GENERATOR INTERCONNECTION

FEASIBLITY STUDY REPORT

for integration of the proposed

330 MW [redacted] PROJECT

(GI PROJECT #590)

to the

IDAHO POWER COMPANY ELECTRICAL SYSTEM

in

ELMORE COUNTY, IDAHO

for

[redacted]

Report v.3

July 7, 2021

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1.0 Introduction

[redacted] has contracted with Idaho Power Company ("Transmission Provider") to perform a Generator Interconnection Feasibility Study for the integration of the proposed 330 MW [redacted] project. The Project location is in Idaho Power Company's (IPC's) Capital Region in Elmore County, Idaho. The primary project latitude and [redacted]. Additionally, a secondary project location latitude and longitude coordinates were also given and are [redacted]. The project is Generation Interconnect (GI) queue number 590 (GI #590). The project has chosen in the Feasibility Study to be studied for both Energy Resource Interconnection Service (ERIS) and Network Resource Interconnection Service (NRIS).

The Project has applied to connect to the Idaho Power's transmission system for an injection of 330 MW at a single Point of Interconnection (POI) at 230kV. The primary POI is located on IPC's [redacted] 230kV line and the secondary POI is located on IPC's [redacted] 230 kV line.

IPC projects queue GI #530, GI #551, GI #557, GI #567, GI #570 and GI #588 are senior queued projects in the affected area of IPC's transmission system. Idaho Power studied GI #590 with all Network Upgrades identified for GI #530, GI #551, GI #557, GI #567, GI #570 and GI #588 modeled as in service (Potential Contingent Facilities). Contingent Facilities of the Network Transmission facility upgrades required by senior queue projects and their conceptual costs, which have been preliminarily identified to be required for GI #590 Network Resource Interconnection Service, are detailed in Appendix B. These Contingent Facilities will be reviewed further and finalized during the System Impact Study.

This report documents the basis for and the results of this Feasibility Study for the GI #590 Generation Interconnection Customer. The report describes the proposed project, the determination of the project interconnection requirements and estimated costs for integration of the project to the Transmission Provider transmission system. This report satisfies the feasibility study requirements of the Idaho Power Tariff.

2.0 Summary

The feasibility of interconnecting the GI #590 330 MW generation project to the Transmission Provider's transmission system at either of the proposed Points of Interconnection (POI) was evaluated. GI #590 can be interconnected to the Idaho Power transmission system. The two POIs evaluated are located on IPC's [redacted] 230kV line and the [redacted] 230 kV line.

A System Impact Study is required to determine if any additional network upgrades are required to integrate this project into the IPCo transmission system and to evaluate full system impacts (thermal, voltage, transient stability, reactive margin). Energy Resource Interconnection Service or Network Resource Interconnection Service do not in any way convey any right to deliver electricity to any specific customer or point of delivery.

GI #590 will be required to control voltage in accordance with a voltage schedule as provided by Idaho Power Grid Operations. GI #590 will be required to manage the real power output of their generation project at the POI. Also, it may be beneficial for [redacted], [redacted] for their own modeling compliance requirements, to install additional PMU devices at their facilities to monitor the generation source(s).

The total "Energy Resource Interconnection Service" generation interconnection preliminary cost estimate to interconnect the project to the primary study POI is as follows:

ER	Primary POI	Secondary POI
330 MW	**$14,604,987.97**	**$33,721,979.15**

See Section 6.5 Energy Resource Interconnection Service Cost Estimate for the required facilities and cost breakdowns.

The total "Network Resource Interconnection Service" generation interconnection preliminary cost estimate to interconnect the [redacted] project is as follows:

NR	Primary POI	Secondary POI
330 MW	**$59,458,002.32**	**$70,896,920.10**

See Section 7.4 Network Resource Interconnection Service Cost Estimate for the required facilities and cost breakdowns. The cost estimate includes a 20% contingency and 7.25% overhead. These are cost estimates only and final charges to the customer will be based on the actual construction costs incurred. It should be noted that the preliminary cost estimates do not include the cost of the customer's owned equipment.

