Interim Transitional Cluster Restudy

Cluster Area 4 Restudy Report

March 16, 2026

Report v3.0

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1. Study Overview

1.1 Introduction

Transitional Cluster Area 4 (TCA4) is generally described as the Greater Treasure Valley area and includes the following Interconnection Requests: GI #704, GI #708, GI #710, GI #716, GI #723, and GI #724. After the final Transitional Cluster Study Report was issued, GI #704 withdrew from the interconnection queue, resulting in a need to conduct a restudy for TCA4. This interim Transitional Cluster Restudy Report includes study results with GI #708, GI #710, GI #716, GI #723, and GI #724 as the Interconnection Requests within TCA4, with a proposed a total of 700 megawatts (MW) of new generation.

In accordance with Section 7.3 of Transmission Provider's (hereinafter referred to as Idaho Power) Large Generator Interconnection Procedures (LGIP), this interim Transitional Cluster Restudy evaluated the impact of the proposed generation interconnections (GI) on the reliability of Idaho Power's Transmission System. The interim Transitional Cluster Restudy considered the Base Case as well as all Generating Facilities — and with respect to (iii) below, any identified Network Upgrades associated with such Generating Facilities — that, on the date the interim Transitional Cluster Restudy commenced:

(i) are directly interconnected to the Transmission System;

(ii) are interconnected to Affected Systems and may have an impact on the Interconnection Request;

(iii) have a pending higher queued Interconnection Request to interconnect to the Transmission System; and

(iv) have no Queue Position but have executed a Large Generator Interconnection Agreement (LGIA) or requested that an unexecuted LGIA be filed with FERC.

1.2 Study Assumptions

- Generation Interconnection Requests GI #551, GI #590, GI #604, GI #605, GI #632, GI #636, GI #639, GI #640, GI #665, GI #666, GI #667, GI #669, and GI #696 are higher-queued Interconnection Requests in the affected area of Idaho Power's Transmission System. Idaho Power studied this Cluster Area with all Network Upgrades for the identified higher-queued Interconnection Requests as in-service. Changes to higher-queued Interconnection Requests, including in-service date and withdrawal from Idaho Power's GI queue, may trigger a restudy of this Cluster Area, and the results and conclusions could significantly change.

- Generation Interconnection Requests GI #708, GI #710, GI #716, GI #723, and GI #724 are equally queued Interconnection Requests in Idaho Power's Transitional Cluster. Changes to equally queued Interconnection Requests within the Transitional Cluster, including in-service date and withdrawal from the queue, may trigger a restudy of this Cluster Area, and the results and conclusions could significantly change.

- Network Resource Interconnection Service (NRIS) does not convey transmission service.

- Power flow analysis requires WECC base cases to reliably balance under peak load conditions the aggregate of generation in the local area, with the Generating Facility at full output, to the aggregate of the load in the Transmission Provider's Transmission System. However, Idaho Power's Balancing Authority Area has proposed generation in the GI queue that far surpasses projected load. To reliably balance the power flow case, it is necessary to assume some portions of other resources are displaced by these Interconnection Requests. Based on the volume of higher-queued Interconnection Requests and in order to assess the impact of interconnecting this generation, some generation is being transferred regionally through the Transmission System.

- The Most Severe Single Contingency (MSSC) is the balancing contingency event, due to a single contingency, that results in the greatest loss (measured in MW) of resource output used by the Balancing Authority at the time of the event to meet firm system load and export obligation. An NRIS Interconnection Request greater than the MSSC must mitigate single contingencies that would result in the loss of the Interconnection Request. This includes, but is not limited to, single contingencies in the Interconnection Customer's Interconnection Facilities.

- Idaho Power will not mitigate thermal or voltage violations with remedial action schemes (RAS) in the GI process.

