Appendix 1

Northern Tier Transmission Group – 2010-11 Study Plan

Background

The Northern Tier Transmission Group was formed in 2007 as an outgrowth of earlier subregional transmission coordination efforts and as an extension of the transmission planning and stakeholder participation processes of Transmission providers in the Northern Tier footprint (or service region).

Transmission providers – a term defined by the Federal Energy Regulatory Commission – are mandated by FERC's Order 890 to conduct a transparent and open planning process at the local, subregional and regional levels, and to provide for timely and meaningful participation by stakeholders in development of transmission plans. These local planning processes are described in Attachments K to the participating Transmission providers' Open Access Transmission Tariffs. These attachments also describe the Transmission providers' participation in subregional planning via Northern Tier.

The framework of the subregional planning process is defined in the Northern Tier Transmission Group's Planning Committee Charter. The charter establishes the Planning Committee with responsibility *"for coordinating transmission planning within the NTTG footprint, coordination with other subregional planning groups and the WECC planning committees."*

As part of the subregional planning process established by the Planning Committee Charter, this study plan is developed and reviewed with stakeholders to provide an agreed framework for conducting the planning study.

Introduction

The Northern Tier Transmission Group's biennial planning cycle provides an eight-quarter framework for the creation of a ten-year bulk transmission expansion plan that provides strategic transmission options and specific alternative plans for reinforcing the transmission system. From the charter:

> **Quarter 2**: Study plan development and assumptions – The identification of the loads, resources, transmission requests, desired flows, constraints, etc. to be included and monitored during the study period. The methodology, criteria, assumptions, databases, and identification of the analysis tools will be established and posted for comment and direction by stakeholders and Planning Committee members.

The planning process begins with the identification of transmission customer needs as identified by transmission providers. These needs include native loads and resources forecasted by Balancing authorities and network transmission customers, as well as service needs (including receipt and delivery points) of point-to-point transmission customers.

The objective of the transmission study effort is to perform a conceptual study that determines, given a limited number of load and resource scenarios, what general transmission improvements are required to provide a feasible system operation at times of transmission stress ten years in the future. This study

plan provides additional detail to the planning committee charter's framework, describing the data, assumptions, methods and processes that will be used.

The study begins by defining the 2019 loads that must be served and the resources assumed available to serve them. It is the reliable delivery of generation to loads that underlies the transmission planning process. In this biennial cycle, a core load and resource scenario will be augmented by four resource expansion scenarios. These are based on data submitted in response to Northern Tier's first quarter request for data and reflect strong indications that future energy needs will be met, at least in part, by development of renewable resources sited in areas with significant energy potential.

The core load and resource scenario will be tested against the current transmission network in the Western Interconnection as defined by an appropriate Western Electricity Coordinating Council base case to verify the need to investigate and plan transmission additions.

That model of the existing transmission network will then be modified to create an initial model of the network in 2019. This will be done by adding a minimal set of committed transmission projects – those that are deemed to have a high probability of being in service before 2019 and are primarily needed for firm load service and reliable system operation.

This initial transmission network will then be tested, using a commitment and dispatch program, against the load and resource scenarios under different operating conditions across the year 2019 to determine where problems exist. For the most problematic hours, the load and resource states will be exported to a power flow program, where simple (generic) transmission modifications will be made to ascertain what types of improvements produce a reliable network at least cost.

The most effective of these modifications (those that solve the most problems at the least cost) will again be tested (in the commitment and dispatch program) against the load and resource scenarios across the year to determine when the most congested conditions occur. The loads and resources on those hours will then be exported back to the power flow program and used to study the initial transmission network augmented by specific proposed transmission projects that most resemble the effective generic additions. This analysis will be a full contingency study to assure a reliable system in 2019.

Study Plan

Objectives of the Study

From the Northern Tier Transmission Group's Planning Committee Charter:

> The planning group will biennially prepare a long-term (10 year) bulk transmission expansion plan, while taking into consideration up to a twenty year planning horizon. The plan will provide strategic transmission options (economic and reliability projects) and specific alternative plans for reinforcing the transmission system. The plan is also intended to help coordinate the integration of new generation into the system and to reduce transmission congestion. The work is intended to be completed primarily by the transmission owners in the footprint utilities with input from all interested stakeholders.
>
> Specifically, the comprehensive transmission plan and/or planning process will:
>
> 1. Identify transmission needs of transmission customers (e.g., point-to-point, network, and retail native load), as they are identified and provided to the transmission provider. The transmission provider shall consolidate this information for their respective system to include in the subregional planning process.
>   a. Native load needs will be incorporated by input from the various integrated resource planning (IRP) processes where they exist. Network transmission customers will be asked to submit information on their projected loads and resources on a comparable basis (e.g., planning horizon and format). The intent will be to plan for all end-use loads on a comparable basis.
>   b. Each transmission provider's existing point-to-point customers will be asked to submit any projections they have of a need for service over the planning horizon and at what receipt and delivery points.
> 2. Identify transmission congestion that is an impediment to the efficient operation of electricity markets. Congestion on the existing and planned system will be reviewed and evaluated. In addition, the impacts on congestion of potential new generation facilities or new transmission projects will be considered. This will include production simulation studies on a subregional and regional level, and historical use analysis as provided by the Northern Tier Use Committee and TEPPC subcommittees.
> 3. Work with TEPPC to include the needs of other subregions and support WECC transmission planning.

The objective of the 2010-2011 Northern Tier transmission study effort is to perform a Conceptual Study that examines a limited number of forecasted and assumed load and resource portfolios, to determine where transmission improvements are needed and which of the subregion's set of proposed transmission additions (if any) are required to provide a feasible system operation at forecasted stress times, ten years in the future.

Investigative or screening analyses will be performed in the second half of 2010 to assess what types of transmission modifications will be needed within the Northern Tier footprint to adequately serve forecasted loads under alternative resource scenarios. A draft transmission

plan report will be prepared that describes the shortcomings of the current grid in serving 2019 needs and the types of improvements that overcome them.

The first half of 2011 will then be used to perform detailed power flow studies on those specific transmission projects that are consistent with the screening analysis, and to conduct additional economic congestion analyses. These analyses will contribute to a more refined plan, which will be prepared, discussed and approved by the end of 2009.

Confidentiality

The studies to be undertaken in developing the transmission plan will employ and report on data that have, in part, been classified by their providers as Critical Energy Infrastructure Information, Confidential Transmission Information, or Proprietary Market Information. Care will be taken to protect such data from unauthorized disclosure.

Any document or file containing confidential information will be marked with its type(s) of confidential contents.

An effort will be made to maximize declassified communication by avoiding the inclusion of small amounts of classified data and by, where practical, separating documents into classified and unclassified portions (such as an unclassified report with some classified attachments).

Stakeholders may have access to classified information in accordance with tariffs and regulatory filings delimiting such access and establishing the required non-disclosure agreements.