The schedule for designing, procuring, and constructing facilities will be developed and optimized during the Facility Study should the generation interconnection customer choose to move to that study phase of the interconnection process.

3.0 Scope of Interconnection Feasibility Study

The Interconnection Feasibility Study was done and prepared in accordance with the Transmission Provider's Standard Generator Interconnection Procedures to provide a preliminary evaluation of the feasibility of the interconnection of the proposed generating project to the Idaho Power system. As listed in the Interconnection Feasibility Study agreement, the Interconnection Feasibility Study report provides the following information:

- preliminary identification of any circuit breaker short circuit capability limits exceeded because of the interconnection;
- preliminary identification of any thermal overload or voltage limit violations resulting from the interconnection; and
- preliminary description and non-binding estimated cost of facilities required to interconnect the Large Generating Facility to the IPC System and to address the identified short circuit and power flow issues.

All other proposed Generation projects prior to this project in the Generator Interconnect queue were considered in this study. A current list of these projects can be found in the Generation Interconnection folder located on the Idaho Power web site at the link shown below:

http://www.oatioasis.com/ipco/index.html.

4.0 Contingent Facilities

GI #590 ERIS and NRIS at the 230kV primary POI are not contingent upon upgrades associated with any senior queued project. However, both the ERIS and NRIS at the 230 kV secondary POI may be contingent upon upgrades associated with senior queued projects. These projects are preliminarily identified in Appendix B.

IPC projects queue GI #530, GI #551, GI #557, GI #567, GI #570 and GI #588 are senior queued project in the affected area of IPC's transmission system. Idaho Power studied GI #590 with all Network Upgrades identified for GI #530, GI #551, GI #557, GI #567, GI #570 and GI #588 modeled as in service (Potential Contingent Facilities). Contingent Facilities of the Network Transmission facility upgrades required by senior queue projects and their conceptual costs, which have been preliminarily identified to be required for GI #590 Network Resource Interconnection Service, are detailed in Appendix B. These Contingent Facilities will be reviewed further and finalized during the System Impact Study. Changes to senior queued projects including in-service date and withdrawal from the queue, may trigger a

restudy associated with GI #590 Network Resource, NR, service, (some or all the network upgrades identified for GI #530, GI #551, GI #557, GI #567, GI #570 and GI #588 may be required by GI #590).

5.0 Description of Proposed Generating Project

Assumptions

The primary point of interconnection for GI #590 is located on IPC's [redacted] 230kV line and the secondary point of interconnection is on IPC's [redacted] 230 kV line. GI #590 Project's maximum generation is 330 MW. The Project's projected Commercial Operation Date (COD) is [redacted].

The GI #590 supplied Single Line Diagram indicates:

- Two 230/34.5-13.8 kV GSU transformers with a 145/190/240 MVA capacity each
- Total plant export limited to 330 MW at the 230kV POI
- All generation in voltage regulation (Reactive capability used to regulate voltage – supply/absorb reactive)

6.0 Energy Resource Interconnection Service (ERIS)

Energy Resource Interconnection Service (ERIS) allows the Interconnection Customer to connect its Generating Facility to Transmission Provider's transmission system and to be eligible to deliver electric output using firm or non-firm transmission capacity on an as available basis.

The GI #590 project has applied to connect to the Idaho Power transmission system for an injection of 330 MW with a 230kV interconnection at the primary point of interconnection on IPC's [redacted] line and a secondary point of interconnection on IPC's [redacted] line. All generation projects in the area ahead of this project in the IPC generation queue and their associated transmission system improvements were modeled in a preliminary power flow analysis to evaluate the feasibility of interconnecting GI #590.

6.1 Description of Substation/Transmission Facilities

As an Energy Resource, a Transmission Service Request will be required to determine the specific Network Upgrades required to deliver the project output to a designated point of delivery. A System Impact Study will be required to determine the specific network upgrades required to integrate the project. Listed below are the required transmission facilities to interconnect the Project.