- Interconnection Requests interconnecting at new greenfield stations (Transmission Provider Interconnection Facilities) will require primary and/or secondary local distribution service be constructed to feed the station. The scope and cost of these potential distribution facilities are not contemplated in this study and will be analyzed in the final Transitional Cluster Restudy, as applicable.

- Telecommunication requirements are not fully contemplated in this study and could require significant upgrades up to and including line rebuilds to accommodate optical ground wire (OPGW), for example. Telecommunication requirements identified during the final Transitional Cluster Restudy could impact the estimated cost of the Interconnection Requests included in this report.

- The following Idaho Power planned system improvements were assumed in service. Any facility that has been determined to be contingent will be listed in Section 5 of this report.

    - 50% series capacitance compensation on the Kinport to Midpoint 345kV transmission line (2026)
    - Midpoint Substation T502 500:345kV transformer (2026)
    - Bowmont to Hemingway #2 230kV transmission line (2026)
    - Bowmont to Hubbard 230kV transmission line (2026)
    - Boardman to Hemingway (B2H) 500kV transmission line (2027)

- Hemingway to Mayfield 500kV transmission line (2028)
- Mayfield to Midpoint 500kV transmission line (2030)

1.3 Power Flow Case Description

The WECC 2030 Heavy Summer and 2030 Light Summer cases served as the Base Cases for the power flow and transient stability analysis for this interim Transitional Cluster Restudy. The Base Cases have been modified to:

- increase power flow across the Transmission System to stress relevant transmission paths,
- include future Idaho Power transmission projects identified in Section 1.2 of this report,
- include higher-queued generation Interconnection Requests, their Interconnection Facilities, and their Network Upgrades in accordance with Section 7.3 of Idaho Power's LGIP, and
- include Generating Facilities interconnected to Affected Systems that may have an impact on the Interconnection Requests in this Cluster Area.

The WECC 2030 Heavy Summer base case was modified to represent a summer month with high west-to-east (eastbound) transfers across the Idaho-to-Northwest (Path 14) WECC path and Midpoint West internal path. The WECC 2030 Heavy Summer base case was also modified to represent a summer month with high load and high generation.

The WECC 2030 Light Summer base case was modified to represent a shoulder month condition with high east-to-west (westbound) transfers across the Idaho-to-Northwest (Path 14) WECC path and Midpoint West internal path.

2. Cluster Area

Idaho Power performed the interim Transitional Cluster Restudy based on geographically and/or electrically relevant areas on Idaho Power's Transmission System known as Cluster Areas. Idaho Power has determined that the Interconnection Requests described below are in a geographically and/or electrically relevant area on Idaho Power's Transmission System and thus were assigned CA4 in this Transitional Cluster Restudy.

CA4 is generally described as Idaho Power's Transmission System in the Greater Treasure Valley. This Cluster Area consists of the Interconnection Requests described below.

2.1 GI #708 Description

Interconnection Customer has proposed to interconnect 150 MW of hybrid solar and battery storage generation to Idaho Power's Danskin to Hubbard 230kV transmission line located in Ada County, Idaho.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by PURPA. The requested COD is December 31, 2028.

The Interconnection Request will be studied for NRIS.

2.2 GI #710 Description

Interconnection Customer has proposed to interconnect 200 MW of hybrid solar and battery storage generation to Idaho Power's Chip to Rattlesnake 230kV transmission line located in Ada County, Idaho. The requested COD is June 30, 2026.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by PURPA.

The Interconnection Request will be studied for NRIS.

2.3 GI #716 Description

Interconnection Customer has proposed to interconnect 150 MW of hybrid solar and battery storage generation to Idaho Power's Cole 230kV substation located in Ada County, Idaho. The requested COD is December 31, 2028.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by PURPA.

The Interconnection Request will be studied for NRIS.

2.4 GI #723 Description

Interconnection Customer has proposed to interconnect 100 MW of battery storage generation to Idaho Power's Bowmont 230kV substation located in Canyon County, Idaho. The requested COD is December 31, 2027. Interconnection Customer requested the Interconnection Request be studied to interconnect using the same generation tie line (gen-tie line) as GI #724.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by PURPA.