General Schedule and Deliverables

The broad timing of the transmission plan development process and the work products to be delivered are presented in the NTTG Planning Committee Charter:

Quarters 3 and 4: Draft plan analysis – The modeling of the system loads, resources, improvements, etc. to be considered. Technical screening studies using power flow analysis will be used to evaluate preliminary feasibility of and reliability of the system. Addition or modification of transmission elements considering past economic studies, and to meet performance and study criteria established in the study plan will be identified, resulting in a draft transmission plan for public and stakeholder comment. *[In this biennial cycle, Northern Tier will extend this analysis into the fifth quarter, as described below, in order to produce a more refined result.]*

Quarter 5: Draft study results – Stakeholder review and comment on the draft plan. Any stakeholder may submit comments, additional information about new or changed circumstances relating to loads, resources, transmission projects or alternative solutions to be evaluated as part of the preparation of the draft transmission plan, or submit identified changes to the data provided in Quarter 1….

Collection of economic study requests for consideration and determination of possible congestion and modification to the draft plan….

Quarter 6: Economic studies

Quarter 7: Final plan report

Quarter 8: Final plan approved by NTTG Steering Committee

Methodology

1. Time Frame
    a. 10 years in the future

    From the NTTG Planning Committee Charter: *The planning group will biennially prepare a long-term (10 year) bulk transmission expansion plan, while taking into consideration up to a twenty year planning horizon.*

    Proper analysis of the Northern Tier transmission system requires data and models that describe the entirety of the Western Interconnection due to the significant transmission ties between subregions and the substantial energy trading markets that span the interconnection. Consequently, Northern Tier bases its work on the data collection and validation work of the WECC and its committees.

    While a ten-year plan here would look at 2020 and 2021, the time required to develop the WECC base cases leads Northern Tier to look at the 2019 time frame used in the current TEPPC study series.

    b. One-hour focus
    NTTG studies will examine the adequacy of the Western Interconnection using techniques consistent with established planning methods, focused on anticipated times of system stress. System stress will be analyzed using integrated one-hour loads and resources. To find periods of stress, which may arise from times of peak load or reduced resource availability, or simply from large geographical disparities in loads and resources, a chronological security-constrained generator commitment and dispatch model will be run across the 8,760 hours of 2019 to find specific hours when energy flow from resources to loads is most constrained.

2. System Conditions to Study
    Northern Tier Transmission Group studies will, as noted above, go beyond traditional focus on snapshots of winter and summer peaks to examine all hours of the year for situations where available resources and forecasted loads across the Western Interconnection cause highest stress on the transmission system in the Northern Tier footprint.

3. Bases Cases Selected
    To perform its studies, Northern Tier will rely on the region-wide data collection and model development work of TEPPC's Technical Advisory Subcommittee. Their extensive efforts to acquire, review and agree on the many datasets needed in these studies not only saves

considerable work by Northern Tier, but provides a widely-accepted and well-vetted starting point. TEPPC in turn relies on the load and resource and transmission network modeling of WECC's Planning Coordination Committee. Both of these groups (TEPPC and PCC) develop reference base cases used for subsequent WECC studies and for the use of WECC members in their own work.

a. For reliability and operational analysis, the PCC has developed a transmission base case to represent the transmission network and potential loads and resources that would exist in the summer of 2012, at a time of peak loads. While focused on a time two years in the future, this case, labeled 12HS2a1, is deemed the best existing WECC base case to represent the current transmission grid. It was the starting point for TEPPC's current base case, and will be the initial case used in developing Northern Tier's studies.

b. For security-constrained economic commitment and dispatch modeling, TEPPC has developed a core base case, labeled 2019 PC1A, to underlie the series of cases they will be analyzing during the summer of 2010. This case is itself based on the PCC's 12HS2a1 power flow base case, with transmission modified to reflect known or highly likely future changes. This TEPPC case will also be a starting point for Northern Tier, with adjustments made to incorporate subregional data.

4. Times of Stress and Congestion Metrics

To determine times of stress, the results of simulating the Western Interconnection across the hours of 2019 for alternative load and resource scenarios will be examined heuristically and a consensus judgment made with regard to which hours will be further studied. To aid the assessment, the following data and statistics will be extracted from the simulation runs:

a. Flows on WECC-defined transmission paths and selected transmission branches within or connecting directly with the Northern Tier footprint;
b. Number of hours during 2019 that flows on monitored paths and branches exceed 75%, 90% and 99% of their ratings;
c. Gigawatt-hours of unserved load or unusable generation resulting from inadequate transmission;
d. Differences in locational marginal prices between WECC market hubs.

5. Contingencies to be Run

In performing screening studies, the ability of power flow programs to automatically test contingencies will be exercised, using contingency lists provided by Northern Tier's member Transmission providers. Lists will include significant single outages of transmission elements or generators, and any reasonably possible (credible) two-element outages. Any violations will be

noted in assessing the adequacy of tested transmission improvements, but detailed analysis and corrective actions will not be pursued.

In the detailed power flow analyses to be performed in the fifth quarter, contingency studies will be reviewed by representatives of each Transmission provider to ascertain which observed criteria violations are credible and what corrective actions would be taken to produce an accepted study.

Criteria

The viability of power flow studies will be determined in accordance with WECC and NERC criteria.

The primary metric for power flow success is service of all demand in the Northern Tier Transmission Group footprint and export of a substantial portion of subregional surplus generation.

Assumptions

1. The study will incorporate the loads, resources and transmission submitted in the Quarter 1 data request, with details provided as requested to assigned engineers in order to perform required analyses.

2. Loads

   One set of loads was provided in response to the Q1 data request, consisting of forecasted Area loads for Balancing Authority Areas internal to the Northern Tier footprint. These loads are generally those in the participating load serving entities' official load forecasts (such as those in integrated resource plans) and are similar to those provided to the Load and Resource Subcommittee of the WECC Planning Coordination Committee. Loads will be expanded, where necessary, from forecasted peaks and averages to hourly loads for use in the security-constrained economic commitment and dispatch programs. The same loads will be used

3. Resources

   Resources provided in response to the Q1 data request are incremental to existing resources within the Northern Tier footprint and are summarized in Table xx. Resource data come from integrated resource plans, interconnection queues, resource developers, and transmission providers who provide indications of expected resource additions.

   Alternative sets of these resources provide the scenarios that will be studied by Northern Tier. The base case, or core scenario, includes the resources identified by load-serving entities through their integrated resource plans or other formal load and resource processes as being needed to adequately service firm loads. Four alternative scenarios will include additional

generation identified by resource and transmission developers. They include, by capacity, 3,000 MW in Montana, 3,000 MW in Wyoming, 3,000 MW in each of Montana and Wyoming, and 6,000 MW in Wyoming alone.

Table 1: Resource Additions Identified in Q1 Data Submittals

Resources Added by 2019 (MW Capacity) From 2010 Q1 Data Response	Natural Gas*	Wind	Geo-thermal	Hydro-electric	Coal	Market	DSM
Basin Electric Project Developer	-	-	-	-	385	-	-
Grasslands Renewable Energy Development Plans	-	-	-	350	-	-	-
Idaho Power Company 2009 Integrated Resource Plan	300	150	40	49	-	425	-
NorthWestern Energy Transmisison Connection Queue	890	2,195	-	50	290	-	-
PacifiCorp East Integrated Resource Plan	45	170	-	39	-	722	224
PacifiCorp West Integrated Resource Plan	1,529	986	-	-	-	1,148	75
Portland General Integrated Resource Plan	450	700	-	-	-	-	-
Power Company of Wyoming Developer Forecast	-	3,000	-	-	-	-	-
TransWest Express Developer Forecast	325	2,900	-	-	-	-	-
TransCanada Chinook & Zephyr Developer Forecast	-	3,000	-	-	-	-	-
Total	3,539	13,101	40	488	675	2,295	299

* Includes thermal with unidentified fuel source

Resource information provided in data submittals also includes information regarding proposed resource locations, but is not detailed here to protect confidentiality or because specific locations, beyond state names, has yet to be provided.