For 330 MW injected at the primary point of interconnection located on IPC's [redacted]

[redacted] 230kV line:

Substation/Transmission Interconnection Facilities:

The proposed interconnection will require:

- 230kV 3-position ring bus interconnection substation
- Modify [redacted] 230 kV series capacitor
  - Bypass segment 2
  - Rebuild segment 1 to 22 ohm.
- Add a 20-ohm 230 kV series capacitor [redacted] at the [redacted] end of the [redacted] line.

The actual station layout and detailed equipment requirements will be determined in the Facility Study should the interconnection customer choose to move to that study phase of the interconnection process.

Transmission Interconnection Facilities:

The proposed interconnection will not require rebuilding of Transmission Facilities.

For 330 MW injected at the secondary point of interconnection located on IPC's [redacted] 230 kV line:

Substation/Transmission Interconnection Facilities:

The proposed interconnection will require:

- 230kV 3-position ring bus interconnection substation

The actual station layout and detailed equipment requirements will be determined in the Facility Study should the interconnection customer choose to move to that study phase of the interconnection process.

Transmission Interconnection Facilities:

The proposed interconnection will require:

- Rebuild the 230 kV [redacted] (31.7 miles).
- Rebuild the 230 kV [redacted] (1.7 miles).

6.2 Description of Distribution Facilities

No distribution facilities are directly impacted by this project.

6.3 Short Circuit Study Results

- The facility does not exceed any of the breaker ratings on the Midpoint or Boise Bench terminals.

GI #590 Primary POI ERIS

Fault Study (w/ GI #590)			
Location	SLG (A)	LTL (A)	3PH (A)
[redacted] 230kV Bus	31226.3	26539.3	30898.6
[redacted] 230kV Bus	29616.8	24583.8	28195.8

GI #590 Primary POI NRIS

Fault Study (w/ GI #590)			
Location	SLG (A)	LTL (A)	3PH (A)
[redacted] 230kV Bus	32326.5	26687.8	30997.9
[redacted] 230kV Bus	29655.0	25607.2	28525.5

GI #590 Secondary POI ERIS

Fault Study (w/ GI #590)			
Location	SLG (A)	LTL (A)	3PH (A)
[redacted] 230kV Bus	30059.7	24739.7	28560.3
[redacted] 230kV Bus	28371.9	24697.5	28879.6

GI #590 Secondary POI NRIS

Fault Study (w/ GI #590)			
Location	SLG (A)	LTL (A)	3PH (A)
[redacted] 230kV Bus	29919.2	24708.1	28425.0
[redacted] 230kV Bus	28317.9	25080.9	28542.5

6.4 Electric System Protection Results and Grounding Requirements

For 230kV line protection, the Transmission Provider's System Protection Department utilizes permissive and line differential protection schemes integrated with our existing digital communication infrastructure. Digital communication infrastructure for the interconnection customer's 230kV line terminal will be the responsibility of said interconnection customer.

6.5 Energy Resource Interconnection Service Cost Estimates

In Table 1 below a summary is provided of the generation interconnection facilities and conceptual costs required to interconnect the GI #590 project to the Transmission Provider's transmission system as an ERIS with 330 MW injected at the primary point of interconnection located on IPC's [redacted] 230kV line.

GI #590 [redacted] **330 MW injected at the primary point of interconnection located on IPC's [redacted] 230kV line** **Energy Resource Interconnection Service Facilities**	
Interconnection Facilities	**Cost**
Approximately 20% of a new 230kV 3 position ring bus interconnection station Air-break switches, breakers, metering, relaying, etc.	$669,617.00
Network Upgrades	
Approximately 80% of a new 230kV 3 position ring bus interconnection station Air-break switches, breakers, metering, relaying, etc.	$2,678,470.00
Modify [redacted] 230 kV series. Bypass segment 2 Rebuild segment 1 to 22 ohm	$1,000,000.00
Add a 20-ohm 230 kV series capacitor [redacted] at the [redacted] end of the [redacted].	$7,000,000.00
Subtotal	**$11,348,087.00**
Contingencies (~20.0%) (1)	$2,269,617.40
Subtotal	**$13,617,704.40**
Overheads (~7.25%) (2)	$987,283.57
Total Estimated Cost (3)	**$14,604,987.97**

Table 1. Estimated GI #590 Project's ERIS Generation Interconnection Costs. 330 MW injection at primary point of interconnection.

