August 18, 2021

[redacted]

Re: Facility Study Report for [redacted] – GI #551

Dear [redacted]:

Idaho Power Company (IPC) has completed the attached Interconnection Facility Study Report (FSR), which describes the facilities that would need to be installed by IPC to provide an interconnection with your generation interconnection project, GI # 551.

Before IPC can begin design or order materials, the LGIA must be executed, a Notice to Proceed must be provided and payment received for the estimated cost identified within the LGIA in full. Alternatively, you may contact IPC's credit department ([redacted]) to discuss credit requirements for construction funding for the facilities.

The actual construction and labor charges will be finalized approximately 90 days subsequent to completion of the facilities. IPC will reconcile any over- or underpayment at that time.

I look forward to hearing from you.

Sincerely,

[redacted]

Engineering & Construction Project Manager

Attachment: [redacted] Project Facility Study Report with Drawings

Cc: [redacted]/IPC [redacted]/IPC [redacted]/IPC [redacted]/IPC [redacted]/IPC

Generator Interconnection
Facility Study Report

for the

[redacted] **Project #551**

for

[redacted]

in

Elmore County, Idaho

8/18/2021

FACILITY STUDY REPORT (FSR)

[redacted]

Project GI #551

8/18/2021

1. General Facility Description

[redacted] (Interconnection Customer) has stated that the proposed project will consist of a 240 MW photovoltaic project in Elmore County, Idaho and connect to the 230kV system at Idaho Power Company (IPC)'s [redacted] ([redacted]) Substation bus. The total project output as studied is 240 MW. All capitalized terms in this report, if not defined herein, are defined in IPC's Open Access Transmission Tariff (OATT).

Contact Information for Interconnection Customer is as follows:

[redacted]

A Large Generator Interconnection Agreement (the "LGIA") under IPC's Open Access Transmission Tariff (OATT) between Interconnection Customer and IPC (Transmission Provider) for the [redacted] Project, specifically Generator Interconnection Project #551 ("Project"), will be prepared for this project. The LGIA will be a definitive agreement that contains terms and conditions that supersedes this FSR. Changes to senior queued projects, including in-service date and withdrawal from the queue, may trigger a restudy associated with GI #551 Network Resource service. Idaho Power studied GI #551 with all Network Upgrades identified in senior queued projects modeled as in-service (potential Contingent Facilities). Project queue GI #530 is a senior queued project that was identified to have Network Upgrades where changes to the in-service date and withdrawal from the queue, would trigger a restudy associated with GI #551 Network Resource service. The network upgrades identified for GI #530 are required by GI #551.

1.1 Point of Interconnection

The Point of Interconnection ("POI") for the Project will be located at IPC's [redacted] Substation. Specifically, a node on the bus between [redacted] and [redacted]. Future plans to build out the ring bus will result in the POI between [redacted] and [redacted]. The proposed Switching Diagram drawing identifying the POI is attached as Exhibit 1.

1.2 Point of Change of Ownership

The Point of Change of Ownership for the Project will be on the dead-end structure of IPC's Interconnection Facilities at [redacted] Substation on the Interconnection Customer's side of air break switch [redacted], as shown in Exhibit 1.

1.3 Interconnection Customer's Facilities

1.3.1 Interconnection Customer's Interconnection Facilities

The Interconnection Customer's Interconnection Facilities are located [redacted] miles to the [redacted] to IPC's Interconnection Facilities. The Interconnection Customer will install, at its expense, air break switches, transformers (including a main step-up transformer), breakers, CTs, appropriate grounding measures, 40 MVAr 230kV Shunt Capacitor Bank, and associated auxiliary equipment. The step-up transformer will be a 253 MVA, 3 phase, 230/34.5/13.2kV unit (Z=12% at BASEMVA; X/R=42) with a grounded-wye to grounded-wye configuration. Interconnection Customer will build facilities to the Point of Change of Ownership.

1.3.2 Interconnection Customer's Generating Facilities

The Interconnection Customer's photovoltaic system will be constructed as follows:

a. The inverter system will comprise of ninety-six [redacted] inverters, with each inverter having a nameplate rating of 2500 kW.
b. A plant controller will be used to control the inverter system and to implement smart inverter functionality for operating the project within a voltage range and power factor specified by IPC at the Point of Interconnection.

