GENERATOR INTERCONNECTION

SYSTEM IMPACT STUDY REPORT

for integration of the proposed

132 MW [redacted] PROJECT

(GI #614)

to the

IDAHO POWER COMPANY ELECTRICAL SYSTEM

in

TWIN FALLS COUNTY, IDAHO

for

[redacted]

REPORT v.1

June 24, 2022

Revision History

Date	Revision	Initials	Summary of Changes
06/23/2022	0	MDH	System Impact Study Initial Report GI #614
06/24/2022	1	MDH	Initial SIS Report with comments/revisions

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1.0 INTRODUCTION

[redacted], [redacted] has contracted with Idaho Power Company ("Transmission Provider") to perform a Generator Interconnection System Impact Study (SIS) for the integration of the proposed 132 MW [redacted] (Project). In the Feasibility Study (FeS), the Project was initially studied at 330 MW. The Project's location is in Idaho Power Company's (IPC's) Southern Region in Twin Falls County, Idaho. The project is Generation Interconnect (GI) queue reference number 614 (GI #614). The project has chosen in the System Impact Study to be studied as both an Energy Resource Interconnection Service (ERIS) and a Network Resource Interconnection Service (NRIS).

Energy Resource Interconnection Service and/or Network Resource Interconnection Service in and of themselves do not convey transmission service. In addition to Network Upgrades identified in the Interconnection System Impact Study:

- For Energy Resource Interconnection Service, the Interconnection Customer's ability to inject its Large Generating Facility output beyond the Point of Interconnection will depend on the existing capacity of Transmission Provider's Transmission System at such time as a transmission service request is made that would accommodate such delivery. The provision of firm Point-to-Point Transmission Service or Network Integration Transmission Service may require the construction of additional Network Upgrades.

- For Network Resource Interconnection Service, additional studies to reduce or eliminate congestion may be required and these studies may identify the need for additional upgrades. To the extent Interconnection Customer enters an arrangement for long term transmission service for deliveries from the Large Generating Facility outside Transmission Provider's Transmission System, such request may require additional studies and upgrades in order for Transmission Provider to grant such request.

The Project has applied to connect to the Idaho Power's transmission system for an injection of 132 MW at a single Point of Interconnection (POI) at 345kV at Idaho Power Company's (IPCo's) new Rogerson Switching Station (RGSS) 345kV bus. The Project was initially studied at 330 MW in the Feasibility Study. Because the proposed interconnection is on WECC Path 16 Idaho-Sierra, Nevada Energy (NVE) is an Affected Party.

This report documents the basis for and the results of this System Impact Study for the GI #614 Generation Interconnection Customer. The report describes the 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 SIS requirements of the Idaho Power Tariff. This report will be reviewed by NVE.

Note:

Because of the sheer volume of senior GI requests in Idaho Power's GI queue, the existing transmission capacity available between the POI and Idaho Power Load is insufficient for the Project's output. The analysis of available transmission capacity usually occurs as part of a Transmission Service Request (TSR). From a TSR perspective, to move power to Idaho Power load in the Treasure Valley area East-to-West will likely require acceleration of the Midpoint to Hemingway 500kV line segment of Gateway West (GWW) (segment 8 or 9). However, since construction has not yet started on GWW, it may be difficult to meet the project's 2025 Commercial Operating Date. If a GWW segment is identified as necessary to transmit [redacted] project's energy to Idaho Power load, additional discussions will be needed to determine the financial arrangement.

2.0 SUMMARY

The system impact to the Idaho Power transmission system of interconnecting the 132 MW [redacted], GI #614, to Idaho Power's Rogerson Switching Station 345kV bus was evaluated.

The GI #614 Project is combined Wind and Battery Energy Storage System (BESS) and it has been assumed that the BESS will be charged via the wind output. [redacted] will need to demonstrate the operating procedures and control measures which prevents the BESS from being charged via IPC's transmission system. However, if the intent is also to be able to charge the BESS via IPC's transmission system, [redacted] will need to make an IPC Large Load Service request.

Interconnection Facilities for GI #614 [redacted] project:

- New Rogerson Switching Station POI 345kV Line Terminal
- 345kV 25 MVAr Shunt Reactor

The total conceptual cost estimate for ERIS to interconnect the [redacted] project, GI #614, as requested to the 345kV bus at Idaho Power's Rogerson Switching Station transmission station is **$8,883,837**. See Section 6.8 Energy Resource Interconnection Service Cost Estimate for the required facilities and cost breakdowns.

