Affected System Study Report

Avista Cluster 2023

November 2nd, 2026

Report v1.0

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1. Study Overview

1.1 Introduction

Avista's 2023 Cluster study was split into five Cluster Areas. Cluster Area 7, which is generally described as Avista's Big Bend Area, includes the following Interconnection Request: CS23-12. Interconnection Requests within Avista's CA7 have proposed a total of 199 megawatts (MW) of new generation.

The Affected System Study was identified and entered post completion of Idaho Power's Cluster 1 study and prior to the start of Idaho Power's Cluster 2 study.

This Affected System Study evaluated the impact of the proposed generation interconnections (GI) in accordance with Section 9.6 of Idaho Power's Large Generator Interconnection Procedures (LGIP).

1.2 Study Assumptions

- Generation Interconnection Requests GI #562, GI #632, GI #634, GI #732, GI #771 and GI #790 in Idaho Power's GI queue are higher-queued Interconnection Requests in the affected area of Idaho Power's Transmission System. Idaho Power conducted this Affected System Study 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 an Affected System Restudy of Avista's 2023 CA7, and the results and conclusions could significantly change.

- Additionally, Generation Interconnection Requests GI #758, GI #759, GI #760, GI #763, GI #767, GI #770, GI #771, GI #772, GI #773, GI #776, GI #777, GI #782, GI #786, GI #788, GI #790, GI #792, and GI #793 are higher-queued Interconnection Requests in Idaho Power's Cluster 1. Changes to higher-queued Interconnection Requests within Cluster 1, Transitional Cluster and Senior Affected Studied Projects in the area, including in-service date and withdrawal from the queue, may trigger a restudy of this Affected System Study of Avista's 2023 CA7, and the results and conclusions could significantly change.

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

- 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)
- Mayfield to Pleasant Valley Solar 230kV transmission line (2028)
- Loop Boise Bench to Midpoint #2 230kV transmission line in-and-out of Mayfield 230kV station (2028)
- Hemingway to Mayfield 500kV transmission line (2028)
- Bennett Mountain to Danskin to Rattlesnake 3-terminal 230kV transmission line (2029)
- Pallette 230kV Switching Station (2029)
- Southwest Intertie Project – North (SWIP-N) 500kV transmission line (2029)
- Loop Boise Bench to Midpoint #3 230kV transmission line in-and-out of Rattlesnake 230kV station (2030)
- Mayfield to Midpoint 500kV transmission line (2030)

In accordance with the Federal Energy Regulatory Commission's, (FERC) pro forma LGIP and Idaho Power's LGIP Section 9.7:

> Transmission Provider must study an Affected System Interconnection Customer using the Energy Resource Interconnection Service modeling standard used for Interconnection Requests on its own Transmission System, regardless of the level of interconnection service that Affected System Interconnection Customer is seeking from the host transmission provider with whom it seeks to interconnect.

Energy Resource Interconnection Service (ERIS) is a basic or minimal Interconnection Service and does not guarantee deliverability of the generators full output to load under all system conditions, nor does it convey transmission service.

In addition to evaluating local thermal and voltage violations around the Point of Interconnection, (POI), available transmission capacity on pertinent Western Electricity Coordinating Council (WECC) Paths are evaluated. Should there be an impact on the ability of a Path to flow at rated levels, a nomogram between Path flow and generation output will be developed. If a Path constraint is identified and a nomogram becomes necessary, signals for real-time curtailment will be communicated from Idaho Power's control center to the generating facility. The host Transmission Provider and Interconnection Customer shall coordinate with Idaho Power to develop and implement the necessary telemetry and control points.

Thermal, voltage and stability violations, including those resulting in a transmission constraint, are outlined below in Section 3.

1.3 Power Flow Case Description

The WECC 2026 Light Spring and 2030 Heavy Summer cases serve as the Base Cases for the power flow and transient stability analysis for this Study. 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,
- 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 2026 Light Spring 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. Affected System Study Area

2.1 AFS1 (C23-12) Description

Affected System Interconnection Customer has proposed to interconnect 199 MW of batteries to a new station called AVAHub23-04 which is connected on the existing Avista-owned Saddle Mountain to Walla Walla 230kV transmission line located in Franklin County, Washington approximately 34 miles east of Avista's existing Saddle Mountain 230kV Station located in Adams County, Washington. The requested Commercial Operation Date (COD) is January 10, 2027.

3. Interconnection Facilities and Upgrades

3.1 Transmission Provider's Interconnection Facilities

Affected System project in Avista's 2023 CA7 have a designated POI external to Idaho Power's transmission system; therefore, no Transmission Provider Interconnection Facilities were identified in the Affected System Study.

3.2 Substation Network Upgrades

The Affected System project in Avista's 2023 CA7 has a designated POI external to Idaho Power's transmission system and stations; therefore, no Substation Network Upgrades were identified in the Affected System Study.