Resource operating parameters will also need to be acquired from developers or assigned by analysts (based on similar generators already modeled in the base TEPPC case). In addition, the TEPPC base case contains some identified future generators and some generic generators, added to balance loads and resource in 2019. Any duplication between those additions and the additions provided in the Q1 data collection will be identified and resolved. Some duplication is likely to exist in the independently-provided resource data of the Q1 collection itself; for example, NorthWestern's resources were compiled from their interconnection queue and may

contain projects also submitted by resource or transmission developers.

4. Transmission

A number of specific transmission projects were identified in response to the Q1 data request. To analyze the projects in quarter five, additional project details will be solicited from project sponsors for those that did not provide the detail in their initial response.

Table 2: Transmission Projects Submitted to Northern Tier

Grasslands Renewable	230 kV	Collector System (5 segments) [MT]
	500 kV	DC line, Colstrip to Bismarck [MT-ND]
Idaho Power Company	500 kV	Boardman – Hemingway [ID-OR]
	500 kV	Gateway West (with PacifiCorp) [WY-ID]
NorthWestern Energy	500 kV	MSTI Project [MT-ID]
	500 kV	Montana Intertie (Path 8) Upgrade [MT-WA]
	230 kV	AMPS Line (Path 18) Upgrade [MT-ID]
	230 kV	MSTI Collector (up to 5 segments) [MT]
PacifiCorp	500 kV	Gateway Central [ID-UT]
	500 kV	Gateway South [WY-UT]
	500 kV	Gateway West (with Idaho Power) [WY-ID]
	230 kV	Walla Walla to McNary [WA-OR]
	500 kV	Hemingway to Captain Jack [ID-OR]
Portland General	500 kV	Cascade Crossing (Boardman-Salem) [OR]
TransCanada	500 kV	Chinook Project (AC+DC) [MT-ID-NV]
	500 kV	Zephyr Project (AC+DC) [WY-ID-NV]
TransWest Express	500 kV	TransWest Express (DC) [WY-NV]

Databases

The primary source of power flow model data will be the Western Electricity Coordinating Council, which makes such data available in formats familiar to those performing power flow studies in the Western Interconnection. The modifications made to the 12HS2a1 WECC Base Case by the TEPPC work groups in developing their PC1A case have been obtained in a format

that, when applied to the original power flow case, provide a 2019 power flow case equivalent to the network modeled within the TEPPC security-constrained economic commitment and dispatch program. Any transmission modifications made by Northern Tier will be collected and made available in the same format, labeled ".epc".

The database underlying the commitment and dispatch model is, as noted above, the dataset developed for the TEPPC 2019 PC1A base case. The data is made available within a platform called PowerBase that is proprietary to the model vendor (Ventyx) that provides WECC with PROMOD, its commitment and dispatch model.

In addition, cases may be exported from the PowerBase system to a Microsoft Access database in a form labeled Portable Database Format, or PDF. This Access database may then be converted into the Access database format used by ABB's GridView model, another commitment and dispatch model used in the Western Interconnection that can also be used to simulate the cases.

All modifications made to the TEPPC PC1A base case to establish the Northern Tier cases will be collected and identified, and made available for use by others (within confidentiality constraints) as PROMOD case files and GridView scenario files (these programs are described next).

Analysis Tools

Reliability analyses are conducted using power flow programs which, given a snapshot of loads and resources, determine whether the transmission grid can be operated to allow the electricity to flow reliably. Economic congestion studies are performed using security-constrained hourly chronological generator commitment and dispatch programs that find feasible and least-cost resource operations, which deliver electricity from generators to loads distributed across the same underlying transmission grid modeled in the power flow programs.

In this study cycle, General Electric's PSLF power flow program will be used to develop the initial transmission network, as the program's exported data are more easily and accurately imported by other power flow programs than the other way around. Northern Tier will also use this program to conduct the screening analysis in quarters three and four of the biennial cycle, to determine, for each of the load and resource scenarios, what general transmission additions are needed to allow reliable system operation. GE PSLF will also be used for the more detailed power flow analysis to be performed in quarter five, and to provide the underlying platform for transmission network specification.

To generate hourly load and resource patterns, the Ventyx PROMOD and ABB GridView programs are available to Northern Tier's technical work group and economic studies team. PROMOD is the program currently used by WECC staff and others in performing the Transmission Expansion Planning Policy Committee's analyses, while the GridView model is used by a number of entities in the Western Interconnection to perform comparable studies.

GridView appears to provide some technical advantages with regard to the study process proposed for Northern Tier in this planning cycle, though they are not yet proved.

Study cases will be maintained in the PSLF, PROMOD and GridView databases and made available to stakeholders interested in verifying, further analyzing, or extending the work done in this planning process, provided that appropriate steps are taken to maintain confidentiality.

Constraints

Path constraints (also referred to as interface limits) will be as defined in WECC's Path Rating Catalog, as modified by TEPPC in its PC1A case, and as further agreed by the Northern Tier Planning Committee. Because of the complexity of the WECC Path Rating Process, transmission projects added to the initial transmission grid that connect the same areas connected by defined paths, will not be added into those paths' definitions. Instead, their transfer limits will be set according to their thermal limits or to any announced rating being sought by the sponsor of the project.

Study Procedure

Technical Work Group

The Technical Work Group reports to the Northern Tier Planning Committee and consists of assigned engineers from planning committee members who are Transmission providers or members who otherwise will assign transmission planning engineers to this study effort. The TWG is responsible for collecting, reconciling and preparing data, clarifying assumptions, running simulation programs, analyzing results, identifying and testing solutions, and reporting outcomes.

Due to the technical nature and multiplicity of the computer programs used, the varying experience of participating engineers in working with the programs, and the need to work among companies with different resources, the operation of the computer programs will be done by two teams within the TWG.

The Power Flow Team will consist of engineers with access to and experience with the General Electric PSLF power flow program, supported by the other members of the TWG.

The Economic Studies Team will consist of engineers with access to and experience with the two principle security-constrained hourly chronological economic commitment and dispatch programs, PROMOD and GridView; again supported by the other members of the TWG.

Data Preparation

The Technical Work Group will review and analyze the data submitted to Northern Tier in Q1, identify and obtain additional data and clarification needed to develop the studies, and prepare the data for use in the computer programs. Data and assumptions will be well-documented and

reported to the Planning Committee for correction and approvals (with proper protection of confidential information) before studies are accepted.