The above referenced inverters, or equivalent inverters that have the same specifications and functionality as stated above must be utilized. If a different inverter is utilized that has different specifications and functionality than that which was studied, then additional study and/or equipment may be necessary.

1.4 Other Facilities Provided by Interconnection Customer

1.4.1 Communications

The Interconnection Customer will install 24 count 0.552" OD OPGW on their 230kV line between the Interconnection Customer's Interconnection Facilities and IPC's Interconnection facilities.

1.4.2 Ground Fault Equipment

The Interconnection Customer will install transformer configurations (Wye-Grounded/Wye-Grounded) that will provide a ground source to the transmission system.

1.4.3 Line Protection

The Interconnection Customer will install SEL-421 and SEL-411L relays for differential protection with the ability for IPC to Direct Transfer Trip (DTT) Interconnection Customer's breakers on the Interconnection Customer owned 230kV transmission line. All protection communication will be direct-to-fiber on Interconnection Customer's OPGW on the line between [redacted] Substation and the Interconnection Customer Facilities.

1.4.4 Generator Output Limit Control

The Interconnection Customer will install equipment to receive signals from IPC Grid Operations for Generation Output Limit Control (GOLC) - see Section 3 Operating Requirements and Appendix A. IPC's recommended method of communication for GOLC is via fiber between IPC's Interconnection Facility and the Project.

1.4.5 Local Service

The Interconnection Customer is responsible to arrange for local service to their site, as necessary.

1.4.6 Property

The Interconnection Customer will not need to acquire property to expand IPC's [redacted] Substation yard to accommodate IPC's Interconnection Facilities.

1.4.7 Monitoring Information

If the Interconnection Customer requires the ability to monitor information related to the IPC breaker/relay (i.e. Mirrored Bits) in the interconnection station, they are required to supply their own communications circuit to the interface area of the interconnection yard. The fiber communication circuit used for GOLC is acceptable.

1.4.8 Meteorological Data

In order to integrate the solar energy into the IPC system and operate IPC's solar forecasting tool, the Interconnection Customer must provide solar irradiation and weather data from the Facility's physical location to IPC via real time telemetry in a form acceptable to IPC. The associated cost for obtaining this data is the Interconnection Customer's responsibility.

The data must be provided at 10 second intervals and consist of:

1. Global Horizontal Irradiance
2. Plane of Array Irradiance
3. Ambient Temperature
4. Wind Speed and Wind Direction
5. Relative Humidity

The installed instruments must equal or exceed the specifications of the following instruments:
Temperature and Relative Humidity: R.M Young Relative Humidity and Temperature Probe Sensors Model 41382
Wind: R.M Young Wind Monitor Model 05103
Pryanometer: Apogee Instruments Model SP-230

1.4.9 Generator Technical Information & Drawings

Interconnection Customer shall provide draft design prints during FSR development containing technical information, like impedances, and equipment brand and models. After construction, the Interconnection Customer shall submit to IPC all the as-built information, including prints with the latest approved technical information and commissioning test results.

1.5 Transmission Provider's Interconnection Facilities

Transmission Provider's Interconnection Facilities are referred to hereafter as "IPC's Interconnection Facilities." IPC's Interconnection Facilities are in IPC's Capital region in Township [redacted], Range [redacted], Section [redacted] at IPC's [redacted] Substation. IPC's Interconnection Facilities will be installed by IPC.

IPC's Interconnection Facilities will include a dead end structure, a 230kV air break switch ([redacted]), three 230kV CCVT's, a revenue meter, bus support structures, foundations, bus, grounding, conduit and conductor for such equipment. IPC's Interconnection Facilities will be located at IPC's [redacted] Substation up to the Point of Change of Ownership.

To meet North American Electric Reliability Corporation's (NERC's) MOD-11 and 13-WECC-CRT-1, R1.2 requirements, IPC will install equipment to collect and transmit Phasor Measurement Unit (PMU) data to IPC. The data can be made available to the Interconnection Customer on request.