The Interconnection Request will be studied for NRIS.

2.5 GI #724 Description

Interconnection Customer has proposed to interconnect 100 MW of battery storage generation to Idaho Power's Bowmont 230kV substation located in Canyon County, Idaho. The requested COD is December 31, 2027. Interconnection Customer requested the Interconnection Request be studied to interconnect using the same generation tie line (gen-tie line) as GI #723.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by PURPA.

The Interconnection Request will be studied for NRIS.

3. NRIS Requirements

3.1 Transmission Provider's Interconnection Facilities

Transmission Provider's Interconnection Facilities (hereinafter referred to as Idaho Power's Interconnection Facilities) are defined in Section 1 of Idaho Power's LGIP as all facilities and equipment owned, controlled, or operated by Idaho Power from the Point of Change of Ownership (POCO) to the POI, including any modifications, additions or upgrades to such facilities or equipment. In accordance with Section 4.2.1 of Idaho Power's LGIP, costs for Idaho Power's Interconnection Facilities are directly assigned to Interconnection Customer.

Listed below are Idaho Power's Interconnection Facilities required to interconnect the generation Interconnection Requests at their respective requested POIs.

3.1.1 GI #708 Interconnection Facilities

- One (1) 230kV disconnect switch
- Meter, dead-end structure, 3-phase PTs, 3-phase CTs, foundations, and cabling
- The last span of the Project's gen-tie line, including insulators, conductor, and associated hardware

3.1.2 GI #710 Interconnection Facilities

- One (1) 230kV disconnect switch
- Meter, dead-end structure, 3-phase PTs, 3-phase CTs, foundations, and cabling
- The last span of the Project's gen-tie line, including insulators, conductor, and associated hardware

3.1.3 GI #716 Interconnection Facilities

- One (1) 230kV disconnect switch
- Meter, dead-end structure, 3-phase PTs, 3-phase CTs, foundations, and cabling
- The last span of the Project's gen-tie line, including insulators, conductor, and associated hardware

3.1.4 GI #723 and GI #724 Interconnection Facilities

- One (1) 230kV disconnect switch
- Meter, dead-end structure, 3-phase PTs, 3-phase CTs, foundations, and cabling
- The last span of the Project's gen-tie line, including insulators, conductor, and associated hardware

3.2 Substation Network Upgrades

Substation Network Upgrades are defined in Section 1 of Idaho Power's LGIP as Network Upgrades that are required at the substation located at the POI; this includes all switching stations. In accordance with Section 4.2.1(a) of Idaho Power's LGIP, costs for Substation Network Upgrades are allocated per capita to each Generating Facility interconnecting at the same substation.

Listed below are the required Substation Network Upgrades required to interconnect the Projects at their respective POIs.

3.2.1 GI #708 Substation Network Upgrades

[redacted]

Figure 1. *GI #708 Point of Interconnection*

- **New GI #708 POI Substation**
  A generation interconnection and protection package at the new 230kV POI substation with three (3) 230kV power circuit breakers and line terminals, six (6) disconnect switches, protective relays, 3-phase PTs, 3-phase CTs, and SCADA and remote connectivity.

3.2.2 GI #710 Substation Network Upgrades

[redacted]

Figure 2. *GI #710 Point of Interconnection*

- **New GI #710 POI Substation**
  A generation interconnection and protection package at the new 230kV POI substation with three (3) 230kV power circuit breakers and line terminals, six (6) disconnect switches, protective relays, 3-phase PTs, 3-phase CTs, and SCADA and remote connectivity.

3.2.3 GI #716 Substation Network Upgrades

[redacted]

Figure 3. *GI #716 Point of Interconnection*

- **New Terminal at Cole Substation**
  A generation interconnection and protection package at the Cole 230kV substation with one (1) 230kV power circuit breaker and line terminal, one (1) disconnect switch, protective relays, 3-phase PTs, 3-phase CTs, and SCADA and remote connectivity.