(1) Contingency is added to cover the unforeseen costs in the estimate. These costs can include unidentified design components, material cost increases, labor estimate shortfalls, etc.
(2) Overhead costs cover the indirect costs associated with the Project.

(3) This cost estimate includes direct equipment, material, labor, and overheads as shown.

- Note that these estimates do not include the cost of the customer's equipment/facilities or required communication circuits for SCADA, PMU, and metering.
- Note that the overhead rates are subject to change during the year.
- These are estimated costs only and final charges to the customer will be based on the actual construction costs incurred.
- These are non-binding conceptual level cost estimates that will be further refined upon the request and completion of the Facility Study.

In Table 2 below a summary is provided of the generation interconnection facilities and conceptual costs required to interconnect the GI #590 project to the Transmission Provider's transmission system as an ERIS with 330 MW injected at the secondary point of interconnection located on IPC's [redacted] 230 kV line.

GI #590 [redacted] **330 MW injected at the secondary point of interconnection located on IPC's [redacted] 230 kV line** **Energy Resource Interconnection Service Facilities**	
Interconnection Facilities	**Cost**
Approximately 20% of a new 230kV 3 position ring bus interconnection station Air-break switches, breakers, metering, relaying, etc.	$669,617.00
Network Upgrades	
Approximately 80% of a new 230kV 3 position ring bus interconnection station Air-break switches, breakers, metering, relaying, etc.	$2,678,470.00
Rebuild the 230 kV [redacted] (31.7 miles)	$21,691,313.00
Rebuild the 230 kV [redacted] (1.7 miles)	$1,162,604.00
Subtotal	**$26,202,004.00**
Contingencies (~20.0%) (1)	$5,240,400.80
Subtotal	**$31,442,404.80**
Overheads (~7.25%) (2)	$2,279,574.35
Total Estimated Cost (3)	**$33,721,979.15**

Table 2. Estimated GI #590 Project's ERIS Generation Interconnection Costs. 330 MW injection at secondary point of interconnection.

(1) Contingency is added to cover the unforeseen costs in the estimate. These costs can include unidentified design components, material cost increases, labor estimate shortfalls, etc.
(2) Overhead costs cover the indirect costs associated with the Project.
(3) This cost estimate includes direct equipment, material, labor, and overheads as shown.

- Note that these estimates do not include the cost of the customer's equipment/facilities or required communication circuits for SCADA, PMU, and metering.
- Note that the overhead rates are subject to change during the year.
- These are estimated costs only and final charges to the customer will be based on the actual construction costs incurred.
- These are non-binding conceptual level cost estimates that will be further refined upon the request and completion of the Facility Study.

The schedule for designing, procuring, and constructing facilities will be developed and optimized during the Facility Study should the generation interconnection customer choose to move to that study phase of the interconnection process.

7.0 Network Resource Interconnection Service (NRIS)

Network Resource Interconnection Service (NRIS) allows the Interconnection Customer to integrate its Generating Facility with the Transmission Provider's Transmission System in a manner comparable to that in which the Transmission Provider integrated its generating facilities to serve native load customers. The transmission system is studied under a variety of conditions to determine the transmission improvements/upgrades which are necessary. Network Resource Interconnection Service in and of itself does not convey Transmission Service or designate the Generating Facility as a Network Resource.

7.1 Description of Power Flow Cases

For the Network Resource Interconnection Service study, two power flow cases were used to study the Transmission Provider's transmission system with westbound and eastbound transmission flows to determine the required Network Transmission Upgrades.

The WECC 2020 Heavy Summer case was chosen as a power flow base case for the study. The case was modified to represent a summer month with high west to east (eastbound) transfers across [redacted].

