BC Hydro
Power smart

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

July 30, 2024

[redacted]

RE: CEAP IR 55 - Mt Bennett Wind Farm Project - Interconnection Feasibility Study Report

Enclosed is the Interconnection Feasibility study report for the proposed Mt Bennett Wind Farm 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 $83.8M.

Major Scope of Work Identified:

- Acquire adequate property for a new switching station close to the existing transmission line 2L337
- Construct a new outdoor 230kV, 3- circuit breaker ring bus switching station
- Construct a new control building and other required substation facilities and infrastructures
- Supply and install protection relays and other required protection equipment
- Install new passive repeater tower, antenna, and other required telecom equipment

Exclusions:

- GST
- Right-of-way
- Permits

Key Assumptions:

- Construction by contractor
- 3 years of construction
- No expansion of existing stations or control buildings to accommodate new equipment
- Early Engineering and Procurement
- No ground improvements will be required
- No piles will be required for construction
- No contaminated soil will be encountered during construction

Key Risks:

- 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 increase 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 2031 (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_55_Mt Bennett Wind Farm_FeS_Report_final.pdf

[redacted]

Mount Bennett Wind Project

Interconnection Feasibility Study

BC Hydro EGBC Permit to Practice No: 1002449

2024 CEAP IR # 55

Prepared for: [redacted]

[redacted]

1000-APR-00025
2024 Jul 30

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Revision	Date	Description
0	2024 Jul	Initial release

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Executive Summary

[redacted] the interconnection customer (IC), requests to interconnect its Mount (Mt) Bennett Wind Project (2024 CEAP IR # 55) to the BC Hydro (BCH) system. Mt Bennett Wind Project has seventeen (17) [redacted] MW type-4 wind turbine generators, adding a total capacity of 102 MW with a maximum power injection of 99.1 MW into the BC Hydro system at the POI. The Point of Interconnection (POI) is on BC Hydro's 230 kV line 2L337, approx. 18 km from Tumbler Ridge substation (TLR). The IC's project will connect to the POI via a 13.5 km 230 kV interconnection line. The IC's proposed commercial operation date (COD) is Oct 1, 2031.

To interconnect the Mt Bennett Wind Project and its facilities to the BCH Transmission System at the proposed POI, this Feasibility Study has identified the following conclusions and requirements:

1. A new 230kV switching station (referred to as "P55T") on 2L337 is required at the proposed POI for interconnecting the IC's generating project to the BCH system. With the new switching station P55T, 2L337 will be segregated into three new lines, temporarily referred to as: 2L337_A (MKT -P55T), 2L377_B (P18T-TLR) and 2L337_C (P55T-P55). The temporary line designations will be replaced by permanent designations at a later stage of interconnection study.

2. The connection of Mt Bennett Wind Project does not cause any performance violation (i.e., thermal overload, voltage performance violation or voltage stability concern) under system normal conditions.

3. The Mt Bennett Wind can exacerbate the pre-existing thermal overload on 2L308 and 2L312 under single contingencies or breaker contingencies (i.e., 2L308, 2L309, 2L312, SLS 2CB11 or SLS 2CB12) under light/heavy summer loading conditions. These overloads are presently addressed by the Peace Region Local Gen-shedding remedial action scheme (RAS). The Mt Bennett Wind project is required to participate in the existing Peace Region Local Gen-shedding RAS.

4. Under certain breaker contingencies (i.e., SGB 2CB6, SGB 2CB7, SNK 2CB12, SLS 2CB14, DKT 2CB2, DKT 2CB3, or DKT 2CB4), the addition of Mt Bennett Wind project can cause thermal overload on 2L308, 2L309,

and 2L312. The issue can be addressed by requiring the Mt Bennett Wind project to participate in the existing Peace Region Local Gen-shedding RAS and by adding these beaker contingencies as input signals to trigger generation shedding. The exact requirements will be determined in subsequent studies if the project proceeds.