3.3 System Network Upgrades

Higher-queued, Idaho Power Interconnection Requests in the affected area of the Transmission System resulted in thermal overloads on the Bonneville Power Administration's, (BPA) [redacted] - [redacted] 230kV and [redacted] - [redacted] 230kV lines during heavy East-to-West Idaho Northwest Path 14 flow conditions. BPA was identified as an Affected System with respect to Idaho Power's Interconnection Requests. The Affected System Study for Avista's AFS1 (C23-12) identified an increase to these overloads and as such, Idaho Power recommends that BPA be consulted as a possible affected party to Avista's C23-12.

Additionally, thermal overloads were seen on Idaho Power's [redacted] - [redacted] 230kV line for a local breaker failure at [redacted] in the WECC 2030 Heavy Summer base case that was modified to represent a summer month with high west-to-east (eastbound) transfers across the Idaho-to-Northwest (Path 14). The incremental generation output of the Affected System Study generation unit will be subject to curtailment following outages of critical facilities or system conditions that decrease the reliability or transfer capabilities of Idaho Power's system. This incremental generation output capability will be reduced first before any other dynamic uses of Idaho Power's system are reduced. As such, a nomogram was developed to identify curtailment of generation vs Idaho Northwest Path 14 West-to-East Flow, as shown in Figure 1.

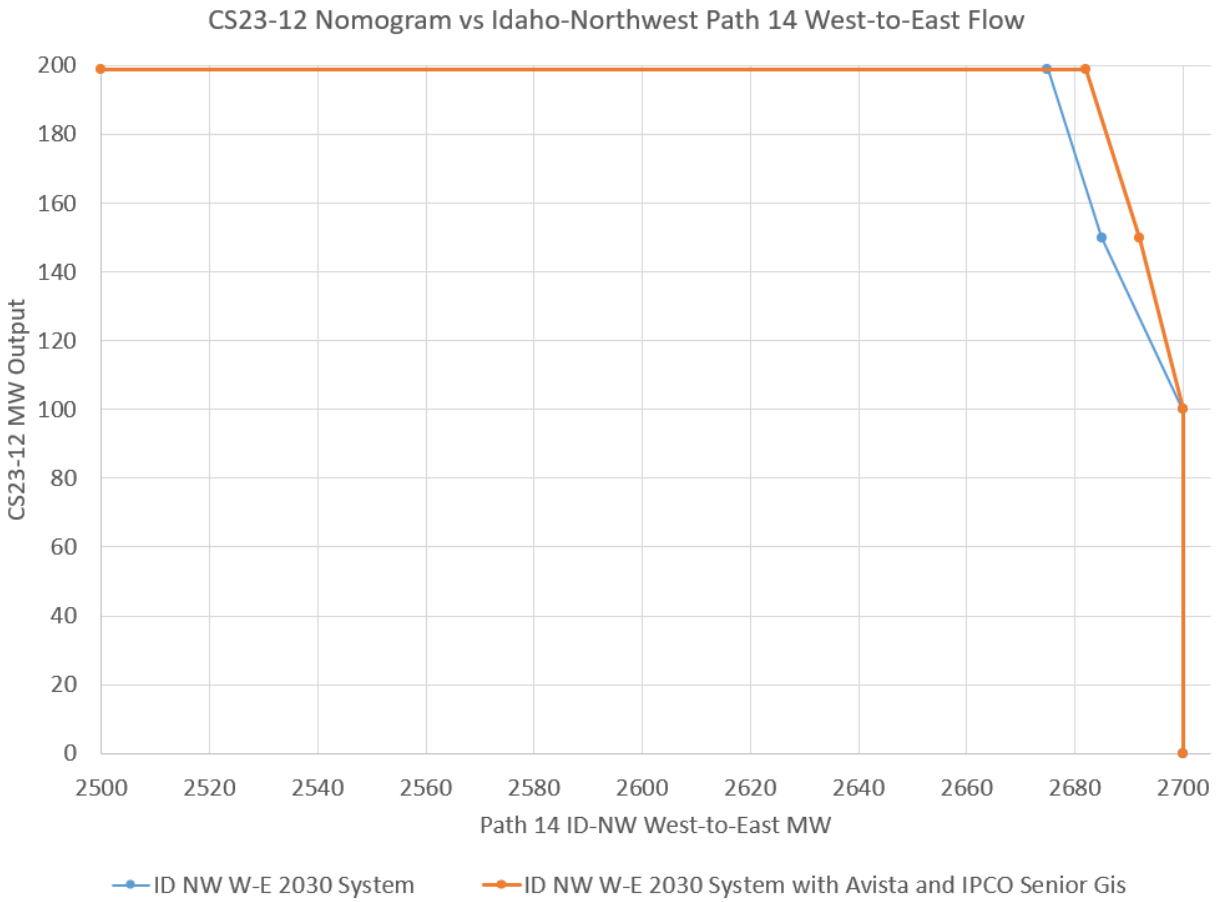


Figure 1: C23-12 Generation Output vs Path 14 Flow Nomogram

Table 1 ERIS System Network Upgrades

Facility Description	Outage(s)	Cost Estimate[2]
Equipment to enable Curtailment of AFS1 and ICCP point support	Breaker Failure of [redacted] Circuit Breaker	less than 100,000[1]

[1] The ERIS Cost assigned to this project is an estimate on labor costs involved in coordinating the new curtailment sharing points between Avista and Idaho Power and the Generation Interconnection location.