For the second case, a WECC 2019 Light Winter operating case, was modified to represent a shoulder month condition with high east to west (westbound) transfers across [redacted].

7.2 Power Flow Analysis Results

Power Flow cases were run for the primary point of interconnection for GI #590 located on IPC's [redacted] 230kV line and the secondary point of interconnection on

IPC's [redacted] 230 kV line.

Results from the high [redacted] westbound transfer case for 330 MW injection at the primary point of interconnection indicate the addition of the GI #590 project will result in steady state overloads and post-contingency overloads. The following list are the steady state and contingency overloads from the westbound transfer case. No steady state or contingency violations were identified in the eastbound transfer case.

1. [redacted] 230 kV line
2. Add protection auto bypass functionality to [redacted] 230 kV series capacitors

Results from the high [redacted] eastbound transfer case for 330 MW injection at the secondary point of interconnection indicate the addition of the GI #590 project will result in post-contingency overloads. The following list are the contingency overloads from the eastbound transfer case.

1. [redacted] 230 kV line
2. [redacted] 230 kV line
3. Add protection auto bypass functionality to [redacted] 230 kV series capacitors

Results from the high [redacted] westbound transfer case for 330 MW injection at the secondary point of interconnection indicate the addition of the GI #590 project will result in steady state and post-contingency overloads. The following list are the overloads from the westbound transfer case.

1. [redacted] 230 kV line
2. [redacted] 230 kV line
3. [redacted] 230 kV line
4. [redacted] 230 kV line
5. [redacted] 138 kV line
6. Add protection auto bypass functionality to [redacted] 230 kV series capacitors

7.3 Network Resource Interconnection Service Transmission Upgrades

From the power flow/contingency analysis, the following Network Transmission upgrades were identified for the integration of GI #590. A System Impact Study will ultimately be required to determine the specific network upgrades required to integrate the project.

Primary point of interconnection, 330 MW injection

1. Modify [redacted] 230 kV series capacitor
   - Bypass segment 2
   - Rebuild segment 1 to 22 ohm
2. Add a 20-ohm 230 kV series capacitor [redacted] at the [redacted] end of the [redacted] line
3. Rebuild the 230 kV [redacted] line to [redacted] (51.6 miles).
4. Add protection auto bypass functionality to [redacted] 230 kV series capacitors.

Secondary point of interconnection, 330 MW injection

1. Rebuild the 230 kV [redacted] line to [redacted] (31.7 miles).
2. Rebuild the 230 kV [redacted] line to [redacted] (11.7 miles).
3. Rebuild the 230 kV [redacted] line to [redacted] (24.4 miles).
4. Rebuild the 230 kV [redacted] line to [redacted] (1.7 miles).
5. Rebuild the 138 kV [redacted] line to [redacted] (11.0 miles).
6. Add protection auto bypass functionality to [redacted] 230 kV series capacitors.

IPC projects queue GI #530, GI #551, GI #557, GI #567, GI #570 and GI #588 are senior queued project in the affected area of IPC's transmission system. Idaho Power studied GI #590 with all Network Upgrades identified for GI #530, GI #551, GI #557, GI #567, GI #570 and GI #588 modeled as in service (Potential Contingent Facilities). Contingent Facilities of the Network Transmission facility upgrades required by senior queue projects and their conceptual costs, which have been preliminarily identified to be required for GI #590 Network Resource Interconnection Service, are detailed in Appendix B. These Contingent Facilities will be reviewed further and finalized during the System Impact Study. Changes to senior queued projects including in-service date and withdrawal from the queue, may trigger a restudy associated with GI #588 Network Resource, NR, service, (some or all the network upgrades identified for senior queued projects may be required by GI #590).

7.4 Network Resource Interconnection Service Cost Estimate

In Table 3 below a summary is provided of the generation interconnection facilities and conceptual costs required to interconnect the GI #590 project to the Transmission Provider's transmission system as a NRIS with 330 MW injected at the primary point of interconnection located on IPC's [redacted] 230kV line.

