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

July 30, 2024

[redacted]

[redacted]

[redacted]

RE: CEAP IR 93 - Jewakwa Heakamie Hydro Project - Interconnection Feasibility Study Report

Enclosed is the Interconnection Feasibility study report for the proposed Jewakwa Heakamie Hydro 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 $39.6 M.

Major Scope of Work Identified:

- Supply and install 230 kV transmission line position and 230 kV circuit breaker with associated equipment at BC Hydro's Malaspina Substation (MSA)
- Supply and install 230 kV 25 MVAr switchable shunt reactor at customer's line termination at MSA
- Expand existing control building to accommodate new P&C panels and other equipment
- Add and upgrade Protection, Control and Telecom

Exclusions:

- GST
- Right-of-Way
- Permits

Key Assumptions:

- Construction by contractor
- 3 years of construction is considered
- Early Engineering and Procurement
- Control building expansion is required
- No station expansion will be required
- No ground improvements will be required
- No contaminated soil will be encountered

Key Risks:

- No defined supply chain strategy, construction costs may increase depending on delivery method
- 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 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,

[redacted]

Senior Manager, Transmission Interconnections

BC Hydro

Encl.: CEAP2024_IR_93_Jewakwa Heakamie Hydro_FeS_Report_final.pdf

[redacted]

Jewakwa Heakamie Hydro Project

Interconnection Feasibility Study

BC Hydro EGBC Permit to Practice No: 1002449

2024 CEAP IR # 93

Prepared for: [redacted]

[redacted]

[redacted]

Report Metadata

Header:	Jewakwa Heakamie Hydro Project
Subheader:	Interconnection Feasibility Study
Title:	Jewakwa Heakamie Hydro Project
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Report Number:	431-APR-00009
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Confidentiality:	Public
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Volume:	1 of 1

[redacted]

Related Facilities:	Malaspina (MSA) 230 kV substation
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Revisions

Revision	Date	Description
0	2024 Jul	Initial release

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Executive Summary

[redacted] Company, the interconnection customer (IC), requests to interconnect its Jewakwa Heakamie Hydro Project (2024 CEAP IR # 93) to the BC Hydro (BCH) system. Jewakwa Heakamie Hydro Project has four (4) 50 MW 13.8 kV hydro generators with total installed capacity of 200 MW. The IC will build a 320 km long 230 kV overhead transmission line (2LXX) to interconnect the generating plant with BC Hydro system, the Point of Interconnection (POI) is at BC Hydro's Malaspina Substation (MSA) 230 kV bus and the maximum power injection at the POI is 185 MW. The IC's proposed commercial operation date (COD) is Oct 1, 2031.

To interconnect the Jewakwa Heakamie Hydro Project and its facilities to the BCH Transmission System at the proposed POI, this Feasibility Study has identified the following observations and requirements:

1. A new 230 kV line position at MSA with a new circbuit breaker is required to interconnect the IC's generating project to the BC Hydro system.
2. Considering the IC owned 230 kV interconnection line is unusually long, to improve and maintain operational performance and reliability, a new switchable shunt reactor at the line terminals and a line series capacitor compensation are required.
3. The connection of Jewakwa Heakamie Hydro Project does not cause any performance violation (i.e. thermal overload, voltage performance violation or voltage stability concern) under system normal conditions.
4. The connection of Jewakwa Heakamie Hydro Project will aggravate most of the pre-existing issues in the area, which are currently addressed by the MSA separation RAS. Jewakwa Heakamie Hydro project must participate in the existing MSA Separation RAS as a generation shedding candidate based on high level assessments at the feasibility study stage. Detailed RAS functional requirement study will be needed in a later stage.
5. The connection of Jewakwa Heakamie Hydro Project will cause an overload on MSA T1 and MSA T2 under single contingencies. Either RAS generation shedding/runback at Jewakwa Heakamie Hydro Project or operator's manual actions will be relied on to address this issue.

6. BC Hydro will provide line protection relays for 2LXX at MSA.The IC will provide the required relays, telecom facility, and associated equipment to accommodate the line protection requirement, as well as entrance protection that complies with BC Hydro guidelines.

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.