Data needed for the Northern Tier study process include:

1. Hourly loads for 2019 for TEPPC load-areas within the Northern Tier footprint,
2. Generator details for resources submitted in response to Northern Tier's Q1 data requests, including:
    a. For thermal generation, the interconnection, cost and operating details required by PROMOD and GridView
    b. For wind generation, the capacity and location of the projects
    c. For hydroelectric projects, the location, capacity and energy (monthly or hourly), and other relevant characteristics (dependent on operating modes) for the projects
3. Transmission data, both for 'committed projects' needed to build the initial case, and for the transmission projects identified in response to Northern Tier's Q1 request for data, including
    a. Definition of the project, in .epc format, including buses, branches, transformers and other devices
    b. Operating information (line ratings, operation of phase shifters, flows on DC line segments, etc)

Scenario Creation

Five load and resource scenarios will be developed and studied by the Technical Work Group. All scenarios will use the same load, but with the following resources:

1. A Core Case, consisting of 2019 loads and resources as forecasted by load-serving entities through such formal processes as integrated resource plans,
2. A case identical to the Core Case, with the addition of 3,000 MW of wind generation in Montana,
3. A case identical to the Core Case, with the addition of 3,000 MW of wind generation in Wyoming,
4. A case identical to the Core Case, with the addition of 3,000 MW of wind generation in Montana and 3,000 MW in Wyoming,
5. A case identical to the Core Case, with the addition of 6,000 MW of wind generation in Wyoming.

Hourly wind generation for the added generators will be defined by their location and the appropriate TEPPC wind curves developed from historical wind analysis performed by the National Renewable Energy Laboratory. Consequently, energy output from a given increment of capacity (e.g, 3,000 MW) will be solely dependent on location.

Loads and resources for all areas outside the Northern Tier footprint will be as specified in the TEPPC PC1A base case.

Null Case Analysis

Using the WECC 12HS2a1 Base Case and the scenarios defined above, an attempt will be made to produce a solved power flow case. This Null Case will indicate whether additional transmission facilities may be needed in 2019. Development and execution of the initial network case will proceed in parallel with this case to avoid delay, as it is anticipated that the Null Case will fail.

Initial Transmission Network

TEPPC used the WECC 12HS2a1 Base Case to develop its own 2019 PC1A base case, by importing the power flow base case and then adding what were deemed to be committed transmission upgrades, needed for native load service or to meet identified reliability needs, with a high likelihood of being in service before 2019.

Subsequent to publication of the PC1A case, a SPG Coordinating Group (formed in response to a WECC initiative sponsored by the US Department of Energy) developed a "Foundation List of Committed Projects", which is a more formally-developed list of projects that met specific criteria. Northern Tier will use that set of projects, with one or two changes, as its additions to the 2012 power flow case to create its 2019 initial transmission network, both for power flow and commitment and dispatch modeling.

The Technical Work Group will, with the concurrence of the Planning Committee prepare base power flow and commitment and dispatch datasets incorporating these modifications.

Determining Loads & Resources at Times of System Stress

Using the PROMOD and GridView programs with the initial transmission network properly represented, the economic studies team will analyze the five load and resource scenarios across the hours of 2019.

Congestion and cost outputs will be reviewed to identify a limited number of hours where paths were severely congested, load went unserved or economical resources could not be used. The load and generation levels on those hours will be exported as snapshots for closer analysis in the power flow programs.

Screening Studies

Beginning with the initial transmission network and the stressed-hour snapshots, the power flow team will use the PSLF program to test simple *ad hoc* modifications of the transmission network, such as adding a high-voltage branch between substations, to identify generic fixes that provide substantial relief of identified stresses in as many situations and at as low a cost as might be found. A minimal set of what are judged to be the best generic fixes will be selected for further analysis. The generic fixes may be different for different load and resource scenarios, though a criterion for selecting 'best' fixes will be that they relieve stress under multiple scenarios.

Determining Times of System Stress with Generic Fixes

The transmission modifications made in the selected set of generic fixes will be reproduced in the PROMOD and GridView programs and run against the five scenarios. Program outputs will again be examined to identify a minimal number of hours on which loads and dispatched resources show the greatest stress. These load and resource configurations will be exported back to the power flow program.

Draft Transmission Plan

The choice of generic fixes and the results of the commitment and dispatch analysis will form the basis for the draft transmission plan to be reported at the end of 2010. The report will document the work done to that point, describe the rationale for selecting the generic fixes and evaluate their effectiveness in reducing congestion and otherwise improving system operation.

Together with stakeholder review and feedback, the draft plan will lead to a more focused and comprehensive evaluation to be performed in the second year of the planning cycle.

Adequacy and Reliability

During the fifth quarter of the biennial planning cycle, the potential improvements to the transmission grid in the Northern Tier footprint will be subjected to a contingency analysis, to see whether they continue to provide load service without violating voltage or current limits after critical transmission elements or appropriate pairs of elements are taken out of service.

Where practical, the generic additions of the earlier analyses will be replaced by specific transmission projects submitted for consideration in response to the Q1 data request. In the event that multiple projects provide comparable relief, an effort will be made to discern and quantify differences in the relief provided, or to provide a qualitative assessment of the projects in the context of the scenarios considered and the level of study performed.

The fifth quarter will also provide a three-month window for stakeholders to introduce additional economic study requests or provide other data that might be of value in the planning process.

Additional Economic Congestion and Power Flow Study

Quarter six of the eight-quarter planning cycle provides a further opportunity to perform economic studies and power flow analyses to address questions that arise out of earlier analysis, or to incorporate new data or developments that might improve the transmission plan.

This quarter will also be used to develop the transmission plan final report.

Final Transmission Plan

The final transmission plan will be contained in a comprehensive report that, upon stakeholder review and comment, will be presented to the Northern Tier Steering Committee for its review and acceptance before the end of the final quarter of the 2010-11 biennial planning cycle.