GI #590 [redacted] **330 MW injected at the primary point of interconnection located on IPC's [redacted] 230kV line** **Network Resource Interconnection Service Facilities**	
Interconnection Facilities	**Cost**
Approximately 20% of a new 230kV 3 position ring bus interconnection station Air-break switches, breakers, metering, relaying, etc.	$669,617.00
Network Upgrades	
Approximately 80% of a new 230kV 3 position ring bus interconnection station Air-break switches, breakers, metering, relaying, etc.	$2,678,470.00
Modify [redacted] 230 kV series capacitor • Bypass segment 2 • Rebuild segment 1 to 22 ohm	$1,000,000.00
Add a 20-ohm 230 kV series capacitor [redacted] at the [redacted] end of the [redacted] line.	$7,000,000.00
Auto-bypass protection functionality for the [redacted] series capacitors	$400,000.00
Rebuild the 230 kV [redacted] line to [redacted] (51.6 miles).	$34,450,827.00
Subtotal	**$46,198,914.00**
Contingencies (~20.0%) (1)	$9,239,782.80
Subtotal	**$55,438,696.80**
Overheads (~7.25%) (2)	$4,019,305.52
Total Estimated Cost (3)	**$59,458,002.32**

Table 3. Estimated GI #590 Project's NRIS Generation Interconnection Costs. 330 MW injection at primary point of interconnection.

(1) Contingency is added to cover the unforeseen costs in the estimate. These costs can include unidentified design components, material cost increases, labor estimate shortfalls, etc.
(2) Overhead costs cover the indirect costs associated with the Project.
(3) This cost estimate includes direct equipment, material, labor, and overheads as shown.

- Note that these estimates do not include the cost of the customer's equipment/facilities or required communication circuits for SCADA, PMU, and metering.
- Note that the overhead rates are subject to change during the year.
- These are estimated costs only and final charges to the customer will be based on the actual construction costs incurred.
- These are non-binding conceptual level cost estimates that will be further refined upon the request and completion of the Facility Study.
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In Table 4 below a summary is provided of the generation interconnection facilities and conceptual costs required to interconnect the GI #590 project to the Transmission Provider's transmission system as a NRIS with 330 MW injected at the secondary point of interconnection on IPC's [redacted] 230 kV line.

GI #590 [redacted] **330 MW injected at the secondary point of interconnection on IPC's [redacted] 230 kV line** **Network Resource Interconnection Service Facilities**	
Interconnection Facilities	**Cost**
Approximately 20% of a new 230kV 3 position ring bus interconnection station Air-break switches, breakers, metering, relaying, etc.	$669,617.00
Network Upgrades	
Approximately 80% of a new 230kV 3 position ring bus interconnection station Air-break switches, breakers, metering, relaying, etc.	$2,678,470.00
Auto-bypass protection functionality for the [redacted] series capacitors	$400,000.00
Rebuild the 230 kV [redacted] line to [redacted] (31.7 miles).	$21,691,313.00
Rebuild the 230 kV [redacted] line to [redacted] (11.7 miles).	$7,905,835.00
Rebuild the 230 kV [redacted] line to [redacted] (1.7 miles).	$1,162,604.00

Rebuild the 230 kV [redacted] line to [redacted] (24.4 miles).	$16,773,949.00
Rebuild the 138 kV [redacted] line to [redacted] (11.0 miles).	$3,805,174.00
Subtotal	**$55,086,962.00**
Contingencies (~20.0%) (1)	$11,017,392.40
Subtotal	**$66,104,354.40**
Overheads (~7.25%) (2)	$4,792,565.70
Total Estimated Cost (3)	**$70,896,920.10**

Table 4. Estimated GI #590 Project's NRIS Generation Interconnection Costs. 330 MW injection at secondary point of interconnection.

(1) Contingency is added to cover the unforeseen costs in the estimate. These costs can include unidentified design components, material cost increases, labor estimate shortfalls, etc.
(2) Overhead costs cover the indirect costs associated with the Project.
(3) This cost estimate includes direct equipment, material, labor, and overheads as shown.