[redacted]

Contents

Appendices

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
EDM	Edmonds Office
ERIS	Energy Resource Interconnection Service
FeS	Feasibility Study
IBR	Inverter-Based Resources
P93	Jewakwa Heakamie Hydro Plant P93
IC	Interconnection Customer
IPP	Independent Power Producer
LAPS	Local Area Protection Schemes
MPO	Maximum Power Output
MSA	Malaspina Substation
NERC	North American Electric Reliability Corporation
NRIS	Network Resource Interconnection Service
OATT	Open Access Transmission Tariff
POI	Point of Interconnection
RAS	Remedial Action Scheme
TIR	BC Hydro “60 KV to 500 kV Technical Interconnection Requirements for Power Generators”
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	Jewakwa Heakamie Hydro	
Name of Interconnection Customer (IC)	[redacted]	
Point of Interconnection (POI)	At Malaspina 230 kV (MSA) station	
IC's Proposed COD	1st October 2031	
Type of Interconnection Service	NRIS ☒	ERIS ☐
Maximum Power Injection [1] (MW)	185 MW (Summer)	185 MW (Winter)
Number of Generator Units	4 x 50 MW Hydro	
Plant Fuel	Hydro	
Note 1: The maximum achievable power injection at the POI is approx. 182 MW after accounting for MW losses and service load which is lower than the IC proposed 185 MW.		

[redacted] the interconnection customer (IC), requests to interconnect its Jewakwa Heakamie Hydro Project (2024 CEAP IR # 93) to the BC Hydro system. Jewakwa Heakamie Hydro Project has (4) 50 MW 13.8 kV Hydro generators with a total installed capacity of 200 MW. The IC will build a 320 km long 230 kV overhead transmission line (2LXX) to interconnect the generating plant with BC Hydro system. The Point of Interconnection (POI) is at BC Hydro's Malaspina Substation (MSA) on the 230 kV bus. The stated maximum power injection at the POI is 185 MW. The proposed commercial operation date (COD) is Oct 1,2031.

Figure 1-1 shows the area system with the proposed Jewakwa Heakamie Hydro Project in the Sunshine Coast and North Shore area. MSA is a major 500/230/132 kV substation which is supplied from Cheekye Substation (CKY) via 5L30 and 5L32, and in turn supplies Vancouver Island via dual 500 kV circuits 5L29 and 5L31. There are two 230 kV circuits: 2L47 supplies Howe Sound Pulp and Paper – Port Mellon Substation (HSP), and 2L48 is the main supply to Saltery Bay Substation (SAY). There are two 132 kV transmission lines: 1L35 ties to Sechelt Substation (SEC) and Pender Harbour Substation (PHR), and 1L37 is the tie to the tems sayamkwu LP (tsLP) owned Narrows Inlet Hydroelectric Cluster generation. 1L37 is also the backup supply to SAY and is normally open at SAY.

The existing CKY area RAS is designed to solve various performance issues for contingencies in that area, especially 132 kV transmission system from MSA to CKY.