5. The Mt Bennett Wind Project may be islanded with other generations and BC Hydro loads after certain contingencies which may result in over-voltages. 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 project is required to install anti-islanding protection within their facility to disconnect the wind farm when an inadvertent island with the local load 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 Mt Bennett Wind Project does not meet the reactive power capability requirement specified in BC Hydro's 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. In addition, the Mt Bennett wind farm does not meet the reactive capability requirement at zero MW output level, which will need to be addressed.

7. BC Hydro will provide line protections for 2L337_A, 2L337_B and 2L337_C protections (BC Hydro end only). As part of the line protection replacements for each of the three lines, telecommunication facilities will be required to accommodate the new protection schemes. The IC shall provide required relays, telecom facility and associated equipment at its facilities to accommodate the new protection schemes.

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.

Contents

Appendices

Appendix A Plant Single Line Diagram Used for Power Flow Study

Appendix B One-Line Sketch for New Switching Station

Acronyms

The following are acronyms used in this report.

BCH	BC Hydro
CEAP	Competitive Electricity Acquisition Process
COD	Commercial Operation Date
CTG	Contingency
DTT	Direct Transfer Trip
EDM	Edmonds Office
ERIS	Energy Resource Interconnection Service
FeS	Feasibility Study
FVO	Fraser Valley Office
IBR	Inverter-Based Resources
IC	Interconnection Customer
LAPS	Local Area Protection Schemes
MKT	Meikle Wind Terminal
MPO	Maximum Power Output
NERC	North American Electric Reliability Corporation
NRIS	Network Resource Interconnection Service
OATT	Open Access Transmission Tariff
POI	Point of Interconnection
RAS	Remedial Action Scheme
SIO	South Interior Office
TIR	BC Hydro “60 KV to 500 kV Technical Interconnection Requirements for Power Generators”
TLR	Tumble Ridge Substation
WECC	Western Electricity Coordinating Council
WTG	Wind Turbine Generator

1 Introduction

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

Table 1-1 Summary of Project Information

Project Name	Mount Bennett Wind Project	
Name of Interconnection Customer (IC)	[redacted]	
Point of Interconnection (POI)	on 2L337 at 18 km from TLR	
IC's Proposed COD	1st October 2031	
Type of Interconnection Service	NRIS ☒	ERIS ☐
Maximum Power Injection [1] (MW)	99.11 MW (Summer)	99.11 MW (Winter)
Number of Generator Units	17 x 6 MW WTGs	
Plant Fuel	Wind	
Note 1: The maximum achievable power injection at the POI is approx. 99.11 MW after accounting for MW losses and service load which is the same as the IC proposed amount.		

[redacted] the interconnection customer (IC), requests to interconnect its Mount (Mt) Bennett Wind Project (2024 CEAP IR # 55) to the BC Hydro (BCH) system. Mt Bennett Wind Project has seventeen (17) [redacted] MW type-4 wind turbine generators, adding a total capacity of 102 MW with a maximum power injection of 99.1 MW into the BC Hydro system at the POI. The Point of Interconnection (POI) is on BC Hydro's 230 kV line 2L337, approx. 18 km from Tumbler Ridge substation (TLR). The IC's project will connect to the POI via a 13.5 km 230 kV interconnection line. The IC's proposed commercial operation date (COD) is Oct 1, 2031.

Figure 1-1 shows the Peace Region 230/138 kV transmission system diagram, including P55 interconnection. The study area – south Peace region 230/138 kV network has six existing wind farms, several transmission voltage customers, and BC Hydro distribution substations. The 230kV transmission lines 2L337, 2L313, 2L309, and 2L308 deliver surplus power from QTY, P55, MLW, MKL, P50, and DKW to GMS. The surplus power is also delivered to the Peace 230/138kV area loads via 2L312. 1L377 is normally open between ET3 and PLD.