The minimum acceptable PMU message rate is 30 samples per second. The minimum set of PMU measurement channels recorded at the POI is shown below. Additional or substitute channels may be required on a per case basis depending on the interconnection configuration and facility design details.

- Frequency
- Frequency Delta (dF/dt)
- Positive Sequence Voltage Magnitude
- Positive Sequence Voltage Angle
- Positive Sequence Current Magnitude
- Positive Sequence Current Angle

2. Estimated Milestones

These milestones will begin, and the construction schedule referenced below will only be valid, upon receipt of funding from Interconnection Customer or its authorized third party no later than the date set forth below for such payment. IPC will not commit any resources toward project construction that have not been funded by Interconnection Customer. Additionally, failure by Interconnection Customer to make the required payments as set forth in this Study by the date(s) specified below may result in the loss of milestone dates and construction schedules set forth below. In the event that the Interconnection Customer is unable to meet dates as outlined below, Interconnection Customer may request an extension of the Operation Date of up to three (3) years. Interconnection Customer's request will be evaluated by IPC to ensure Interconnection Customer's request does not negatively impact other projects in IPC's Generator Interconnection Queue. Such extension will be allowed only if IPC determines, in its sole discretion, that the extension will not negatively impact other projects in IPC's Generator Interconnection Queue.

Estimated milestones, which will be updated and revised for inclusion in the LGIA in light of subsequent developments and conditions, are as follows:

Estimated Date	**Responsible Party**	**Estimated Milestones**
TBD	*Interconnection Customer*	*IPC receives Notice to Proceed and construction funding or arrangements acceptable to IPC are made with IPC's Credit Department*
18 months after construction funds received	*IPC*	*IPC Engineering and Design Complete*
18 months after construction funds received	*IPC*	*IPC Long Lead Material Procured/Received*
22 months after construction funds received, 6 months prior to IPC Commissioning	*IPC*	*New generation must be modeled and submitted to the Western Energy Imbalance Market a minimum of 6 months prior to coming online, failure to submit by given lead time will results in project delay.*
27 months after construction funds received	*IPC*	*IPC Construction Complete*
27 months after construction funds received	*Interconnection Customer*	*Communication circuits identified in Section 1.4.1 are operational and provided to the IPC site*
28 months after construction funds received	*IPC*	*IPC Commissioning Complete, commissioning will not take place until Telecommunication circuits are operational*
5 days after switching request made to IPC Dispatch	*Interconnection Customer*	*Switch at the Point of Interconnection can be closed*
TBD	*Interconnection Customer*	*Interconnection Customer testing begins*

IPC does not warrant or guarantee the foregoing estimated milestone dates, which are estimates only. These milestone dates assume, among other things, that materials can be timely procured, labor resources are available, and that outages to the existing transmission system are available to be scheduled. The milestone dates also assume that all Network Upgrades for senior queued project GI #530 are completed and in-service which has an approximate timeline of 5 years from GIA execution. Note that the network upgrades may be able to be completed in parallel with the GI #551 timeline. If the upgrades assigned to the senior queue projects are not constructed, GI #551 may be required to assume responsibility for those upgrades. A list of potential network upgrades was provided in Appendix B of the System Impact Study. Additionally, there are several matters, such as permitting issues and the performance of subcontractors that are outside the control of IPC that could delay the estimated Operation Date. For purposes of example only, federal, state, or local permitting, land division approval, identification of Interconnection Facilities location, access to proposed Interconnection Facilities location for survey and geotechnical investigation, coordination of design and construction with the Interconnection Customer, failure of IPC's vendors to timely perform services or deliver goods, and delays in payment from Interconnection Customer, may result in delays of any estimated milestone and the Operation Date of the project. To the extent any of the foregoing are outside of the reasonable control of IPC, they shall be deemed Force Majeure events.

3. Operating Requirements

The Project is required to comply with the applicable Voltage and Current Distortion Limits found in IEEE Standard 519-2014 *IEEE Recommended Practices and requirements for harmonic Control in Electrical Power Systems* or any subsequent standards as they may be updated from time to time.