3.2.4 GI #723 and GI #724 Substation Network Upgrades

[redacted]

Figure 4. *GI #723 and GI #724 Point of Interconnection*

- **New Terminal at Bowmont Substation**
  Expand the existing Bowmont 230kV substation yard by approximately 300' x 80' and add one (1) entrance gate and driveway apron. Add associated relaying, PLC communications, and control equipment in the station yard and building.

3.3 NRIS System Network Upgrades

System Network Upgrades are defined in Section 1 of Idaho Power's LGIP as Network Upgrades that are required beyond the substation located at the POI. In accordance with Section 4.2.1(b) of Idaho Power's LGIP, costs for each specific System Network Upgrade are allocated based on proportional impact of each individual Generating Facility in the Cluster Study.

Listed below are the required System Network Upgrades required for NRIS.

- **Cut-in Line [redacted] to new GI #708 POI Substation**
- **Cut-in Line [redacted] to new GI #710 POI Substation**
- **Rebuild [redacted] 230kV Line**
  Rebuild [redacted]-mile [redacted] 230kV line with [redacted] and steel poles with OPGW.

Table 1 NRIS System Network Upgrades

Facility Description	Outage	Cost Allocation	Cost Estimate
Cut-in Line [redacted] to new GI #708 POI Substation	[redacted]	GI708 – 100%	$1,705,475
Cut-in Line [redacted] to new GI #710 POI Substation	[redacted]	GI710 – 100%	$1,697,777
Rebuild 230kV [redacted]	[redacted]	GI708 – 100%	$20,432,468

3.4 Battery Charging

The energy storage system (ESS) component of each Interconnection Request was studied charging from the grid in an unstressed case and limited local area N-1 contingency analysis. There may be times during the year where system load in the local area will prevent charging of the ESS from the grid at full capacity; for example, a forced outage that would require Idaho Power to curtail grid charging. Should the Generating Facility require non-curtailable grid charging, a firm Point-to-Point transmission service from the energy market/source to the ESS would be required.

Prior to this interim Transitional Cluster Restudy commencing, Interconnection Customers did not notify Idaho Power of any intention to not charge the ESS portion of the projects from the grid, so the results of the charging study will be included in the scope of the final Transitional Cluster Restudy.

No additional upgrades are required to support charging the ESS from the grid for any of the included CA4 Interconnection Requests.

3.5 NRIS Cost Estimates

GI #708	
Interconnection Facilities	$848,112
Substation Network Upgrades	$11,298,842
System Network Upgrades	$22,137,943
Distribution Upgrades	$70,639

Total NRIS: $34,355,536

<u>GI #710</u>	
Interconnection Facilities	$856,092
Substation Network Upgrades	$11,311,261
System Network Upgrades	$1,697,777
Distribution Upgrades	$725,634
	Total NRIS: $14,590,763

<u>GI #716</u>	
Interconnection Facilities	$606,018
Substation Network Upgrades	$1,663,207
System Network Upgrades	$0
Distribution Upgrades	$0
	Total NRIS: $2,269,225

<u>GI #723</u>	
Interconnection Facilities	$386,484
Substation Network Upgrades	$507,040
System Network Upgrades	$0
Distribution Upgrades	$0
	Total NRIS: $893,524

<u>GI #724</u>	
Interconnection Facilities	$386,484
Substation Network Upgrades	$507,040
System Network Upgrades	$0
Distribution Upgrades	$0
	Total NRIS: $893,524

3.6 Estimated Time to Construct

Based on the identified scope of work for this Cluster Area, Idaho Power's non-binding, good-faith estimate of time to construct is a minimum of 4–5 years from LGIA execution, funding, and notice to proceed (Project Initiation). A detailed and refined timeline will be provided for each project in the final Transitional Cluster Restudy Report.