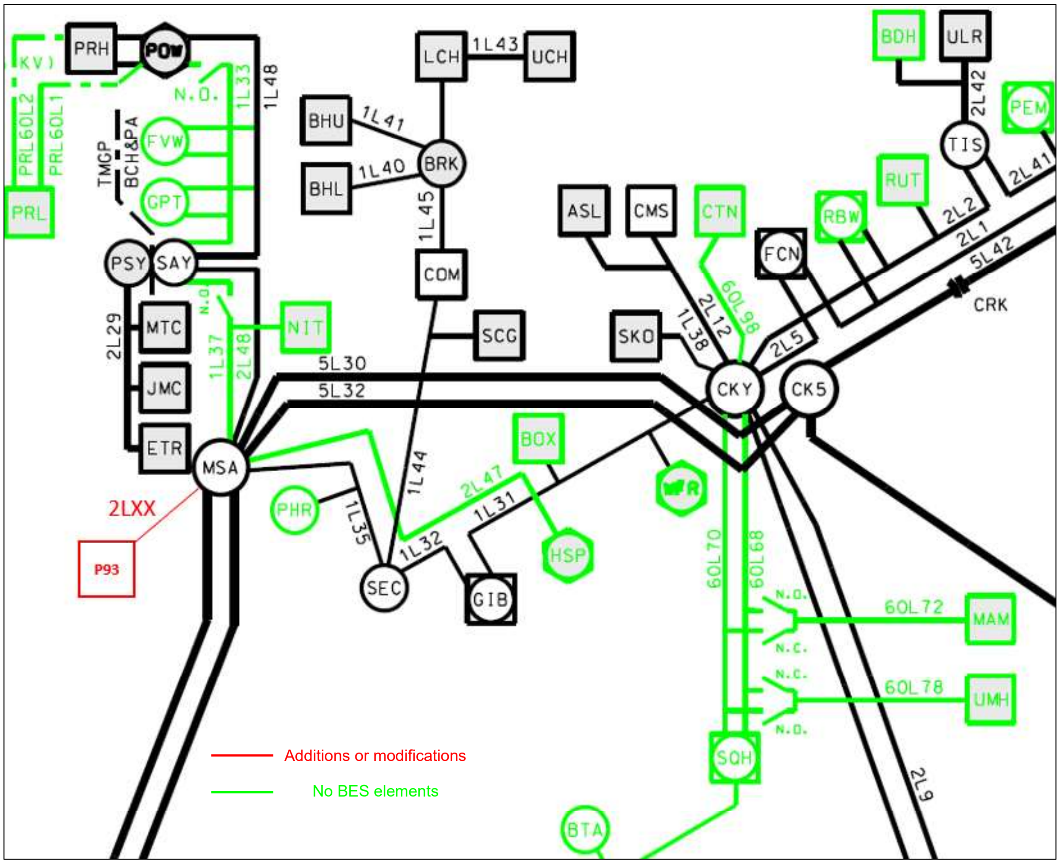

Figure 1-1: Sunshine Coast and North Shore Region 132/230/500 kV Transmission System Diagram

There is an existing MSA Separation RAS. The major purpose of the RAS is to prevent instability of MTC and ETR generators and avoid collapse of Sunshine Coast load area after 500 kV supply to MSA 230 kV bus lost. It also prevents overload of 1L31/1L32 after 500 kV supply to MSA 230 kV bus lost. At last, it prevents transient instability of Narrows Inlet generation for close in faults on 1L35 or loss of MSA T1/T5.

[redacted]

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.

[redacted]

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.

[redacted]

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) The POW-SAY-MSA 132 kV and 230 kV transmission system (1L48 and 2L48) is stressed with power transfer 82 MW on 1L48 from POW to achieve firm power export to the US required by an existing customer, and full output from local IPPs including MTC, JMC, and ETR.

[redacted]

5 System Studies and Results

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 (32HS) 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) for various load conditions.

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

For single contingencies, the connection of Jewakwa Heakamie Hydro Project could cause transformer overloads in the summer load conditions (32HS & 32LS); thermal overload on MSA T1 for loss of MSA T2, and MSA T2 overload for loss of MSA T1. RAS generation shedding or runback at Jewakwa Heakamie Hydro Project or operator's manual actions will be relied on to address this issue.

Table 5-1: Summary of Branch Loading Analysis Results

Case	IC's Plant Output	Contingency		Branch Loading			
				T1	T2	1L35	1L31
		Cat.	Description	MSA 500 - MSA 230 T1	MSA 500 - MSA 230 T2	SEC 132 - PHR 132	GIB 132 - BOX 132
Winter Rating				714 MVA	714 MVA	134.9 MVA	114.1 MVA
31HW	Max	P0	System Normal	45%	44%	15%	13%
	Max	P1	Loss of MSA T2	84%	N/A	25%	21%
	Max	P1	Loss of MSA T1&T5	N/A	83%	31%	28%
Summer Rating				600 MVA	600 MVA	112 MVA	63.6 MVA
32HS	Max	P0	System Normal	58%	57%	39%	52%
	Max	P1	Loss of MSA T2	113%	N/A	23%	76%
	Max	P1	Loss of MSA T1&T5	N/A	101%	4%	52%
32LS	Max	P0	System Normal	60%	61%	56%	39%
	Max	P1	Loss of MSA T2	119%	N/A	41%	65%
	Max	P1	Loss of MSA T1&T5	N/A	103%	3.7%	72%

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) based on the proposed project in addition to two 25 MVAr line shunt reactors. Table 5-2 shows a summary of steady-state voltage performance under various system conditions and contingencies.