The Project will be subject to reductions directed by IPC Grid Operations during transmission system contingencies and other reliability events. When these conditions occur, the Project will be subject to Generator Output Limit Control ("GOLC") and will have equipment capable of receiving an analog setpoint via DNP 3.0 from IPC for GOLC. Generator Output Limit Control will be accomplished with a setpoint and discrete output control from IPC to the Project indicating maximum output allowed. For more detail see Appendix A.

Frequency and Low Voltage Ride Through: The Project must be capable of riding through frequency and voltage deviations that result from system contingencies without tripping as set forth in NERC Standard PRC-024.

Frequency Response Requirements: Generator must be capable of providing Fast Frequency Response for both positive and negative frequency deviations from 60Hz (+/- 0.036 Hz) for Bulk Electric System disturbances. The required frequency response will be linear for a deviation of 0 to +/- 0.1 Hz, a response of 0% to 3% of generator capacity, with a maximum required response of 3% of generator's full capacity for as long as the generator is able to provide support or the frequency deviation is reduced to within stated limits, whichever occurs first. Provided that Generator meets the above Fast Frequency Response requirements, Company shall not curtail Interconnection Customer when such curtailments are caused by a need to comply with applicable Frequency Responsive reliability standards.

Momentary Cessation Requirements: Momentary cessation should not be used within the voltage and frequency ride-through curves specified in PRC-024. Use of momentary cessation is not considered "ride through" within the "No Trip" zone curves of PRC-024. The use of momentary cessation should be eliminated to the extent possible consistent with NERC's *Reliability Guideline for BPS-Connected Inverter-Based Resource Performance.*

Interconnection Customer will be able to modify power plant facilities on the Interconnection Customer side of the Interconnection Point with no impact upon the operation of the transmission or distribution system whenever the generation facilities are electrically isolated from the system via the [redacted] air break switch and a terminal clearance is issued by IPC's Grid Operator.

4. Reactive Power

The Project must provide the reactive power capability to provide at a minimum a power factor operating range of 0.95 leading (supplying) to 0.95 lagging (absorbing), as measured at the Point of Interconnection, for all MW production levels. At full output of 240 MW, the Project would need to be able to provide approximately +/- 78.9 MVAr reactive support at the POI.

Based on the information provided, the Project's own facilities will require approximately 78 MVAr of reactive support. If the installed inverters cannot supply the sum of these needs (+156.9/-17.9 MVAr), the Project will be required to install additional shunt reactive.

Based on the P-Q Capability curve provided for the inverter model, it appears the specified inverters plus 40 MVAr shunt capacitor cannot satisfy the reactive requirements for the project. Possible solutions include installation of more inverters, a larger shunt capacitor bank, or a more efficient GSU (56 MVAr losses). Of note is that the current GSU also overloads to 106% of its continuous rating on the low-side when the Project provides 240 MW and 78.9 MVAr at the POI.

In our review of the data provided, it appears that the collector impedance is a factor of 10 smaller than what we normally see for projects of this size. This is not to imply that the provided impedance is incorrect, but it may warrant double-checking by the developer.

The Project must have equipment capable of receiving an analog setpoint, via DNP 3.0 from IPC for Voltage Control. The setpoint will be the desired voltage level as measured at the interconnect bus. For more detail see Appendix A.

GI #551 will be required to control voltage in accordance with a voltage schedule as provided by Idaho Power Grid Operations, and GI#551 will be required to manage the real power output of their stated generation at the project's POI. The Project 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.

5. Network Upgrades

5.1 Network Upgrades to Substations

Network upgrades will be installed at IPC's [redacted] Substation that consists of a 230kV circuit breaker ([redacted]), two 230kV air-break switch ([redacted] and [redacted]), associated relaying/control/SCADA equipment and foundations, structures, bus, grounding, cable trench and conductor for such equipment.

5.2 Network Upgrades to the Transmission System

There are no Network Upgrades to the transmission system required unless there are changes to senior queued project GI #530, including the in-service date and withdrawal from the queue. If the upgrades assigned to the senior queue projects are not constructed, GI #551 may be required to assume responsibility for those upgrades. A list of potential network upgrades was provided in Appendix B of the System Impact Study.