4. Contingent Facilities and Affected Systems

Contingent Facilities are defined in Section 1 of Idaho Power's LGIP as those unbuilt Interconnection Facilities and Network Upgrades upon which the Interconnection Request's costs, timing, and study findings are dependent, and if delayed or not built, could cause a need for restudies of the Interconnection Request or a reassessment of the Interconnection Facilities and/or Network Upgrades and/or costs and timing.

Table 2 Contingent Facilities

Service	Assigned To	Facility Description	Outage	Planned ISD
NRIS	Idaho Power	Build new 230kV Bowmont–Hemingway #2	[redacted]	2026
NRIS	Idaho Power	Install Midpoint T502 500/345kV transformer	[redacted]	2026
NRIS	Idaho Power	Rebuild 138kV Bowmont–Mora	[redacted]	2026
NRIS	Idaho Power	Expand 230kV Bowmont Station	[redacted]	2026
NRIS	Idaho Power	Build new 230kV Bowmont–Hubbard	[redacted]	2026
NRIS	Idaho Power	Rebuild 230kV Mountain Air Wind Park–Rattlesnake	[redacted]	2026
NRIS	Idaho Power	Build B2H Project	[redacted]	2027
NRIS	Idaho Power	Build new 500/230kV Mayfield Station	[redacted]	2028
NRIS	Idaho Power	Build new 230kV Mayfield–Pleasant Valley Solar	[redacted]	2028
NRIS	Idaho Power	Loop Boise Bench–Midpoint #2 230kV in-and-out of Mayfield 230kV Station	[redacted]	2028
NRIS	Idaho Power	Build new 500kV Hemingway–Mayfield	[redacted]	2028
NRIS	Idaho Power	Build 230kV Bennett Mountain–Danskin–Rattlesnake 3-terminal line	[redacted]	2029
NRIS	Idaho Power	Loop Boise Bench–Midpoint #3 230kV in-and-out of Rattlesnake 230kV Station	[redacted]	2030
NRIS	Idaho Power	Build new 500kV Mayfield–Midpoint	[redacted]	2030

5. Transient Stability Analysis

The WECC 2030 Light Summer base case and PowerWorld Simulator version 24 Transient Stability analysis tool were used to perform the transient stability analysis.

The results showed no transient stability violations. Per NERC Standards, the Generator Owner is responsible 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.

6. Voltage Stability Analysis

A Voltage Stability analysis was performed using the WECC 2030 Heavy Summer case with Midpoint West and Idaho-to-Northwest West-to-East flows at 105% of their path ratings and the WECC 2030 Light Summer case with Midpoint West and Idaho-to-Northwest East-to-West flows at 105% of their path ratings. All contingencies solved successfully; there were no voltage stability issues found for any of the TCA4 Interconnection Requests.

The Generating Facilities will be required to control voltage in accordance with a voltage schedule as provided by Idaho Power's Load Serving Operations. Interconnection Customers will be required to manage the real power output of their Generating Facilities at the POI.

7. Protection and Control

7.1 GI #708 Protection and Control

For 230kV line protection, Idaho Power's System Protection Department utilizes permissive and line differential protection schemes integrated with digital communication infrastructure. Idaho Power will require OPGW in the static wire position for any gen-tie lines and fiber communication between co-located facilities. Interconnection Customer is responsible to provide communication infrastructure between Interconnection's Customer's 230kV collector substation and Idaho Power.

Studies indicate that there is adequate load and short circuit interrupting capability on the Transmission Provider's existing 230kV breakers after this Project is interconnected.

The proposed 230kV Wye-Grounded/Wye-Grounded with a Delta tertiary transformer specified in the Project should provide an adequate ground return path for transmission line protection/relaying.