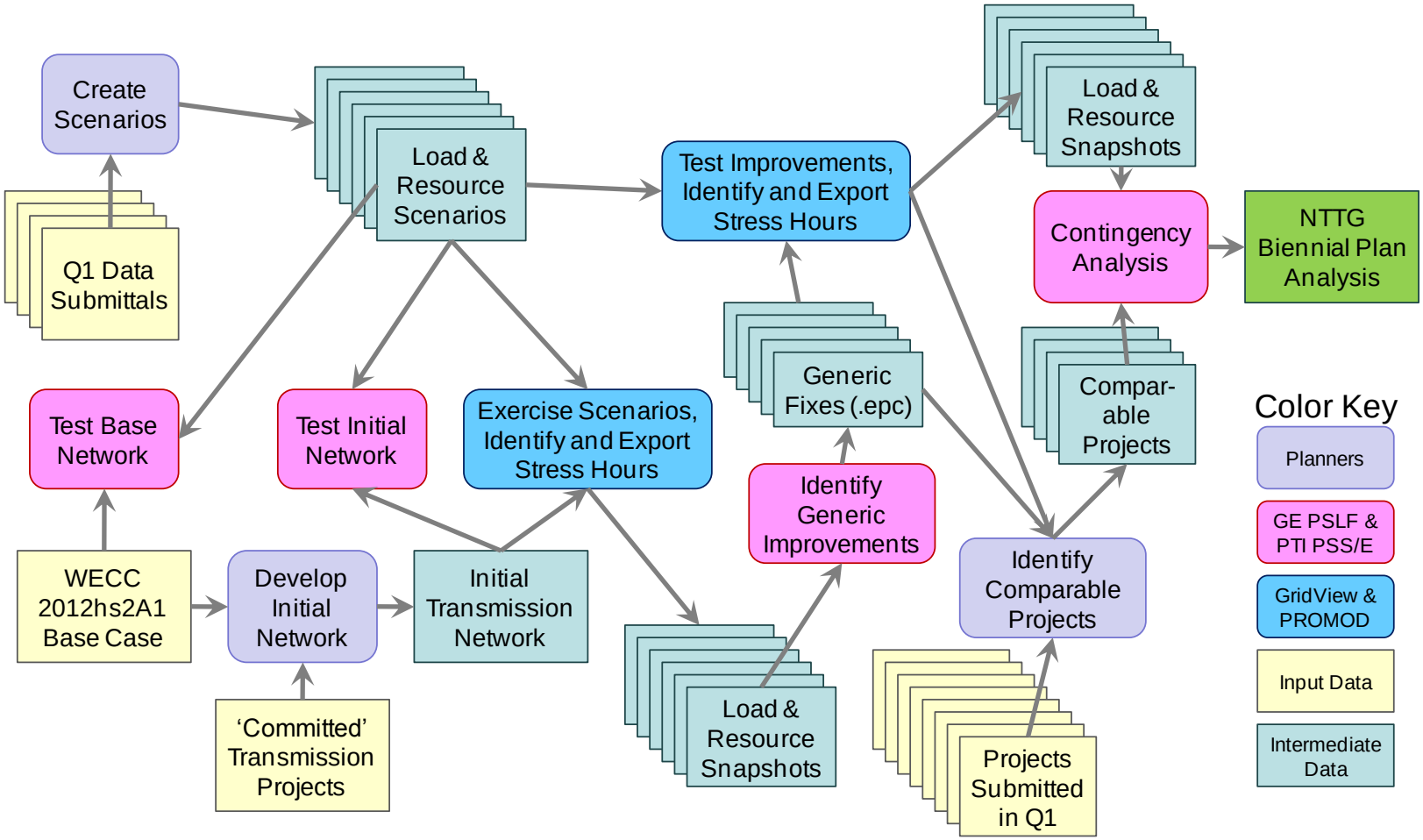

Figure 1 - Diagram of Study Process

Appendix 2

NTTG Foundation Projects

The following NTTG Transmission Provider projects are included in the WECC SCG Foundation Project List and the TEPPC 2020 PC0 base case. The data provided below is from the WECC TEPPC Transmission Project Portal, which is located at:
http://www.wecc.biz/Planning/TransmissionExpansion/Transmission/Pages/default.aspx.

Boardman-Hemingway 500 kV (B2H)

Project Purpose: The B2H project will increase transmission capacity between the Pacific Northwest and Idaho to provide: dependable electrical service for Idaho Power network load, access to energy markets and transmission service to eligible customers.
Estimated In-Service Date: 6/1/2016
Estimated Transfer Capability/Rating (MW): 1,300
Sponsoring Organization(s): Idaho Power
Voltage Class: 500kV AC
Project Website: http://www.boardmantohemingway.com/

Cascade Crossing

Project Purpose: Satisfies Generation Interconnection Requests. Supports compliance with state Renewable Energy Standard.
Estimated In-Service Date: 6/1/2015
Estimated Transfer Capability/Rating (MW): 1,500
Sponsoring Organization(s): Portland General Electric
Voltage Class: 500 kV AC
Project Website: http://www.oatioasis.com/pge/index.html - Click on 'Cascade Crossing Project' in the left-side column.

Gateway Central Project – Mona to Oquirrh 500 kV (Energy Gateway Segment C)

Project Purpose: Meet load growth, provide increased reliability and improved operational flexibility in conjunction with future generation resources, including renewable resources.
Estimated In-Service Date: 6/1/2013
Estimated Transfer Capability/Rating (MW): 1,500
Sponsoring Organization(s): PacifiCorp
Voltage Class: 500 kV AC
Project Website: http://www.pacificorp.com/tran/tp/eg/gc.html

Gateway Central Project, Sigurd - Red Butte - Crystal 345 kV Line

Project Purpose: Load service and increased reliability for SW Utah load service   Note:

estimated transfer capability 550 MW (s-n) 400 MW (n-s)
Estimated In-Service Date: 6/1/2014
Estimated Transfer Capability/Rating (MW): 600
Sponsoring Organization(s): PacifiCorp
Voltage Class: 345 kV AC
Project Website: http://www.pacificorp.com/tran/tp/eg/gc.html

Gateway South Project – Segment #2 (Aeolus-Mona 500 kV)

Project Purpose: Delivery of network resources to network load. Load growth requirements.
Estimated In-Service Date: 1/1/2019
Estimated Transfer Capability/Rating (MW): 1,500
Sponsoring Organization(s): PacifiCorp
Voltage Class: >500kV AC
Project Website: http://www.pacificorp.com/tran/tp/eg/gs.html

Gateway West Transmission Project Segment 1A – Windstar to Jim Bridger 230 kV, 500 kV

Project Purpose: Delivery of new resources in transmission service request queues, to ensure reliable electric service to customers and to also accommodate regional needs for integrating renewable and other resource development. Note: two 230 kV lines from Windstar to Aeolus and a single 500 kV circuit 500 kV line from Aeolus to Bridger.
Estimated In-Service Date: 6/1/2017
Estimated Transfer Capability/Rating (MW): 1,500
Sponsoring Organization(s): PacifiCorp and Idaho Power
Voltage Class: 500kV AC
Project Website: http://www.pacificorp.com/tran/tp/eg/gw.html

Gateway West Transmission Project Segment 1B – Jim Bridger to Southeast Idaho (Bridger – Populus single circuit 500 kV)

Project Purpose: Delivery of new resources in transmission service request queues, to ensure reliable electric service to customers and to also accommodate regional needs for integrating renewable and other resource development.
Estimated In-Service Date: 1/1/2017
Estimated Transfer Capability/Rating (MW): 1,500
Sponsoring Organization(s): PacifiCorp and Idaho Power
Voltage Class: 500kV AC
Project Website: http://www.pacificorp.com/tran/tp/eg/gw.html

Gateway West Transmission Project Segment 1C – Southeast Idaho – South Central Idaho (Populus – Midpoint 500 kV)

Project Purpose: Increased capacity to serve customer growth and reliably deliver energy to customers; support new renewable and other resource development
Estimated In-Service Date: 1/1/2018

Estimated Transfer Capability/Rating (MW): 1,500
Sponsoring Organization(s): PacifiCorp and Idaho Power
Voltage Class: 500kV AC
Project Website: http://www.pacificorp.com/tran/tp/eg/gw.html

Gateway West Transmission Project Segment E – South to Southwest Idaho (Midpoint – Hemingway 500 kV)

Project Purpose: Increased capacity to serve customers and reliably deliver energy to customers; support new renewable and other resource development.
Estimated In-Service Date: 1/1/2018
Estimated Transfer Capability/Rating (MW): 1,500
Sponsoring Organization(s): PacifiCorp and Idaho Power
Voltage Class: 500kV AC
Project Website: http://www.pacificorp.com/tran/tp/eg/gw.html

Appendix 3

Scenario Transmission Projects

The following proposed projects are potentially capable to provide the transmission capacity required to transport the scenario generated power from Montana and Wyoming to the Southwest. The data provided below is from the WECC TEPPC Transmission Project Portal, which is located at http://www.wecc.biz/Planning/TransmissionExpansion/Transmission/Pages/default.aspx.