6. Estimated Costs

The following good faith estimates are provided in 2021 dollars and are based on several assumptions and conditions. IPC does not warrant or guarantee the estimated costs in the table below, which are estimates only and are subject to change. Interconnection Customer will be responsible for all actual costs incurred in connection with the work to be performed by IPC and its agents, under the terms and subject to the conditions included in any LGIA executed by IPC and Interconnection Customer.

The estimated cost below is required to be paid in full by the Interconnection Customer, or other arrangements acceptable to IPC are made with IPC's Credit Department, prior to IPC commencing construction on the project.

Estimated Cost of IPC's Interconnection Facilities and Network Upgrades:

Description	Ownership	Funding Responsibility[1]	Cost Estimate
IPC Interconnection Facilities:			
Install Interconnection Facilities as described in Section 1.5 above.	IPC	Interconnection Customer	$973,000
Network Upgrades:			
Install Network Upgrades to Substations as described in Section 5.1 above.	IPC	Interconnection Customer	$596,000
GRAND TOTAL			**$1,569,000**

6.1 Comparison to the System Impact Study (SIS)

The FSR cost estimate is higher than the estimate in the SIS. This difference can be attributed to several items:

- The SIS did not account for the DE disconnect switch [redacted].
- The SIS did not account for the metering package.
- There is an increase in the length of bus, number of bus structures and associated foundations in the FSR upon engineering review.
- There was an increase in the cost for the DE structure.

Note Regarding Transmission Service:

This FSR is a study of a request for Network Resource Interconnection Service. This FSR identifies the facilities necessary to provide such service. Network Resource Interconnection Service in and of itself does not convey any right to transmission service or to deliver electricity to any specific customer or Point of Delivery.

Note Regarding LGIA:

This FSR is a study and preliminary evaluation only and does not constitute, or form the basis of, a definitive agreement related to the matters described in this FSR. Unless and until a LGIA is executed

[1] Funding responsibility is described in the standard LGIA in Idaho Power's OATT (OATT Attachment M). Interconnection Facilities are funded by the Interconnection Customer without reimbursement. Distribution Upgrades are funded by the Interconnection Customer without reimbursement. Network Upgrades are funded by the Interconnection Customer and those funds are eligible for reimbursement under LGIA section 11.4.1.

by IPC and Interconnection Customer no party will have any legal rights or obligations, express or implied, related to the subject matter of this FSR.

Appendix A

Generation Interconnection Control Requirements

A.1 Generator Output Limit Control (GOLC)

A.1.1 IPC requires Interconnected Power Producers to accept GOLC signals from IPC's energy management system ("EMS").

A.1.2 The GOLC signals will consist of four points shared between the IPC EMS (via the IPC RTU) and the Interconnection Customer's Generator Controller ("ICGC"). The IPC RTU will be the master and the ICGC will be the slave.

A.1.2.1 GOLC Setpoint: An analog output that contains the MW value the Interconnection Customer should curtail to, should a GOLC request be made via the GOLC On/Off discrete output Control point.

A.1.2.1.1 An Analog Input feedback point must be updated (to reflect the GOLC setpoint value) by the ICGC upon the ICGC's receipt of the GOLC setpoint change, with no intentional delay.

A.1.2.2 GOLC On/Off: A discrete output (DO) control point with pulsing Trip/Close controls. Following a "GOLC On" control (DNP Control Code "Close/Pulse On"), the ICGC will run power output back to the MW value specified in the GOLC Setpoint. Following a "GOLC Off" control (DNP Control Code "Trip/Pulse On"), the Interconnection Customer is free to run to maximum possible output.

A.1.2.2.1 A Discrete Input (DI) feedback point must be updated (to reflect the last GOLC DO Control Code received) by the ICGC upon the ICGC's receipt of the GOLC DO control, with no intentional delay. The feedback DI should latch to an OFF state following the receipt of a "GOLC OFF" control and it should latch to an ON state following the receipt of an "GOLC ON" control.

A.1.3 If a GOLC control is issued, it is expected to see MW reductions start within 1 minute and plant output to be below the GOLC Setpoint value within 10 minutes.