Idaho Power currently reserves 330 MW of CBM based upon Idaho Power's Most Severe Single Contingency (MSSC). Moreover, Idaho Power's contingent operating reserves are also based on the MSSC. With senior queue 120 MW Jackpot Solar Project (GI #502, GI #503, GI #513, GI #514, GI #517, and GI #523) and 100 MW GI #549 project already requesting NRIS at Idaho Power's RGSS transmission station, the interconnection of GI #614 [redacted] 132 MW at RGSS increases the total amount of generation requesting NRIS to 352 MW. The single event loss of the MPSN-RGSS 345kV line, disconnects the RGSS transmission station from the rest of Idaho Power's system stranding the 352 MW of generation which exceeds Idaho Power's current MSSC.

With the assumption of the availability of the limited transmission capacity to re-route a portion of this generation back to the Idaho Power system, the single contingency loss of ~352 MW, the combined total of the three project's output, may be permissible. However, if the 137 MW Valmy Unit #2 retirement is postponed, Idaho Power cannot tolerate the single contingency loss of 489 MW of Network Resource.

Network Transmission upgrades identified for GI #614 [redacted] project for NRIS:

- No additional Network upgrades were identified for GI #614

The total conceptual cost estimate for NRIS to interconnect the [redacted] project, GI #614, as requested to the 345kV bus at Idaho Power's Rogerson Switching Station transmission station is **$8,883,837**. See Section 7.5 Network Resource Interconnection Service Cost Estimate for the required facilities and cost breakdowns.

The cost estimates include direct equipment and installation labor costs, indirect labor costs and general overheads, and a contingency allowance. 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 estimate does not include the cost of the customer's equipment to construct the generation facility.

For potential operating requirement, see Section 10.0 Description of Operating Requirements.

3.0 SCOPE OF INTERCONNECTION SYSTEM IMPACT STUDY

The Interconnection SIS was performed and prepared in accordance with Idaho Power Standard Generator Interconnection Procedures, to provide a preliminary evaluation of the system impact of the interconnection of the proposed generating project to the Idaho Power transmission system. As listed in the Interconnection SIS agreement, the Interconnection SIS report provides the following information:

- identification of any circuit breaker short circuit capability limits exceeded because of the interconnection,
- identification of any thermal overload or voltage limit violations resulting from the interconnection, and
- identification of any instability or inadequately damped response to system disturbances resulting from the interconnection; and
- description and non-binding estimated cost of facilities required to interconnect the Large Generating Facility to the transmission system and to address the identified short circuit and power flow issues.

Generation projects in the Generator Interconnect queue prior to this project could impact the cost of interconnection. A current list of projects in Idaho Power's queue can be found in the Generation Interconnection folder located on the Idaho Power OASIS web site at the link shown below:

http://www.oasis.oati.com/ipco/index.html

4.0 CONTINGENT FACILITIES

IPC projects queue GI #530, GI #549, GI #551, GI #557, GI #567, GI #570, GI #588, GI #590, GI #604, GI #605, and GI #613 are senior queued projects in the affected area of IPC's transmission system. Idaho Power studied GI #614 with all Network Upgrades identified for senior queued projects as in-service. Changes to senior queued projects including withdrawal from the queue, may trigger a restudy associated with GI #614.

GI #614 Energy Resource Interconnection Service, ERIS, at the Rogerson Switching Station 345kV Bus POI is not contingent upon upgrades associated with any senior queued project.

GI #614 Network Resource Interconnection Service, NRIS, at the Rogerson Switching Station 345kV Bus POI is not contingent upon upgrades associated with any senior queued project.

5.0 DESCRIPTION OF PROPOSED GENERATING PROJECT

[redacted], GI #614, proposes to interconnect to the Idaho Power transmission system at 345kV with a total injection of 132 MW (maximum project output). The POI is the 345kV bus at IPCo's Rogerson Switch Station transmission station. The project's requested in-service date is December 1, 2025.