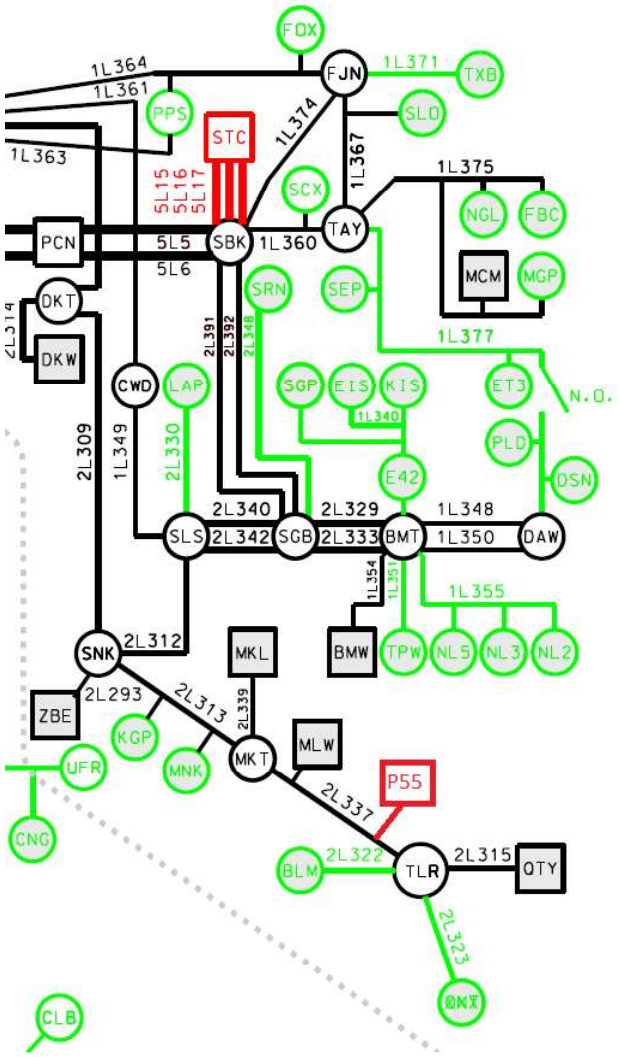

Figure 1-1: Peace Region 230/138 kV Transmission System Diagram

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.
- 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 are 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), has entered service in 2023. Based on the schedule available at the time of study, the Site C project will be completed by 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.

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 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.

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.

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 project.

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

4) This study is based on 1D6L377 normally open between PLD and ET3 for 1L377. Change of this configuration could affect the study results.

5 System Studies and Results

Based upon the IC's submitted information and the area system conditions, a new switching station (referred to as "P55T") at the proposed POI on 2L337 is required to interconnect the IC's generating project to the BCH system. There are multiple terminals and multiple sources on the existing line 2L337. The addition of the new switching station would help to maintain reliability and adequate protection performance to serve the existing customers and the new addition.

With the new switching station P55T, the existing line 2L337 will be segregated into three new lines, temporarily referred to as: 2L337_A (MKT-P55T), 2L337_B (P55T-TLR) and 2L337_C (P55T-P55). The temporary line designations will be replaced by permanent designations at a later stage of interconnection study.

5.1 Power Flow Study Results

Power flow studies were performed to evaluate whether the IC's generating 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 2032 light summer (32LS) 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 2032 heavy summer (30HS) and 2031 heavy winter (31HW) 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 (P0) 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 (32LS, 32HS, 31HW).

In the light/heavy summer loading conditions (32LS, 32HS), the study finds that Mt Bennett Wind exacerbates the pre-existing thermal overload on 2L308 and 2L312 under single contingencies or breaker contingencies (i.e., 2L308, 2L309, 2L312, SLS 2CB11 or SLS 2CB12). These overloads are presently addressed by the

Peace Region Local Gen-shedding remedial action scheme (RAS). The new Mt Bennett Wind project is required to participate in the existing Peace Region Local Gen-shedding RAS[1].