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

Case	IC's Plant Output	Contingency		Bus Voltage (PU)		
		Cat.	Description	MSA 230	MSA 500	SEC 132
29HW	Max	P0	System normal	1.05	1.07	1.05
		P1	Loss of MSA T2	1.03	1.07	1.04
30HS	Max	P0	System normal	1.03	1.06	1.05
		P1	Loss of MSA T2	1.01	1.06	1.05
30LS	Max	P0	System normal	1.04	1.07	1.06
		P1	Loss of MSA T2	1.01	1.06	1.05

5.1.3 High Voltage Checking for shunt reactor requirements

Preliminary study results to check for high voltages are summarized in Table 5-3. Two cases are compared in this study, the first case (Case 1) has no shunt reactors at both terminals of the 320 km 230 KV transmission line, the second case (Case 2) has one 25 MVAR shunt reactor installed at each terminal of the long line. In both study cases, it is assumed that only one generating unit is online. Study results show that the voltages are unacceptably high for Case 1, and voltage performance for Case 2 is under control. The exact size and locations would be proposed by the IC and reviewed/approved by BC Hydro in a later stage study such as SIS.

Table 5-3: Summary of High Voltage Checking Study Results

Case	IC's Plant Output	Contingency		Bus Voltage (PU)			
		Cat.	Description	MSA 230	P93 230 KV line terminal at MSA	P93 230 KV line terminal at generating station	P93 generating station 230 kV bus
Case 1	Max	P0	System normal	1.046	1.046	1.072	1.072
32LS		P2	P93 230KV line open end at MSA	1.031	1.52	1.39	1.39
		P2	P93 230KV line open end at generating station	1.052	1.052	1.15	
Case 2	Max	P0	System normal	1.038	1.038	1.016	1.016
32LS		P2	P93 230KV line open end at MSA	1.028	1.028	1.016	1.016
		P2	P93 230KV line open end at generating station	1.041	1.041	1.053	

5.1.4 Series Compensation on the 360 km 230 kV Overhead Transmission Line

The IC's project is a 320 km long 230kV overhead transmission line connecting the Jewakwa Heakamie Hydro Project to MSA. The equivalent PI representation of the long line needs to be further reviewed and confirmed by the IC for the next stage study. To improve transient stability performance and system voltage control of the IC's project, adding a series capacitor compensation station with a 40% to 50% degree compensation in the middle of the transmission line is recommended. The compensation level would be proposed by the IC and reviewed/approved by BC Hydro's further review in a later stage such as SIS.

[redacted]

5.1.5 High Level Assessment for Updating the Existing MSA Separation RAS

The connection of Jewakwa Heakamie Hydro project will aggravate most of the pre-existing issues, which are mentioned in the project background section and currently addressed by the MSA separation RAS. Dynamic simulations for all contingencies and power flow studies for N-2 or N-1-1 contingencies are not conducted and covered in this report because they are out of the feasibility study scope. Similar to other existing major IPP hydro generating plants in the region, Jewakwa Heakamie Hydro project must participate in the existing MSA separation RAS as a generation shedding candidate. Detailed RAS functional requirement study will be conducted in a later stage such as System Iimpact Study (SIS).

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 Jewakwa Heakamie Hydro project will be at MSA 230kV switchyard of the existing substation Malaspina substation (MSA). The station upgrade scope at the existing is as follows:

Following is the scope of station work in MSA:

- Add one 230kV transmission line position with a new 230 kV circuit breaker and associated substation equipment. Refer to Appendix B MSA one-line sketch for details.
- Expand the existing control building, if required, to accommodate the new P&C panels and other equipment.
- Terminate the Jewakwa Heakamie Hydro 230 kV 2LXX transmission line.
- Add new 230 kV 1x25 MVAr switchable shunt reactor and associated equipment at the new 230 kV Jewakwa Heakamie Hydro 2LXX transmission line terminal. Refer to Appendix B MSA one-line sketch for details. Note that exact size and locations of the shunt reactor shall be determined at later stage.

- Other associated station work.

All the infrastructures outside MSA substation such as 320 km overhead 230 kV transmission line, series compensation capacitor station and shunt reactor at IC end 230 kV transmission line terminal shall be constructed by IC.

5.4 Protection & Control Requirements

For successful integration of the new IPP, new line protection relays will be installed at BC Hydro's Malaspina (MSA) and IPP's Jewakwa Heakamie Hydro (P93) substations to protect 2LXX using line current differential scheme (87L). As part of the new line protection functionality, WECC Level 3 telecommunication facilities will be required between the two substations.