Chinook

Project Purpose: Facilitate movement of energy between Montana, Idaho and the Southwest US
Estimated In-Service Date: 12/31/2018
Estimated Transfer Capability/Rating (MW): 3,000
Sponsoring Organization(s): TransCanada
Voltage Class: 500kV DC
Project Website: http://www.transcanada.com/company/zephyr_chinook.html

High Plains Express Transmission Project

Project Purpose: Enhance reliability, access renewable energy resources, and allow the transfer of economical energy resources to customers in Wyoming, Colorado, New Mexico, and Arizona
Estimated In-Service Date: 1/1/2017
Estimated Transfer Capability/Rating (MW): 4,000
Sponsoring Organization(s): Black Hills Corporation; Colorado Springs Utilities; Public Service Company of New Mexico, Public Service Company of Colorado (Xcel Energy); Salt River Project; Tri-state Generation and Transmission; Trans-Elect Development Company; Western Area Power Administration; Colorado Clean Energy Development Authority; New Mexico Renewable Energy Transmission Authority; and Wyoming Infrastructure Authority
Voltage Class: 345 kV AC and 500 kV AC
Project Website: https://www.highplainsexpress.com

Mountain States Transmission Intertie (MSTI) (Townsend-Midpoint 500 kV)

Project Purpose: Provide capacity to relieve congestion from Montana to Idaho and to meet requests for transmission service to move renewable power from Montana to load centers outside Montana.
Estimated In-Service Date: 9/30/2016
Estimated Transfer Capability/Rating (MW): 1,500
Sponsoring Organization(s): Northwestern Energy
Voltage Class: 500k V AC
Project Website: http://www.msti500kv.com/

SWIP North

Project Purpose: Improved system reliability, economic transfers between Northwest and Southwest, and delivery of wind resources (NV, ID, MT, and WY) and geothermal resources (NV and UT).
Estimated In-Service Date: 1/1/2014
Estimated Transfer Capability/Rating (MW): 2,000
Sponsoring Organization(s): Great Basin Transmission, LLC
Voltage Class: 500 kV AC
Project Website: http://www.swipos.com/index.htm

SWIP South

Project Purpose: Improved system reliability, economic transfers between Northwest and Southwest, and delivery of wind resources (NV, ID, MT, and WY) and geothermal resources (NV and UT).
Estimated In-Service Date: 1/1/2014
Estimated Transfer Capability/Rating (MW): 2,000
Sponsoring Organization(s): Great Basin Transmission, LLC
Voltage Class: 500 kV AC
Project Website: http://www.swipos.com/index.htm

TransWest Express Project

Project Purpose: Delivery of cost effective wind energy to Arizona, California and Nevada
Estimated In-Service Date: 1/1/2016
Estimated Transfer Capability/Rating (MW): 3,000
Sponsoring Organization(s): TransWest Express, LLC
Voltage Class: 500kV DC
Project Website: https://transwestexpress.net/

Zephyr

Project Purpose: Facilitate movement of renewable energy between Wyoming and the Southwest US
Estimated In-Service Date: 12/31/2018
Estimated Transfer Capability/Rating (MW): 3,000
Sponsoring Organization(s): TransCanada
Voltage Class: 500kV DC
Project Website: http://www.transcanada.com/company/zephyr_chinook.html