Table 1: Project Specifications

POI Location	Project to be located in Twin Falls County approximately [redacted] to [redacted] miles southwest of Twin Falls, ID near [redacted], [redacted]
Number and Type of Generators	(42) GE 3.03-140 WTG – Wind (32) – BESS
Individual Generator Nameplate Rating	Wind 3.03 MW BESS 3.334 MW
Total Output Power Rating	127.6 MW Wind 106.7 MW BESS
Rated Power Factor	0.95
Transmission Lines	One 10.1 miles 345kV Line (Project to POI) Two 230kV Lines with lengths from 0.1 to 11.7 miles Four 34.5kV Collector Equivalent Circuits
Transformers	Two Station 3-phase 345/230kV 120/160/200 MVA Z = 7.0%, X/R = 45 A Plant 3-phase 230/34.5kV 60/80/100 MVA Z = 7.0%, X/R = 33 B Plant 3-phase 230/34.5kV 42/56/70 MVA Z = 7.0%, X/R = 33 A Plant GSU 3-phase 34.5/0.69kV 94.5 MVA Z = 6.9%, X/R = 7.5 B Plant GSU 3-phase 34.5/0.69kV 66.5 MVA Z = 6.9%, X/R = 7.5
Interconnection Voltage	345kV

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 #614 has applied to connect to the Idaho Power's transmission system for an injection of 132 MW at a single Point of Interconnection (POI) at 345kV at Idaho Power Company's (IPCo's) new Rogerson Switching Station (RGSS) 345kV bus. All generation projects in the immediate 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 system impact of interconnecting GI #614.

6.1 Transmission Line Facilities

The Project will be inserted in the Rogerson Switching Station 345kV ring-bus.

6.2 Substation Facilities

The new RGSS 345kV ring-bus will need to be expanded to make room for a new line bay with one new 345kV power circuit breaker, associated switches, protective relaying systems, SCADA, communications, and a Generation Interconnection metering package.

Prior to the proposed GI #614 interconnection, Rogerson Switching Station (RGSS) 345kV voltage performance was very marginal for the loss of Midpoint (MPSN)-RGSS 345kV line with Jackpot Solar (GI #502, GI #503, GI #513, GI #514, GI #517, and GI #523) and GI #549 off-line. The addition of GI #614 project with its 345kV and 230kV transmission collector network will require an approximate 25 MVAr 345kV shunt reactor to mitigate GI #614 transmission collector network charging.

6.3 Grounding Requirements

For 345kV 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 345kV line terminal will be the responsibility of said interconnection customer.

The project single line does not indicate the winding configuration on the 345kV side of the 345/230kV transformers. Idaho Power requires a wye grounded connection on the high side and delta included in the transformer to create a solid ground path for the transmission system. This can be achieved with auto-transformers with a delta tertiary which is a source of ground current, other configurations can and do exist.

Grounding requirements and acceptability criteria are found in Appendix A.

6.4 System Protection Assessment

Short Circuit details at POI interconnection location:

Studies indicate that there is adequate load and short circuit interrupting capability on the Transmission Provider's existing 345kV breakers after this project is interconnected.

Fault duty at the POI 345kV bus with and without generation.

Fault Study (Baseline w/o additional gen)			
Location	**SLG (A)**	**LTL (A)**	**3PH (A)**
RGSS 345kV Bus	5644.7	5866.0	5520.4

Fault Study (with GI #614)			
Location	**SLG (A)**	**LTL (A)**	**3PH (A)**
RGSS 345kV Bus	6018.1	6422.3	6152.7

6.5 ERIS – Description of Power Flow Cases

PowerWorld simulator software was used to evaluate the WECC 2023 Heavy Summer base case (23HS3a) simulating the Idaho Power transmission system with nominal flows/transfers consistent with a heavy summer peak load condition. Idaho Power's Midpoint West path was modeled at a nominal flow ~1250 MW W-E, the WECC Path 17 Borah West was modeled at a nominal flow of ~600 MW W-E; and the WECC Path 16 Idaho-Sierra was modeled at a nominal flow of ~345 MW N-S The original WECC Base Case was modified to add Jackpot Solar, IPCo senior GI queue projects (GI #530, GI #549, GI #551, GI #557, GI #567, GI #570, GI #588, GI #604, GI #605, and GI #613) in the affected area, and the [redacted] GI #614 project. To add GI #614 project's 132 MW of generation, IPCo thermal (coal and gas) and wind generation were decreased.

The levels of flow represented in the study cases are intended to capture potential impact of the Project on the existing transmission system.