Listed below are the required System Network Upgrades required to mitigate the transmission constraint that resulted in the above nomogram.

Install 230kV Bus Tie Breaker in Brownlee Substation

Table 2 System Network Upgrades

Facility Description	Outage(s)	Cost Estimate[2]
Install 230kV bus tie breaker at Brownlee Substation	Breaker Failure of [redacted] Circuit Breaker	$ 2,309,769

3.4 Transmission Impacts

The Idaho-to-Northwest (WECC Path 14) is, among other uses, leveraged by the Idaho Power Load Serving Operator (LSO) for purchases to serve Idaho Power Load. Because this project impacts Idaho Powers existing transmission service rights on the Idaho-to-Northwest path, Idaho Power will be an affected party for any Transmission Service Request related to AFS1 (C23-12).

3.5 Battery Charging

No additional upgrades are required to support charging the ESS from the grid for any of the Affected System Study Interconnection Request.

3.6 Cost Estimates

The following good faith estimates are provided in 2026 US dollars and are based on a number of assumptions and conditions. Idaho Power does not warrant or guarantee the estimated costs in the table below, which are estimates only and are subject to change. Affected System Interconnection Customers will be responsible for all actual costs incurred in connection with the work performed by IPC and its agents, under the terms and subject to the conditions included in any Affected System Construction Agreement executed by Idaho Power and the Affected System Interconnection Customer(s). Costs for work being performed by Affected System Interconnection Customer and/or the host Transmission Provider are not included.

Table3: Estimated cost of Interconnection Facilities and Network Upgrades.

Description	Ownership	Cost Estimate
System Network Upgrades:		
Upgrades to Transmission System as described in Section 3.3	IPC	$1,480,621
Contingency 50%		$740,311
Overheads 4%		$88,837
Total		$2,309,769
	GRAND TOTAL	**$2,309,769**

4. Affected System Study 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.

The WECC 2026 Light Spring, and 2026 Heavy Summer cases serve as the Base Cases, which represent Idaho Power's current system and were used to identify any contingent facilities within Idaho Power's system. These cases were stressed to the current Path 14 West-to-East and East-to-West path limits, then contingencies were evaluated. No contingent facilities were identified in this analysis. Additionally, the WECC 2026 Light Spring and 2030 Heavy Summer cases serve as the Base Cases were built with everything except the Senior GI facilities or upgrades including load, path stressing and Idaho Power 2030 projects, then contingencies were evaluated. No contingent facilities were identified in this analysis.

5. Transient Stability Analysis

The WECC 2026 Light Spring case and WECC 2030 Heavy Summer 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 for ensuring 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 2026 Light Spring 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 the Project.

7. Protection and Control

The Affected System project in Avista's 2023 CA7 has a designated POI external to Idaho Power's transmission system and stations; therefore, no protection and control requirements were identified in the Affected System Study.

Studies indicate that there is adequate load and short circuit interrupting capability on the Transmission Provider's existing 230kV breakers after the Affected System project in Avista's 2023 CA7 is interconnected.

8. Total Cost Summary

The cost estimates below are allocated in accordance with Section 4.2.1 of Idaho Power's LGIP. The total cost estimates include the costs associated with Idaho Power's Interconnection Facilities, Substation Network Upgrades, and System Network Upgrades required for ERIS, including those facilities identified as necessary for grid-charging any ESS components. Additionally, the project to support non-curtailable generation has an NRIS cost identified below. Either the ERIS or the NRIS cost can be used to support the Affected System Study interconnection depending on the level of service requested from Avista:

AFS1 (CS23-12)	
Interconnection Facilities	$0
Substation Network Upgrades	$0
ERIS System Network Upgrades	Less than $100,000[1]
NRIS System Network Upgrades	$2,309,769
Total NRIS Cost $2,309,769	

[1] The ERIS Cost assigned to this project is an estimate on labor costs involved in coordinating the new curtailment sharing points between Avista and Idaho Power and the Generation Interconnection location.

Appendices

A-1 Method of Study

The power flow case for the Affected System 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 senior-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 Affected System 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 potential impediments to Affected System Interconnection Customer's receipt of interconnection service on its host transmission provider's transmission system are identified for mitigation by the host transmission provider.

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, as applicable.

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.

Revision History

Date	Author	Version	Revisions
11/02/2026	Linnea Gentry	1.0	Affected System Study Avista 2023 Cluster Report issued.