Moreover, it is identified that under new breaker contingencies (i.e., SGB 2CB6 or 2CB7, SNK 2CB12, SLS 2CB14, DKT 2CB2 or 2CB3 or 2CB4), Mt Bennett Wind project can also cause thermal overload on 2L308, 2L309, and 2L312. The issue can be addressed by requiring the Mt Bennett Wind project to participate in the existing Peace Region Local Gen-shedding RAS and by adding these beaker contingencies as input signals to trigger generation shedding. The exact requirements will be determined in subsequent studies if the project proceeds.

Table 5-1: Summary of Branch Loading Analysis Results

Case	IC's Generation Output	Contingency Identified		Branch Loading[2]		
				2L308	2L309	2L312
		Cate-gory	Description[3]	GMS-DKT	DKT-SNK	SNK-SLS
32LS	102 MW	P0	System Normal	267.9 MVA 63 %	131.3 MVA 31%	319.6 MVA 75 %
		P1	2L308 CTG			586.5 MVA 134.4 %
		P1	2L309 CTG			448.4 MVA 102 %
		P1	2L312 CTG	573.4 MVA 134.6%	446.6 MVA 102.6%	
		P2	SGB 2CB6 or 2CB7	484.1 MVA 111.9%		
		P2	SLS 2CB14	484.1 MVA 111.9%		
		P2	SLS 2CB11 or 2CB12	573.4 MVA 134.6%	446.6 MVA 102.6%	
		P2	SNK 2CB12	545.5 MVA 127.6%		
		P2	DKT 2CB2 or 2CB3 or 2CB4			448.5 MVA 102%
32HS	102 MW	P0	System Normal	258.5 MVA 61 %	121.5 MVA 28%	328.5 MVA 77 %
		P1	2L308 CTG			585.6 MVA 134.3 %
		P1	2L309 CTG			447.8 MVA 101.9 %
		P1	2L312 CTG	572.9 MVA 134.6%	446.1 MVA 102.6%	
		P2	SGB 2CB6 or 2CB7	481.1 MVA 111.3%		
		P2	SLS 2CB14	481.1 MVA 111.3%		

[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.

		P2	SLS 2CB11 or 2CB12	572.9 MVA 134.5%	446.1 MVA 102.6%	
		P2	SNK 2CB12	544.9 MVA 127.6%		
		P2	DKT 2CB2 or 2CB3 or 2CB4			447.9 MVA 101.9%

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 (32LS, 32HS, 31HW). Table 5-2 shows a summary of steady-state voltage performance under various system conditions and contingencies.

For all the studied load conditions (32ls, 32hs, 31hw), the voltage performance under system normal condition (P0) is acceptable.

There are no voltage deviation violations for P1 or P2 contingencies. The summary below demonstrates the voltages in the surrounding 230 kV buses are within acceptable ranges with very limited deviations for representative contingencies.

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

Case	IC's Generation Output	Contingency		Bus Voltage (PU)		
		Cate-gory	Description	DKT 230	SNK 230	SLS 230
31HW	102 MW	P0	System Normal	1.020 PU	1.031 PU	1.031 PU
		P1	2L312 CTG	1.001 PU	1.019 PU	1.034 PU
		P2	SLS 2CB11/12 Contingency	1.001 PU	1.019 PU	1.034 PU
32HS	102 MW	P0	System Normal	1.021 PU	1.035 PU	1.039 PU
		P1	2L312 CTG	0.996 PU	1.018 PU	1.040 PU
		P2	SLS 2CB11/12 Contingency	0.996 PU	1.018 PU	1.040 PU

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 by the IC 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 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. The proposed wind farm does not meet this requirement at zero MW output, which will need to be addressed.