- Note that these estimates do not include the cost of the customer's equipment/facilities or required communication circuits for SCADA, PMU, and metering.
- Note that the overhead rates are subject to change during the year.
- These are estimated costs only and final charges to the customer will be based on the actual construction costs incurred.
- These are non-binding conceptual level cost estimates that will be further refined upon the request and completion of the Facility Study.

The schedule for designing, procuring, and constructing facilities will be developed and optimized during the Facility Study should the generation interconnection customer choose to move to that study phase of the interconnection process.

8.0 Description of Operating Requirements

It is the generation project's responsibility to provide reactive power capability of the project to have a power factor operating range of at least 0.95 leading (absorbing) to at least 0.95 lagging (supplying) at the POI over the range of real power output (up to maximum output of the project.

Identification of any additional equipment required at the plant to meet Idaho Power reactive power capability interconnection requirements will be provided in the System Impact Study if the generation interconnection customer chooses to move to the next study phase of the interconnection process.

GI #590 will be required to control voltage in accordance with a voltage schedule as provided by Idaho Power Grid Operations, and GI#590 will be required to manage the real power output of their stated generation at the project's POI.

The project(s) is required to comply with the applicable Voltage and Current Distortion Limits found in IEEE Standard 519-1992 *IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems*.

Installation of phasor measurement unit (PMU) devices at the POI, associated communication circuits and maintenance costs associated with communication circuits needed to stream PMU data will also be required to be provided to interconnect GI #590. Details regarding the communications necessary will be dependent on the POI chosen and the available communications in the area. The specific costs associated with the IPC requirements for interconnection customers with aggregate facilities larger than 20 MW to provide PMU data to IPC will be identified in the Facility Study should the generation interconnection customer choose to proceed to that phase of the interconnection process. Also, it may be beneficial for [redacted] for their own modeling compliance requirements, to install additional PMU devices at their facilities to monitor the generations sources separately.

Additional operating requirements for this project may be identified in the System Impact study when it is performed.

9.0 Conclusion

GI #590 can be interconnected to the Idaho Power transmission system.

Interconnection requirements detailed in Section 6.5 are required for Energy Resource Interconnection Service at the 230kV POIs given.

ERIS	Primary POI	Secondary POI
330 MW	**$14,604,987.97**	**$33,721,979.15**

Network Resource Interconnection Service costs are estimated to be:

NRIS	Primary POI	Secondary POI
330 MW	**$59,458,002.32**	**$70,896,920.10**

Details are given in section 7.4. The Network Resource Interconnection Service is also reliant on network facility upgrades identified in senior queued generation interconnection.

IPC projects queue GI #530, GI #551, GI #557, GI #567, GI #570 And GI #588 are senior queued project in the affected area of IPC's transmission system. Idaho Power studied GI #590 with all Network Upgrades identified for GI #530, GI #551, GI #557, GI #567, GI #570 and GI #588 modeled as in service (Potential Contingent Facilities). These Contingent Facilities will be reviewed further and finalized during the System Impact Study. Contingent Facilities of the Network Transmission facility upgrades required by senior queue projects and their conceptual costs, which have been preliminarily identified to be required for GI #590 Network Resource Interconnection Service, are detailed in Appendix B.

A System Impact Study is required to determine the specific Transmission Network Upgrades required to integrate the project as a Network Resource and to evaluate the system impacts (thermal overload, voltage, transient stability, reactive margin). Generator interconnection service (either as an Energy Resource or a Network Resource) does not in any way convey any right to deliver electricity to any specific customer or point of delivery. A Transmission Service Request will be required to study the Transmission System Impacts.

APPENDIX A

A-1.0 Method of Study

The Feasibility Study plan inserts the Project up to the maximum requested injection into the selected Western Electricity Coordinating Council (WECC) power flow case and then, using Power World Simulator or GE's Positive Sequence Load Flow (PSLF) analysis tool, examines the impacts of the new resource on Idaho Power's transmission system (lines, transformers, etc.) within the study area under various operating and outage scenarios. The WECC and Idaho Power reliability criteria and Idaho Power operating procedures were used to determine the acceptability of the configurations considered. The WECC case is a recent case modified to simulate stressed but reasonable pre-contingency energy transfers utilizing the IPC system. For distribution feeder analysis, Idaho Power utilizes DNV·GL's Synergi Electric software and EPRI's OpenDSS software.