6.6 ERIS – Power Flow Study Results

Power Flow Analysis was performed on the cases described above. The base cases were used to simulate the impact of the Project interconnection during normal and contingency operating conditions (TPL-001). Mitigation of any adverse changes in loading or voltage from pre- to post-Project was identified.

The contingencies simulated include:

- All transformers and transmission lines in the local area of the proposed Project.
- The proposed project.

The results of the power flow studies were evaluated using WECC/NERC planning standards and Idaho Power planning standards. The power flow analysis related evaluation criteria that were used are summarized below:

- All transmission facilities must remain within their thermal limits.
- Pre-contingency bus voltages within the study area must be between 0.95 per unit and 1.05 per unit.
- Maximum voltage deviation allowed at all load buses under contingency conditions will be 8% for N-1.

Power flow solution was achieved for each of the N-1/N-2 outages simulated. Key findings from the power flow analysis are as follows:

23HS3a GI_#614 ERIS Case

- Overloading. There were no significant thermal violations in the power flow analysis.
- Voltage Deviation. There were no significant voltage deviations in the power flow analysis.
- Voltage Violations. There were no significant voltage violations in the power flow analysis.

6.7 Energy Resource Interconnection Service Transmission Upgrades

With the Idaho power transmission system modeled with nominal flows/transfers consistent with a heavy summer peak load condition, no additional transmission Network Upgrades were identified for the ERIS of GI #614.

6.8 Energy Resource Interconnection Service Cost Estimate

In Table 2 below a summary is provided of the facilities and conceptual costs required to facilitate the ERIS of [redacted], GI #614:

GI #614 [redacted] Project **Energy Resource Interconnection Service Facilities**	
Interconnection Facilities	
Direct Assigned:	**Cost**
Approximately 33% of a new RGSS 345kV Line Terminal for GI #614 Standard one-breaker 345kV line terminal with revenue metering	$987,761
Network Assigned:	
Approximately 67% of a new RGSS 345kV Line Terminal for GI #614 Standard one-breaker 345kV line terminal with revenue metering	$1,975,521

RGSS 345kV 25MVAr Shunt Reactor 25 MVAr 345kV shunt reactor, 345kV breaker, 345kV air-break switch, protection, etc.	$4,004,433
Subtotal	**$6,967,715**
Contingencies (~20.0%) (1)	$1,393,543
Subtotal	**$8,361,258**
Overheads (~6.25%) (2)	$522,579
ERIS – Total Estimated Cost (3)	**$8,883,837**

Table 2: ERIS Conceptual Cost Estimate

(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, overheads, and contingency 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.

7.1 Network Resource Single Event Exposure

If the full 132 MW Project elects to move forward as an Idaho Power Network Resource, consideration must be given to the amount of generation that can be lost due to a single event (for example a single 345kV line outage, bus fault, or breaker failure).

Section 23 and Section 24 of Business Practices, Waivers, and Exemptions on the Idaho Power OASIS site discusses Capacity Benefit Margin (CBM) and Transmission Reliability

Margin (TRM) respectively. These business practices are in accordance with Idaho Power's OATT, Commission orders, Commission regulations, and Commission approved NERC Standards. Idaho Power currently reserves 330 MW of CBM based upon Idaho Power's Most Severe Single Contingency (MSSC). Moreover, Idaho Power's contingent operating reserves are also based on the MSSC.

With senior queue 120 MW Jackpot Solar Project (GI #502, GI #503, GI #513, GI #514, GI #517, and GI #523) and 100 MW GI #549 project already requesting NRIS at Idaho Power's RGSS transmission station, the interconnection of GI #614 [redacted] 132 MW at RGSS increases the total amount of generation requesting NRIS to 352 MW. The single event loss of the MPSN-RGSS 345kV line, disconnects the RGSS transmission station from the rest of Idaho Power's system stranding the 352 MW of generation. There is limited transmission capacity to re-route this generation back to the Idaho Power system. Idaho Power's share of Valmy #2 unit wasn't included in this NR total analysis because it is scheduled to be retired by the of 2025. But, if the Valmy retirement is postponed, another 137 MW will need to be added to the total.

With the assumption of the availability of the limited transmission capacity to re-route a portion of this generation back to the Idaho Power system, the single contingency loss of ~352 MW, combined total of the three project's output, probably can be tolerated due to the N-1 loss of the MPSN-RGSS 345kV line. However, if the Valmy retirement is postpone, Idaho Power cannot tolerate the single contingency loss of 489 MW of Network Resource.