5.1.4 Anti-Islanding Requirements

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

1. Loss of 2L313.
2. 2L337 open ended at MKT.
3. Loss of 2L308 or 2L309 with 2L312 OOS.
4. Loss of 2L312 with 2L308 or 2L309 OOS, or GMS T13 & T14 OOS.
5. Loss of GMS T13 with GMS T14 and 2L312 OOS.
6. Loss of GMS T14 with GMS T13 and 2L312 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 its facility to disconnect the IC's wind farm when an inadvertent island with the local load forms.

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 next stage of interconnection study.

5.3 Stations Requirements

A new outdoor 230kV, 3-circuit breaker ring bus Air Insulated Switchgear (AIS) switching station (P55T temporarily) will be built at POI, close to the existing 230kV

transmission line 2L337. The existing transmission line 2L337 will be cut and looped in/out, and 230kV line of Mt Bennett Wind Project will be terminated at the new switching station.

The station scope at the new switching station P55T is as follows.

- Acquire adequate property for a new switching station close to the existing transmission line 2L337.
- Construct a new outdoor 230kV, 3- circuit breaker ring bus AIS switching station. Refer to the one-line sketch in Appendix B for details.
- Construct a new control building and other required substation facilities and infrastructures.
- Cut the existing 2L337 and loop in/out the switching station.
- Terminate 230kV transmission line of Mt Bennett Wind Project at the station.

5.4 Protection & Control Requirements

BC Hydro will provide line protections for 2L337_A (MKT – P55T), 2L337_B (P55T - TLR) and 2L337_C (P55T-P55) protections (BC Hydro end only). As part of the line protection replacements for each of the three lines, telecommunication facilities will be required to accommodate the new protection schemes.

The IC is to provide the following for the interconnection of Mt Bennett Wind 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) at the entrance of Mt Bennett Switching Station to provide protection coverage for 2L337_C. BC Hydro P&C Planning will provide core protection settings for these relays to protect transmission line 2L337_C during a transmission line fault. Non-core protection such as local breaker failure, auto-reclosing, backup protection for station elements will not be provided by BC Hydro P&C Planning.
- 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 PPIS equipment by BCH servers.

- Provide anti-islanding protection as stated in Section 5.1.
- The IC is required to participate in the existing Peace Region Windfarm RAS.
- The IC is required to participate in the existing Peace Region anti-islanding direct transfer trip (DTT) scheme.

If the proposed project proceeds through the CEAP process, subsequent System Impact Studies may identify additional customer generation shedding requirements due to remedial action schemes (RAS). These RAS functional requirements, including initiating events, control actions, and response times, will be established in detail. Depending on these detailed requirements, additional telecommunication facilities may be needed to facilitate signal transmission between the BC Hydro substation and the customer facilities.

5.5 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 MKT and Mt Bennett Switching Station (P55T) for “MKT – P55T 2L337_A PY DIGITAL TELEPROT” and “MKT – P55T 2L337_A SY DIGITAL TELEPROT”. Physical interface shall be C37.94 optical over multimode fibre using ST connectors.
- Provide WECC Level 3 64 kbps synchronous circuits between TLR and Mt Bennett Switching Station (P55T) for “TLR – P55T 2L337_B PY DIGITAL TELEPROT” and “TLR – P55T 2L337_B SY DIGITAL TELEPROT”. Physical interface shall be C37.94 optical over multimode fibre using ST connectors.
- Provide WECC Level 3 64 kbps synchronous circuits between Mt Bennett Switching Station (P55T) and Mt Bennett Wing Project (P55) for “P55T – P55 2L337_C PY DIGITAL TELEPROT” and “P55T – P55 2L337_C SY DIGITAL TELEPROT”. Physical interface shall be C37.94 optical over multimode fibre using ST connectors.

Telecontrol Requirements for Telecom

- Provide Mt Bennett Switching Station (P55T) SCADA circuits to FVO and SIO.
- Provide Mt Bennett Wing Project (P55) SCADA circuits to FVO and 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.