A-2.0 Acceptability Criteria

The following acceptability criteria were used in the power flow analysis to determine under which system configuration modifications may be required:

The continuous rating of equipment is assumed to be the normal thermal rating of the equipment. This rating will be as determined by the manufacturer of the equipment or as determined by Idaho Power. Less than or equal to 100% of continuous rating is acceptable.

Idaho Power's Voltage Operating Guidelines were used to determine voltage requirements on the system. These states, in part, that distribution voltages, under normal operating conditions, are to be maintained within plus or minus 5% (0.05 per unit) of nominal everywhere on the feeder. Therefore, voltages greater than or equal to 0.95 pu voltage and less than or equal to 1.05 pu voltage are acceptable.

Voltage flicker during starting or stopping the generator is limited to 5% as measured at the point of interconnection, per Idaho Power's T&D Advisory Information Manual.

Idaho Power's Reliability Criteria for System Planning was used to determine proper transmission system operation.

All customer generation must meet IEEE 519 and ANSI C84.1 Standards.

All other applicable national and Idaho Power standards and prudent utility practices were used to determine the acceptability of the configurations considered.

The stable operation of the system requires an adequate supply of volt-amperes reactive (VAr or VArs) to maintain a stable voltage profile under both steady-state and dynamic system conditions. An inadequate supply of VArs will result in voltage decay or even collapse under the worst conditions.

Equipment/line/path ratings used will be those that are in use at the time of the study or that

are represented by IPC upgrade projects that are either currently under construction or whose budgets have been approved for construction in the near future. All other potential future ratings are outside the scope of this study. Future transmission changes may, however, affect current facility ratings used in the study.

A-3.0 Electrical System Protection Guidance

IPC requires electrical system protection per Facility Connection Requirements found on the Idaho Power Web site,

https://docs.idahopower.com/pdfs/BusinessToBusiness/FacConnReq.pdf

A-4.0 WECC Coordinated Off-Nominal Frequency Load Shedding and Restoration Requirements

IPC requires frequency operational limits to adhere to WECC Under-frequency and Over-frequency Limits per the WECC Coordinated Off-Nominal Frequency Load Shedding and Restoration Requirements available upon request.

APPENDIX B

Table B1 is a summary of Contingent Facilities of the Network Transmission facility upgrades required by senior queue projects and their conceptual costs, which have been preliminarily identified to be required for GI #590 Network Resource Interconnection Service. These Contingent Facilities will be reviewed further and finalized during the System Impact Study.

Contingent upgrades for the Primary POI

None

Contingent upgrades for Secondary POI

GI #530 Project	
[redacted] **230kV Line** Rebuild 35.6 miles of 230kV line with [redacted] [redacted] Conductor	$30,470,000
[redacted] **230kV Line** Rebuild 3.1 miles of 230kV line with [redacted] [redacted] Conductor	$2,655,000
[redacted] **Line Loop in-and-out of** [redacted] Build 1.25 miles 230kV [redacted] [redacted] Conductor	$1,040,000
[redacted] **230kV Station** Add two 230kV Line Terminals	$1,775,000
Subtotal	**$35,940,000**
Contingencies (~20%)	$7,188,000
Subtotal	**$43,128,000**
Overheads (~8.5%)	$3,665,880
Network Transmission – Total Estimated Cost	**$46,793,880**

Revision History

Date	Revision	Initials	Summary of Changes
03/31/2021	0	PMA	Initial Feasibility Study Report
04/02/2021	1	PMA	Incorporation of internal review comments
07/07/2021	2	PMA	Restudy after the withdrawal of GI #561 and GI #568
07/08/2021	3	PMA	Incorporation of internal review comments