7.2 NRIS – Description of Power Flow Cases

PowerWorld simulator software was used to evaluate the 23HS3a1 WECC Base Case simulating with high west to east (1660 MW eastbound) transfers across Midpoint West and WECC Path 16 Idaho-Sierra represented at its Accepted Ratings of 500 MW N-S. The second case used the WECC 2022 Light Winter operating case (22LW1a) simulating shoulder months with high east to west (2500 MW westbound) transfers across Midpoint West and WECC Path 16 Idaho-Sierra represented at its Accepted Ratings of 360 MW S-N. The original WECC Base Cases were modified to add Jackpot Solar, IPCo senior GI queue projects (GI #530, GI #549, GI #551, GI #557, GI #567, GI #570, GI #588, GI #604, GI #605, and GI #613) in the affected area, and the [redacted] GI #614 project.

The levels of flow represented in the study cases are intended to capture potential impact of the Project on the existing transmission system.

7.3 NRIS – Power Flow Study Results

Power Flow Analysis was performed on the cases described above. The cases were used to simulate the impact of the Project interconnection during normal and contingency operating conditions (TPL-001). Mitigation of any adverse changes in loading or voltage from pre- to post-Project was identified.

The contingencies simulated include:

- All transformers and transmission lines in the local area of the proposed Project.

- The proposed project.

The results of the power flow studies were evaluated using WECC/NERC planning standards and Idaho Power planning standards. The power flow analysis related evaluation criteria that were used are summarized below:

- All transmission facilities must remain within their thermal limits.
- Pre-contingency bus voltages within the study area must be between 0.95 per unit and 1.05 per unit.
- Maximum voltage deviation allowed at all buses under contingency conditions will be 8% for N-1 (NERC Category B).

Power flow solution was achieved for each of the N-1/N-2 outages simulated. Key findings from the power flow analysis are as follows:

23HS3a GI_#614 NRIS Case

- Overloading.
    - The N-2: BF (Breaker Failure) Midpoint 205A (loss of the Midpoint-Justice and Midpoint-Hunt 230kV Lines) resulted in a flagged thermal violation in the power flow analysis:
        - King Upper Salmon 3 &4 B 138kV Line – 99.9%
- Voltage Deviation. There were no significant voltage deviations in the power flow analysis.
- Voltage Violations. There were no significant voltage violations in the power flow analysis.

22LW1a GI_#614 NRIS Case

- Overloading.
    - The N-1: Falcon-Robinson 345kV Line resulted in a flagged thermal violation in the power flow analysis:
        - Jackpot Solar 345/34.5 kV GSU Transformer – 99.3%
- Voltage Deviation. There were no significant voltage deviations in the power flow analysis.
- Voltage Violations. There were no significant voltage violations in the power flow analysis.

7.4 Network Resource Interconnection Service Transmission Upgrades

From the NRIS power flow analysis with high Midpoint West eastbound flow (1660 MW) and Path 16 at its N-S Accepted Rating of 500 MW and with high Midpoint West westbound flow (2500 MW) and Path 16 at its S-N Accepted Rating of 360 MW, no additional transmission Network Upgrades were identified for the NRIS of GI #614.

7.5 Network Resource Interconnection Service Cost Estimate

In Table 3 below a summary is provided of the facilities and conceptual costs required to facilitate the NRIS of [redacted], GI #614:

GI #614 [redacted] Project **Network Resource Interconnection Service Facilities**	
NRIS Transmission Upgrades:	
Network Upgrades	**Costs**
None	**$0**
NRIS – Subtotal	**$0**
ERIS – Total Estimated Cost	$8,883,837
NRIS – Total Estimated Cost (1)	**$8,883,837**

Table 3: NRIS Conceptual Cost Estimate

(1) This cost estimate includes direct equipment, material, labor, overheads, and contingency 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 VOLTAGE STABILITY ANALYSIS

A Voltage Stability study was performed using the WECC 2023 Heavy Summer base case (23HS3a) with Midpoint West W-E/Path 16 N-S stressed 1750/525 MW (105%) respectively, and the WECC 2022 Light Winter operating case (22LW1a) with Midpoint West E-W/Path 16 S-N stressed 2625/378 MW (105%) respectively. In both power flow cases, the total generation of the three projects (Jackpot Solar, GI #549), and GI #614) was increased to 370 MW (105%). All contingencies solved successfully so there were no Voltage Stability issues found for the Project.