6 Cost Estimate and Schedule

A non-binding good faith cost for required network upgrades and estimated schedule for construction are included in a separate letter to the IC.

7 Conclusions

To interconnect the Mt Bennett Wind Project and its facilities to the BCH Transmission System at the proposed POI, this Feasibility Study has identified the following conclusions and requirements:

1. A new 230kV switching station (referred to as "P55T") on 2L337 is required at the proposed POI for interconnecting the IC's generating project to the BCH system. With the new switching station P55T, 2L337 will be segregated into three new lines, temporarily referred to as: 2L337_A (MKT -P55T), 2L377_B (P18T-TLR) and 2L337_C (P55T-P55). The temporary line designations will be replaced by permanent designations at a later stage of interconnection study.

2. The connection of Mt Bennett Wind Project does not cause any performance violation (i.e., thermal overload, voltage performance violation or voltage stability concern) under system normal conditions.

3. The Mt Bennett Wind can exacerbate the pre-existing thermal overload on 2L308 and 2L312 under single contingencies or breaker contingencies (i.e., 2L308, 2L309, 2L312, SLS 2CB11 or SLS 2CB12) under light/heavy summer loading conditions. These overloads are presently addressed by the Peace Region Local Gen-shedding remedial action scheme (RAS). The Mt Bennett Wind project is required to participate in the existing Peace Region Local Gen-shedding RAS.

4. Under certain breaker contingencies (i.e., SGB 2CB6, SGB 2CB7, SNK 2CB12, SLS 2CB14, DKT 2CB2, DKT 2CB3, or DKT 2CB4), the addition of Mt Bennett Wind project can cause thermal overload on 2L308, 2L309, and 2L312. The issue can be addressed by requiring the Mt Bennett Wind project to participate in the existing Peace Region Local Gen-shedding RAS and by adding these beaker contingencies as input signals to trigger generation shedding. The exact requirements will be determined in subsequent studies if the project proceeds.

5. The Mt Bennett Wind Project may be islanded with other generations and BC Hydro loads after certain contingencies which may result in over-voltages. The IC's project is required to participate in the existing Peace region anti-islanding direct transfer trip (DTT) scheme. In addition, as a

backup the project is required to install anti-islanding protection within their facility to disconnect the wind farm when an inadvertent island with the local load 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 Mt Bennett Wind Project does not meet the reactive power capability requirement specified in BC Hydro's 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. In addition, the Mt Bennett wind farm as submitted does not meet the reactive capability requirement at zero MW output level, which will need to be addressed.

7. BC Hydro will provide line protections for 2L337_A, 2L337_B and 2L337_C protections (BC Hydro end only). As part of the line protection replacements for each of the three lines, telecommunication facilities will be required to accommodate the new protection schemes. The IC shall provide required relays, telecom facility and associated equipment at its facilities to accommodate the new protection schemes.

A non-binding good faith cost for required network upgrades and estimated schedule for construction are included in a separate letter to the IC.

Appendix A
Plant Single Line Diagram Used for Power Flow Study

Figure A-1 shows Mt Bennett Wind Project single line diagram used for power flow study.