Appendix 4

Null Case Data

Pending summission

Appendix 5

Area to Area Interchange Diagrams

List of Figures

Bubble Diagrams
for
6000MW in Wyoming
JUL27H16

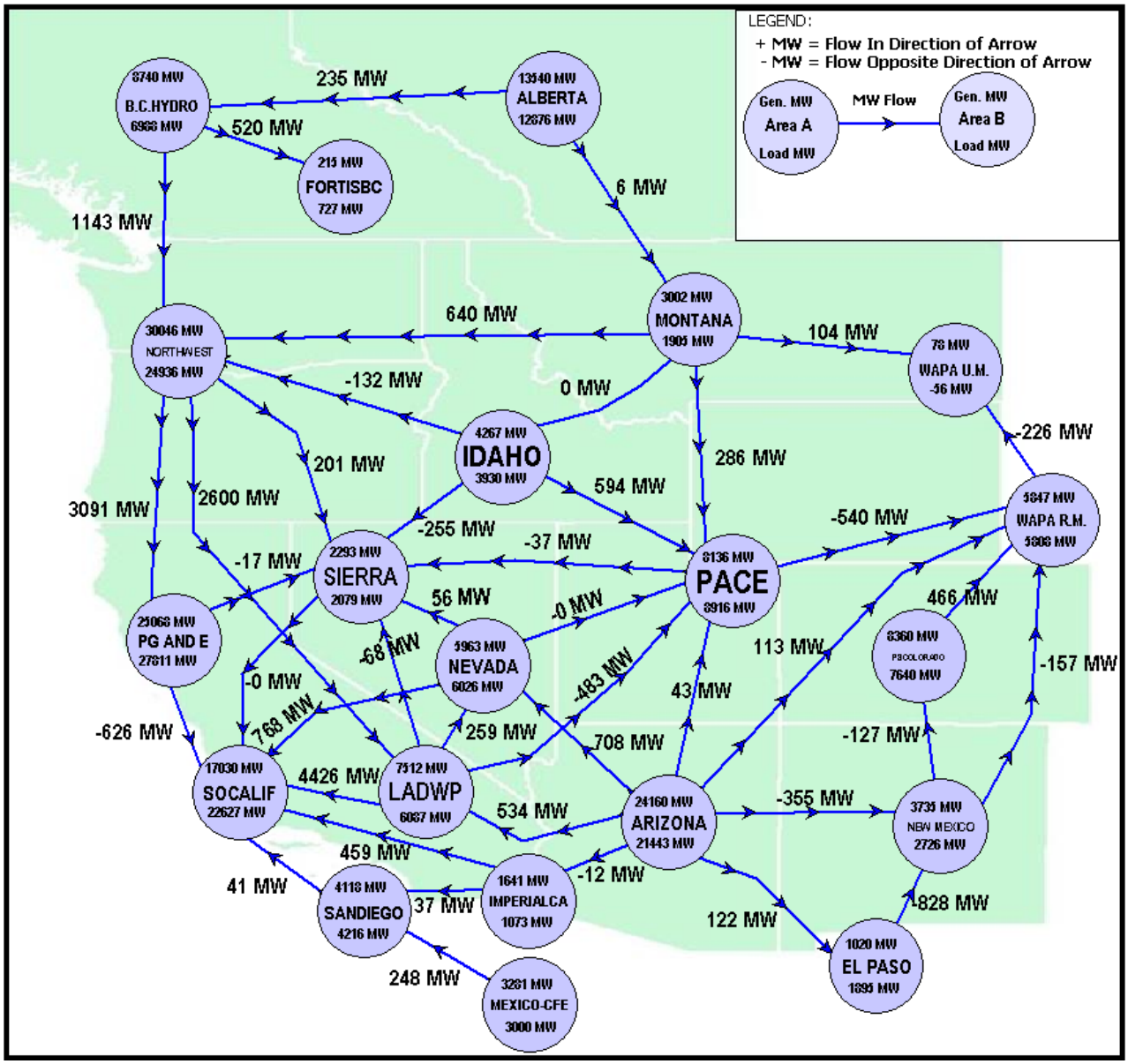

Figure 1 – Core Case JUL 27 Hour 16

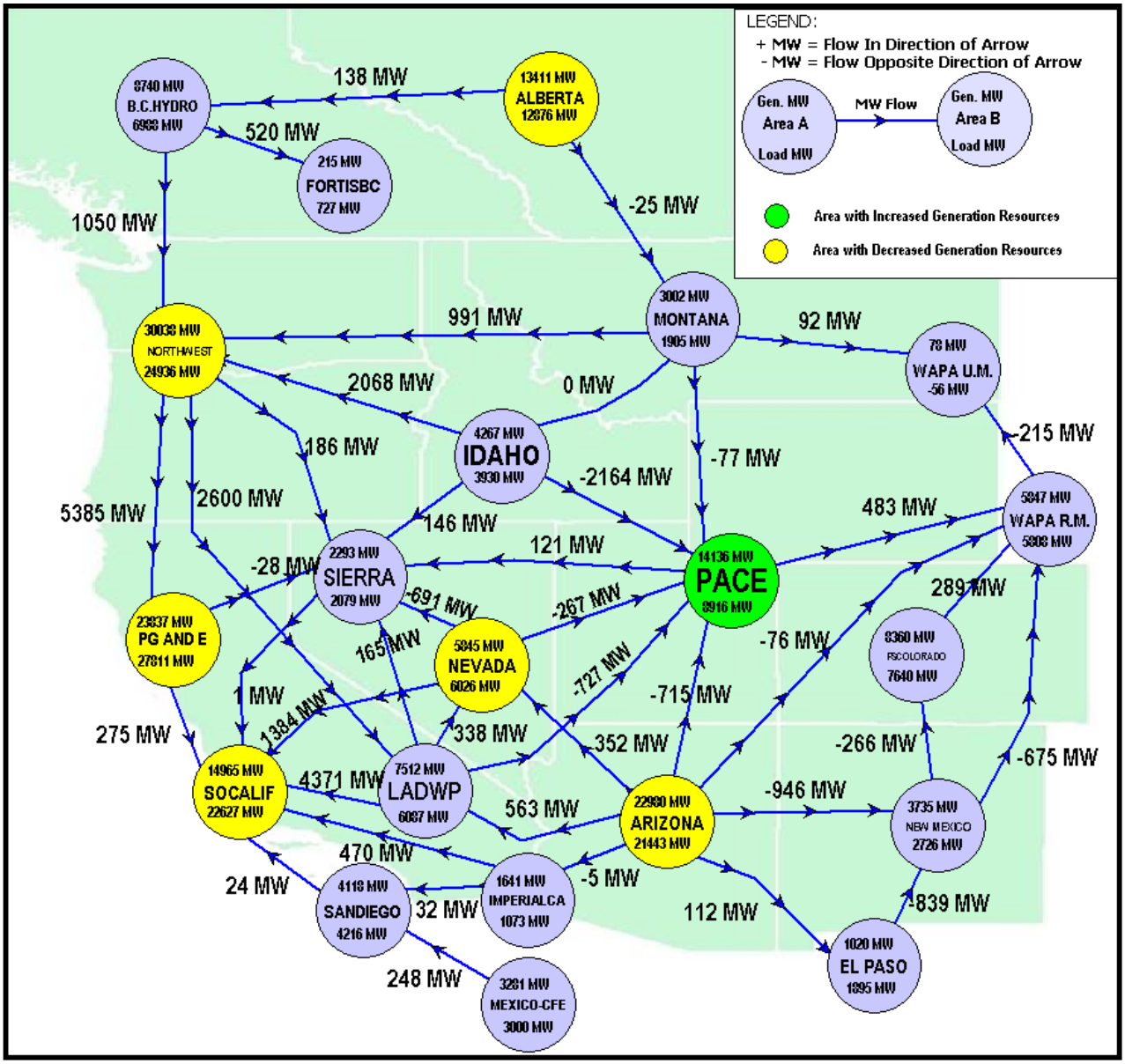
LEGEND:
+ MW = Flow In Direction of Arrow
- MW = Flow Opposite Direction of Arrow
Gen. MW Area A Load MW
MW Flow
Gen. MW Area B Load MW
Area with Increased Generation Resources
Area with Decreased Generation Resources
8740 MW B.C.HYDRO 6998 MW
13411 MW ALBERTA 12876 MW
215 MW FORTISBC 727 MW
3002 MW MONTANA 1905 MW
30038 MW NORTHWEST 24936 MW
78 MW WAPA U.M. -56 MW
4267 MW IDAHO 3930 MW
5847 MW WAPA R.M. 5808 MW
2293 MW SIERRA 2079 MW
14136 MW PACE 8916 MW
23837 MW PG AND E 27811 MW
5845 MW NEVADA 6026 MW
8360 MW PSCOLORADO 7640 MW
14965 MW SOCALIF 22627 MW
7512 MW LADWP 6087 MW
22980 MW ARIZONA 21443 MW
3735 MW NEW MEXICO 2726 MW
4118 MW SANDIEGO 4216 MW
1641 MW IMPERIALCA 1073 MW
1020 MW EL PASO 1895 MW
3281 MW MEXICO-CFE 3000 MW
138 MW
520 MW
1050 MW
-25 MW
991 MW
92 MW
2068 MW
0 MW
186 MW
-77 MW
-215 MW
5385 MW
2600 MW
-2164 MW
483 MW
146 MW
121 MW
-28 MW
-691 MW
-267 MW
289 MW
165 MW
-76 MW
1 MW
1384 MW
-727 MW
-715 MW
275 MW
338 MW
352 MW
-266 MW
-675 MW
4371 MW
563 MW
-946 MW
470 MW
24 MW
32 MW
-5 MW
112 MW
-839 MW
248 MW

Figure 2 – 6000MW Wyoming: JUL 27 Hour 16 (Pre-Transmission Improvements)