9.0 TRANSIENT STABILITY ANALYSIS

The WECC 2023 Heavy Summer base case (23HS3a) and PowerWorld Simulator version 22 analysis tool were used to perform the transient stability analysis.

The following two transient stability simulation were run:

- 4-cycle 3-Phase Fault, Loss of Rogerson Switching Station-Midpoint 345kV Line
- 4-cycle 3-Phase Fault, Loss of Rogerson Switching Station-Humboldt 345kV Line

The results showed no transient stability violations. It is the responsibility (per NERC Standards) of the Generator Owner to ensure the modeling data utilized accurately reflects inverter operations, and to provide updates to Idaho Power if testing or real-time observations indicate a need.

10.0 DESCRIPTION OF OPERATING REQUIREMENTS

The Project will be required to control voltage in accordance with a voltage schedule as provided by Idaho Power's Grid Operations. Therefore, the Project is required to install a plant controller for managing the real and reactive power output of the 132 MW Project at the POI. As an interconnection on Idaho Power's transmission facilities, a phasor measurement unit device (PMU) will be required at the POI, and the installation of the PMU and the maintenance costs associated with communication circuits needed to stream PMU data will be required.

The installed reactive power capability of the Project must have a power factor operating range of 0.95 leading to 0.95 lagging at the POI over the range of real power output. At full output of 132 MW, the Project would need to be able to provide approximately +/- 43.45 MVAr reactive support plus the reactive energy consumed by the customer's own facilities. Preliminary analysis of the customer's facilities showed the Project's installed reactive power capability was sufficient to meet this requirement.

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*.

Additional operating studies will be required for prior planned and/or forced outages of the Midpoint-Rogerson Switching Station, Humboldt-Coyote Creek, and Valmy-Coyote Creek 345kV lines. Because the N-1-1 outages of the Midpoint-Rogerson Switching Station 345kV line and the Humboldt-Coyote Creek 345kV line or the Valmy-Coyote Creek 345kV line will strand the Humboldt-Rogerson Switching Station 345kV line and the three Rogerson Switching Station generation projects on NVE's underlying 120kV transmission network. Most likely outcome of this analysis is only a minimal amount of generation can remain on-line when one of these three 345kV lines is out-of-service.

11.0 CONCLUSIONS

The requested interconnection of the [redacted], GI #614, to Idaho Power's Rogerson Switching Station 345kV ring-bus was studied. GI #614 can be interconnected to the Idaho Power transmission system.

Interconnection requirements detailed in Section 6.8 totaling **$8,883,837** are required to interconnect the Project for Energy Resource Interconnection Service at the proposed Rogerson Switching Station 345kV Bus POI. No additional upgrades were identified for the integration of the Project for Network Resource Interconnection Service.

Generator interconnection service (either as an Energy Resource Interconnection Service or a Network Resource Interconnection Service) does not in any way convey any right to deliver electricity to any specific customer or point of delivery.

APPENDIX A

A-1.0 Method of Study

The SIS plan inserts the Project up to the maximum requested injection into the selected Western Electric Coordinating Council (WECC) power flow case and then, using Power World Simulator or GE's Positive Sequence Load Flow (PSLF) analysis tool, the impacts of the new resource on PacifiCorp's transmission system (lines, transformers, etc.) within the study area are analyzed. The WECC and Idaho Power reliability criteria and Idaho Power operating procedures were used to determine the acceptability of the configurations considered. For distribution feeder analysis, Idaho Power utilizes Advantica's SynerGEE 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; this specifies, 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 POI, 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) 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 Idaho Power 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 Grounding Guidance

Idaho Power requires interconnected transformers to limit their ground fault current to 20 amps at the POI.

A-4.0 Electrical System Protection Guidance

Idaho Power requires electrical system protection per Requirements for Generation Interconnections found on the Idaho Power Web site,

http://www.idahopower.com/pdfs/BusinessToBusiness/facilityRequirements.pdf

A-5.0 WECC Coordinated Off-Nominal Frequency Load Shedding and Restoration Requirements

Idaho Power 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.

http://www.idahopower.com/pdfs/BusinessToBusiness/facilityRequirements.pdf