The IC is to provide the following for the interconnection of Jewakwa Heakamie Hydro 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 Jewakwa Heakamie Hydro substation to provide protection coverage for 2LXX. BC Hydro P&C Planning will provide core protection settings for these relays to protect transmission line 2LXX during a transmission line fault. Non-core protection such as local breaker failure, auto-reclosing, backup protection, NERC PRC related settings for station elements will not be provided by BC Hydro P&C Planning.
- The IC is responsible for NERC PRC-related 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.
- If a shunt reactor is required at the Jewakwa Heakamie Hydro substation as determined by Regional System Planning, provide redundant protection for the shunt reactor.
- Provide redundant protection and control for the series capacitor bank as per BC Hydro Series Capacitor Bank P&C Standard.

- The IC may be required to receive generation shedding or generation run back initiation signal via the 2LXX line protection telecom channel as determined by Regional System Planning.

The 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.

5.5 Telecommunications Requirements

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

Teleprotection Requirements for Telecom

- WECC Level 3 PY & SY, MSA – P93, with C37.94 interfaces.

Telecontrol Requirements for Telecom

- One P93 SCADA circuit off MDN.
- One P93 REMACC circuit off EDM.

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

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.

As noted in Section 5.3, all the infrastructure outside MSA substation towards the IC's facilities shall be constructed by the IC. Those infrastructure are not a part of the BCH's Network Upgrades and are excluded in the cost estimate or estimated schedule to be provided in the letter.

7 Conclusions

To interconnect the Jewakwa Heakamie Hydro Project and its facilities to the BCH Transmission System at the POI, this Feasibility Study has identified the following observations and requirements:

1. A new 230 kV line position at MSA with a new circuit breaker are required to interconnect the IC's generating project to the BC Hydro system.
2. Considering the IC owned 230 kV interconnection line is unusually long, to improve and maintain operational performance and reliability, a new switchable shunt reactor at the line terminals and a line series capacitor compensation are required.
3. The connection of Jewakwa Heakamie Hydro Project does not cause any performance violation (i.e. thermal overload, voltage performance violation or voltage stability concern) under system normal conditions.
4. The connection of Jewakwa Heakamie Hydro Project will cause an overload on MSA T1 and MSA T2 under single contingencies. RAS generation shedding or runback at Jewakwa Heakamie Hydro Project or operator's manual actions will be relied on to address this issue.
5. The connection of Jewakwa Heakamie Hydro Project will aggravate most of the pre-existing issues in the area, which are currently addressed by the MSA separation RAS. Jewakwa Heakamie Hydro project must participate in the existing MSA Separation RAS as a generation shedding candidate.
6. BC Hydro will provide line protection relays for 2LXX at MSA.The IC will provide the required relays, telecom facility, and associated equipment to accommodate the line protection requirement, as well as entrance protection that complies with BC Hydro guidelines.

 [redacted]