7.2 GI #710 Protection and Control

For 230kV line protection, Idaho Power's System Protection Department utilizes permissive and line differential protection schemes integrated with digital communication infrastructure. Idaho Power will require OPGW in the static wire position for any gen-tie lines and fiber communication between co-located facilities. Interconnection Customer is responsible to provide communication infrastructure between Interconnection's Customer's 230kV collector substation and Idaho Power.

Studies indicate that there is adequate load and short circuit interrupting capability on the Transmission Provider's existing 230kV breakers after this Project is interconnected.

The two (2) proposed 230kV Wye-Grounded/Wye-Grounded with a Delta tertiary transformers specified in the Project should provide an adequate ground return path for transmission line protection/relaying.

7.3 GI #716 Protection and Control

For 230kV line protection, Idaho Power's System Protection Department utilizes permissive and line differential protection schemes integrated with digital communication infrastructure. Idaho Power will require OPGW in the static wire position for any gen-tie lines and fiber communication between co-located facilities. Interconnection Customer is responsible to provide communication infrastructure between Interconnection's Customer's 230kV collector substation and Idaho Power.

Studies indicate that there is adequate load and short circuit interrupting capability on the Transmission Provider's existing 230kV breakers after this Project is interconnected.

The proposed 230kV Wye-Grounded/Wye-Grounded with a Delta tertiary transformer specified in the Project should provide an adequate ground return path for transmission line protection/relaying.

7.4 GI #723 Protection and Control

For 230kV line protection, Idaho Power's System Protection Department utilizes permissive and line differential protection schemes integrated with digital communication infrastructure. Idaho Power will require OPGW in the static wire position for any gen-tie lines and fiber communication between co-located facilities. Interconnection Customer is responsible to provide communication infrastructure between Interconnection's Customer's 230kV collector substation and Idaho Power.

Studies indicate that there is adequate load and short circuit interrupting capability on the Transmission Provider's existing 230kV breakers after this Project is interconnected.

The proposed 230kV Wye-Grounded/Wye-Grounded with a Delta tertiary transformer specified in the Project should provide an adequate ground return path for transmission line protection/relaying.

7.5 GI #724 Protection and Control

For 230kV line protection, Idaho Power's System Protection Department utilizes permissive and line differential protection schemes integrated with digital communication infrastructure. Idaho Power will require OPGW in the static wire position for any gen-tie lines and fiber communication between co-located facilities. Interconnection Customer is responsible to provide communication infrastructure between Interconnection's Customer's 230kV collector substation and Idaho Power.

Studies indicate that there is adequate load and short circuit interrupting capability on the Transmission Provider's existing 230kV breakers after this Project is interconnected.

The proposed 230kV Wye-Grounded/Wye-Grounded with a Delta tertiary transformer specified in the Project should provide an adequate ground return path for transmission line protection/relaying.

8. Description of Operating Requirements

GI projects will be required to control voltage in accordance with a voltage schedule as provided by Idaho Power's Load Serving Operations. Interconnection Customers will be required to manage the real power output of their Generating Facilities at the POI. Projects will be required to provide reactive power versus real power capability measured at the high side of the main power transformer that complies with IEEE Standard 2800 *IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems*, or any subsequent standards as they may be updated from time to time.

Projects are required to comply with the applicable Voltage and Current Distortion Limits found in IEEE Standard 2800 or any subsequent standards as they may be updated from time to time.

Installation of phasor measurement unit devices at the POI and maintenance costs associated with communication circuits needed to stream PMU data will also be required to be provided to interconnect the Projects. The specific costs associated with the Idaho Power requirements for

Interconnection Customers with aggregate facilities larger than 20 MW to provide PMU data to Idaho Power will be identified in the final Transitional Cluster Restudy should Interconnection Customer choose to proceed to that phase of the GI process. Also, it may be beneficial for Interconnection Customers, for their own modeling compliance requirements, to install additional PMU devices at their facilities to monitor the generations sources separately.