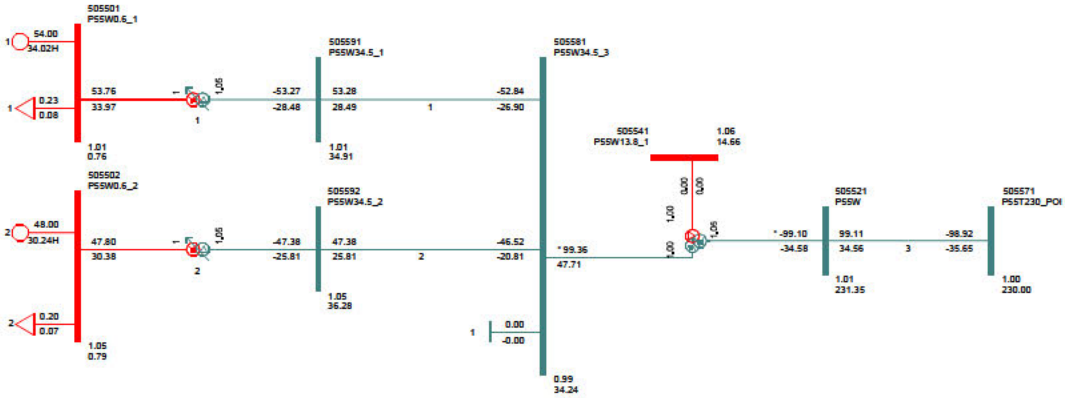

Figure A-1: Mt Bennett Wind Project (P55) Single Line Diagram for Power Flow Study.

As seen in the diagram, Mt Bennett Wind Project includes one main power transformer that steps-up the voltage from 34.5kV to 230kV, and a 34.5kV collector system consisting of two (2) feeders connecting nine (9) and eight (8) wind turbines, respectively.

Appendix B
One-Line Sketch for New Switching Station

Figure B-1 shows the Stations Planning One-Line Sketch for the New Switching Station P55T.

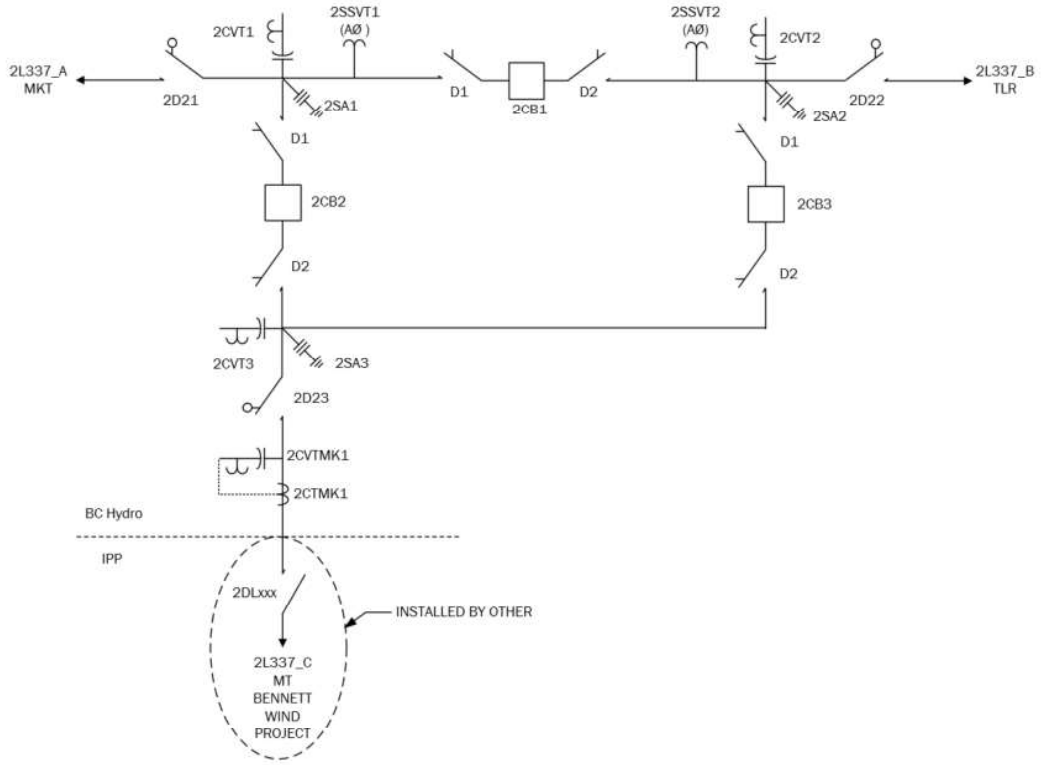

Figure B-1: Stations Planning One-Line Sketch for the New Switching Station P55T.