A.2 Voltage Control

A.2.1 IPC requires Transmission-Interconnected Power Producers to accept voltage control signals from IPC's EMS when they are connected to IPC's transmission system.

A.2.2 The voltage control will consist of one setpoint and one feedback point shared between the IPC EMS and the ICGC.

A.2.3 The setpoint will contain the desired target voltage for plant operation. This setpoint will have a valid control range between 0.95 and 1.05 per unit ("p.u.") of nominal system voltage.

A.2.4 The control will always be active, there is no digital supervisory point like the Curtail On/Off control above.

A.2.4.1 When a setpoint change is issued an Analog Input feedback point must be updated (to reflect the voltage control setpoint value) by the ICGC upon the ICGC's receipt of the voltage control setpoint change, with no intentional delay.

A.2.4.2 When a setpoint change is received by the ICGC, the voltage control system should react with no intentional delay.

A.2.4.3 The voltage control system should operate at the voltage indicated by the setpoint with an accuracy of +/- 0.5% of the nominal system voltage.

A.2.5 The Interconnection Customer should supervise this control by setting up "reasonability limits", i.e. configure a reasonable range of values for this control to be valid. As an example, they will accept anything in the valid control range (between 0.95 and 1.05 p.u.) but reject values outside this range. If they were fed an erroneous value outside the valid range, their control system would default to the last known, good value.

A.3 Generation Interconnection Data Points Requirements

Digital Inputs to IPC (DNP Obj. 01, Var. 2)			
Index	Description	State (0/1)	Comments:
0	GOLC Off/On (Control Feedback)	Off/On	Feedback provided by Interconnection Customer
1	FREQUENCY RESPONSE OFF/ON (Control Feedback)	Off/On	Feedback provided by Interconnection Customer
2	52A Interconnection Customer Main Breaker (if present)	Open/Closed	Sourced at substation
3	52A Interconnection Customer Capacitor Breaker (if present)	Open/Closed	Sourced at substation

Digital Outputs to Interconnection Customer (DNP Obj. 12, Var. 1)		
Index	Description	Comments:
0	GOLC Off/On	Control issued by IPC
1	Frequency Response Off/On	Control issued by IPC

Analog Inputs to IPC (DNP Obj. 30, Var. 2)							
Index	Description	Raw High	Raw Low	EU High	EU Low	EU Units	Comments:
0	GOLC Setpoint Value Received (Feedback)	32767	-32768	TBD	TBD	MW	Provided by Interconnection Customer
1	Voltage Control Setpoint Value Rec'd (Feedback)	32767	-32768	TBD	TBD	kV	Provided by Interconnection Customer
2	Maximum Park Generating Capacity	32767	-32768	TBD	TBD	MW	Provided by Interconnection Customer
3	Ambient Temperature	32767	-32768	327.67	-327.68	DEG C	Provided by Interconnection Customer
4	Wind Direction	32767	-32768	327.67	-327.68	Deg from North	Provided by Interconnection Customer
5	Wind Speed	32767	-32768	327.67	-327.68	M/S	Provided by Interconnection Customer
6	Relative Humidity	32767	-32768	TBD	TBD	%	Provided by Interconnection Customer

7	Global Horizontal Irradiance	32767	-32768	TBD	TBD	W/M^2	Provided by Interconnection Customer
8	Plane of Array Irradiance	32767	-32768	TBD	TBD	W/M^2	Provided by Interconnection Customer
9	SPARE						
10	SPARE						
11	SPARE						
12	SPARE						
13	SPARE						
14	SPARE						
15	SPARE						
16	SPARE						
17	SPARE						

Analog Outputs to Interconnection Customer (DNP Obj. 41, Var. 2)							
Index	Description	Raw High	Raw Low	EU High	EU Low	EU Units	Comments:
0	GOLC Setpoint	32767	-32768	TBD	TBD	MW	Control issued by IPC
1	Voltage Control Setpoint	32767	-32768	TBD	TBD	kV	Control issued by IPC
2	SPARE						
3	SPARE						
4	SPARE						
5	SPARE						
6	SPARE						
7	SPARE						
8	SPARE						
9	SPARE						

Exhibit 1

[redacted] Switching Diagram

[redacted]