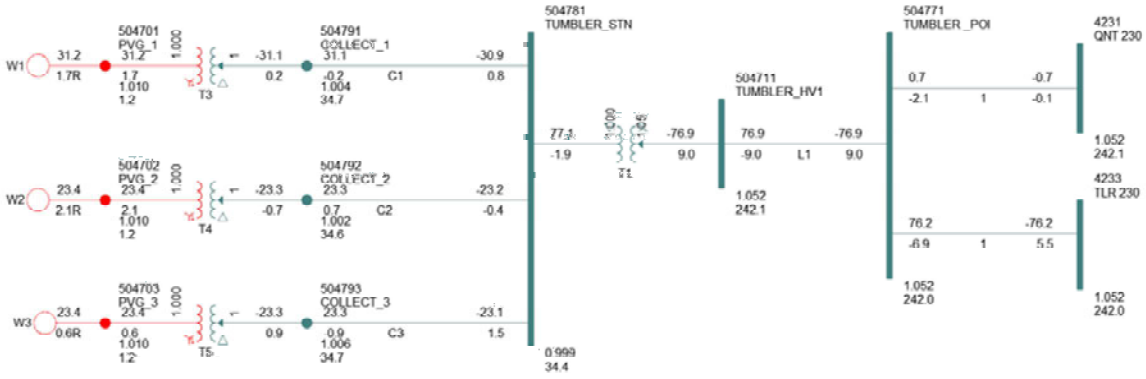

Figure A-1: Tumbler Ridge Renewable Energy Center Project Single Line Diagram for Power Flow Study.

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