Appendix A
Plant Single Line Diagram Used for Power Flow Study

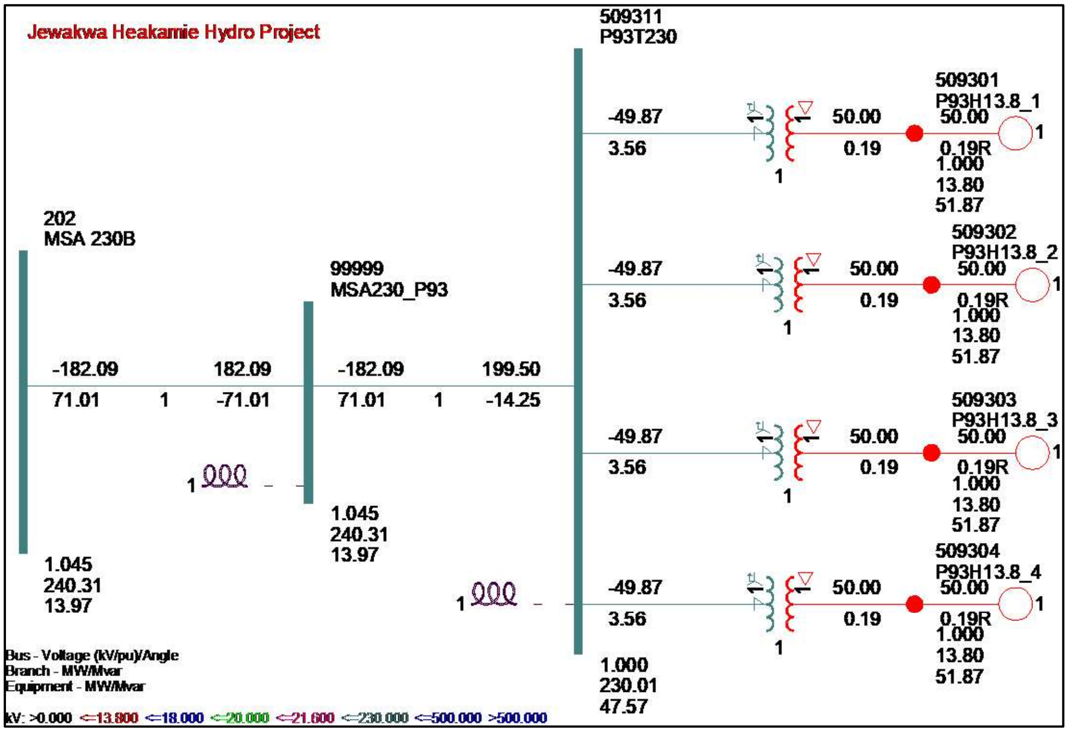

Figure A-1: Jewakwa Heakamie Hydro Project Single Line Diagram used for Power Flow Study.

As seen in the diagram, Jewakwa Heakamie Hydro Project consist of four parts. Each Part has one (1) feeder connecting one (1) hydro generator to the 13.8/230 kV GSU transformer. Finally, all 4 transformers will be connected to the existing BC Hydro substation Malaspina (MSA) 230 kV via a 320 km long 230 kV overhead transmission line.

Appendix B
MSA One-line Sketch

Figure B-1 shows the Stations Planning One-Line Sketch for MSA station updates to interconnect Jewakwa Heakamie Hydro Project.

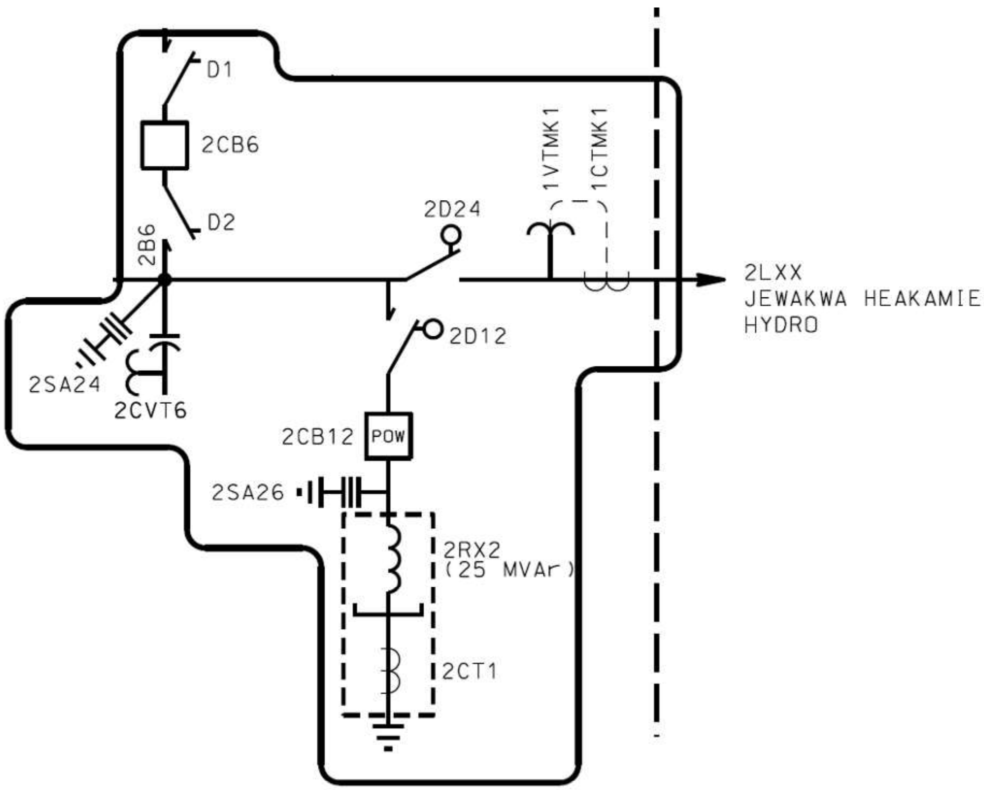

Figure B-1: Stations Planning One-Line Sketch for MSA.