9. Total Cost Summary

The cost estimates below are allocated in accordance with Section 4.2.1 of Idaho Power's LGIP. The total NRIS cost estimate includes the costs associated with Idaho Power's Interconnection Facilities, Substation Network Upgrades, and System Network Upgrades required for Network Resource Interconnection Service, including those facilities identified as necessary for grid-charging any energy storage components.

GI #708
Total NRIS $34,355,536

GI #710
Total NRIS $14,590,763

GI #716
Total NRIS $2,269,225

GI #723
Total NRIS $893,524

GI #724
Total NRIS $893,524

Appendices

A-1 Method of Study

The power flow case for the Cluster Study is built using Western Electricity Coordinating Council (WECC) power flow cases as a Base Case in Power World Simulator. The Base Cases are then modified to include the higher-queued generation Interconnection Requests identified in Section 1.2 and their respective Network Upgrades and Interconnection Facilities. The Interconnection Requests being studied are then added to the cases with the model provided by the Interconnection Customers at the requested MW injection at the agreed-upon POI. The Base Cases are then rebalanced such that the applicable WECC transmission paths are at their WECC path rating with reasonable pre-contingency energy transfers utilizing the Idaho Power (Idaho Power) Transmission System. The power flow model is then analyzed using P1, P2, and P7 category contingencies contained in Table 1 of NERC standard TPL-001. WECC and Idaho Power reliability criteria are applied to the results of the contingency analysis, and any violations are mitigated with Network Upgrades or Contingent Facilities.

A-2 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 (P-0) 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 state, 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 while 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 2800 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, or 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 Grounding Guidance

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

A-4 Electrical System Protection Guidance

Idaho Power requires electrical system protection per Facility Connection Requirements found on the Idaho Power website,

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

A-5 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, which are available upon request.

A-6 Grid Enhancing Technology

The following technologies are considered when addressing voltage instability: static synchronous compensator, static VAR compensator, and synchronous condensers. Voltage instability was not found in the study.

The Transmission System interconnects all major generating stations and main load centers in the system. For reliable service, a bulk electric system must remain intact and be capable of withstanding a wide variety of disturbances. The integrated electric system is designed and operated such that the more probable contingencies can be endured with no loss of load and the more adverse contingencies do not result in uncontrolled and widespread power outages. The need to modify the electric configuration of the system or apply transmission switching was not found in the study.

Voltage source converters are used to connect HVAC and HVDC systems. Idaho Power does not act as a Transmission Provider for HVDC systems.

Advanced conductors have a higher cost when compared to more traditional conductors. However, reconductoring with advanced conductors may be less expensive than building new transmission lines. The need to modify the conductors used in an existing line, or rebuild a line, was found in the study. The use of advanced conductors would mitigate violations identified in this study. Existing structures are wood poles and steel poles. Due to fire risk and age of existing wood pole transmission lines, advanced conductors are not an option. The existing steel pole structures may be capable of supporting a reconductor with advanced conductor, however, an advanced conductor solution is not more cost effective than new transmission lines.

Power flow control devices are considered when a transmission element is overloaded and would benefit from a redistribution of flow. This can be accomplished through series reactors, series capacitors, or an equivalent technology. Power flow control devices were evaluated in this study. They did not mitigate violations, rather they pushed violations to other locations. Therefore, power flow control devices were not identified as upgrades in this study.

Raising lattice tower heights to provide more clearance may facilitate reconductoring a transmission line instead of rebuilding the transmission line. Tower lifting was not identified as a potential reconductor solution in this study because the transmission line identified as needing to be rebuilt requires an upgrade from single conductor to bundled conductors, which requires a new type of tower.

Revision History

Date	Author	Revisions
03/28/2025	Stephen Longmuir	1.0 – TCA4 restudied due to withdrawal of GI #731
09/08/2025	Stephen Longmuir	2.0 – TCA4 restudied due to removal of GI #530
03/16/2026	Stephen Longmuir	3.0 – TCA4 restudied due to withdrawal of GI #704