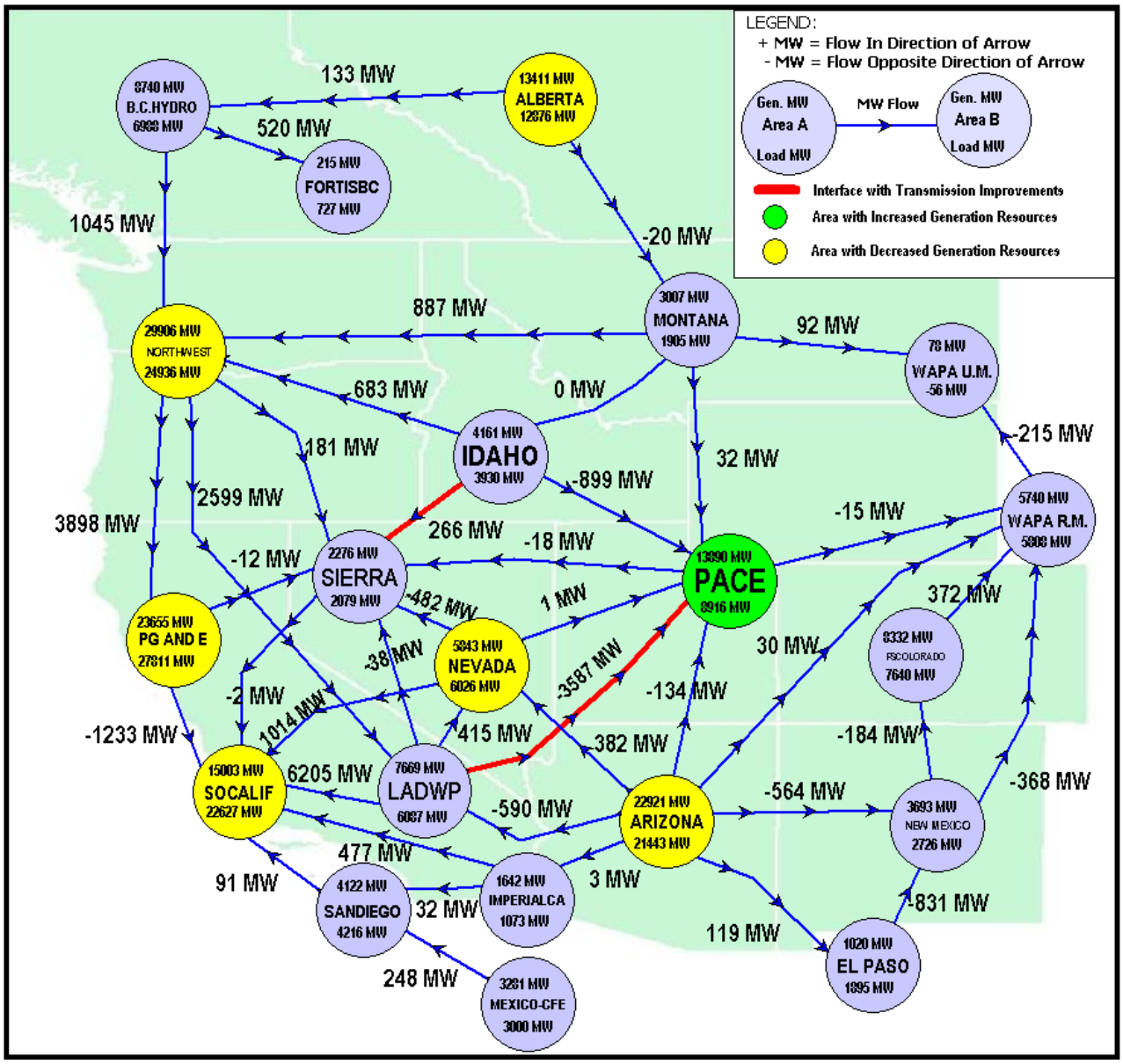

Figure 3 – 6000MW Wyoming: JUL 27 Hour 16 (Post-Transmission Improvements)

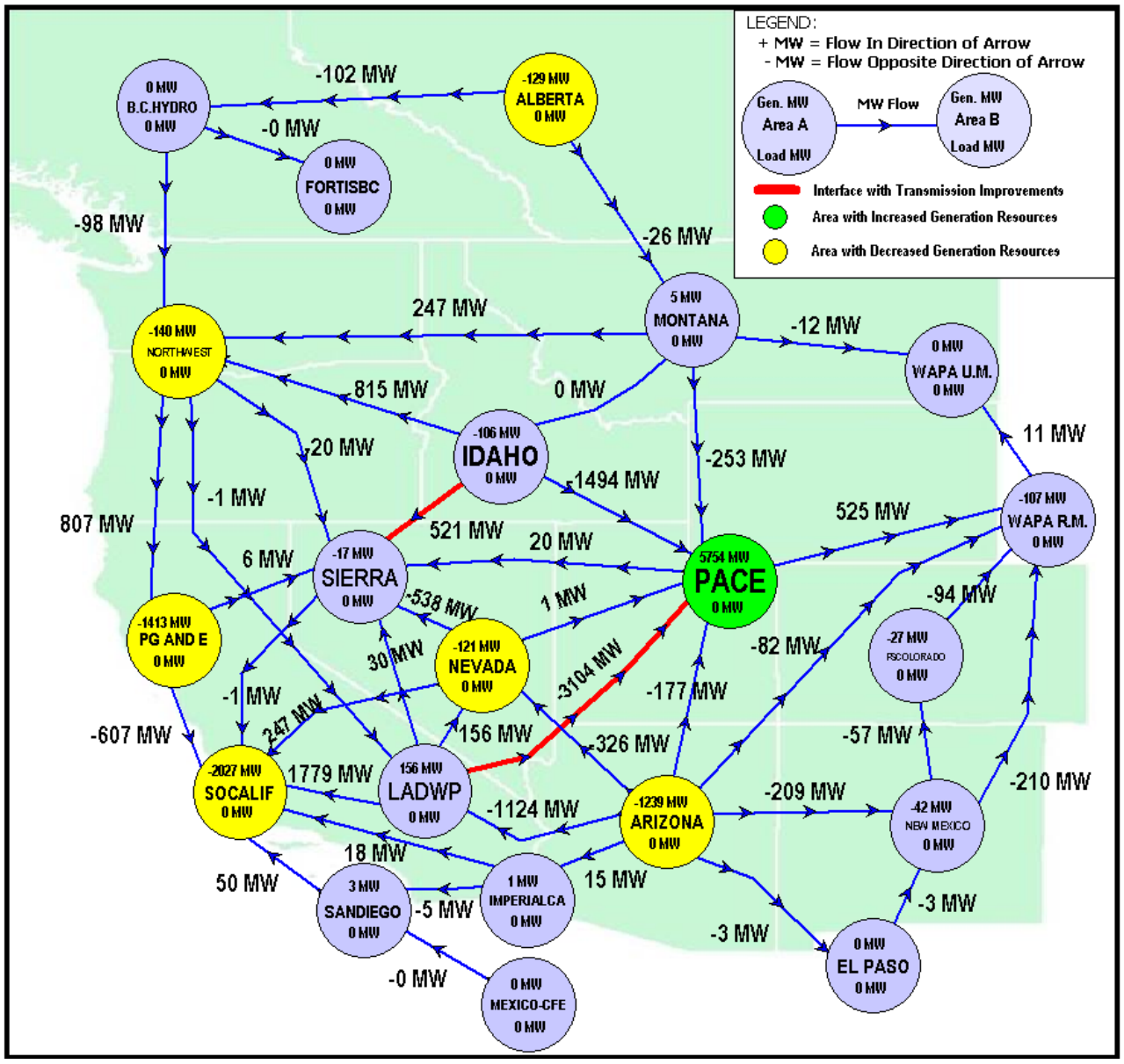

Figure 4 – Difference Flow 6000MW Wyoming: JUL 27 Hour 16 (Core Case vs. Post-Imp)

Bubble Diagrams

for

6000MW in Wyoming

DEC22H18

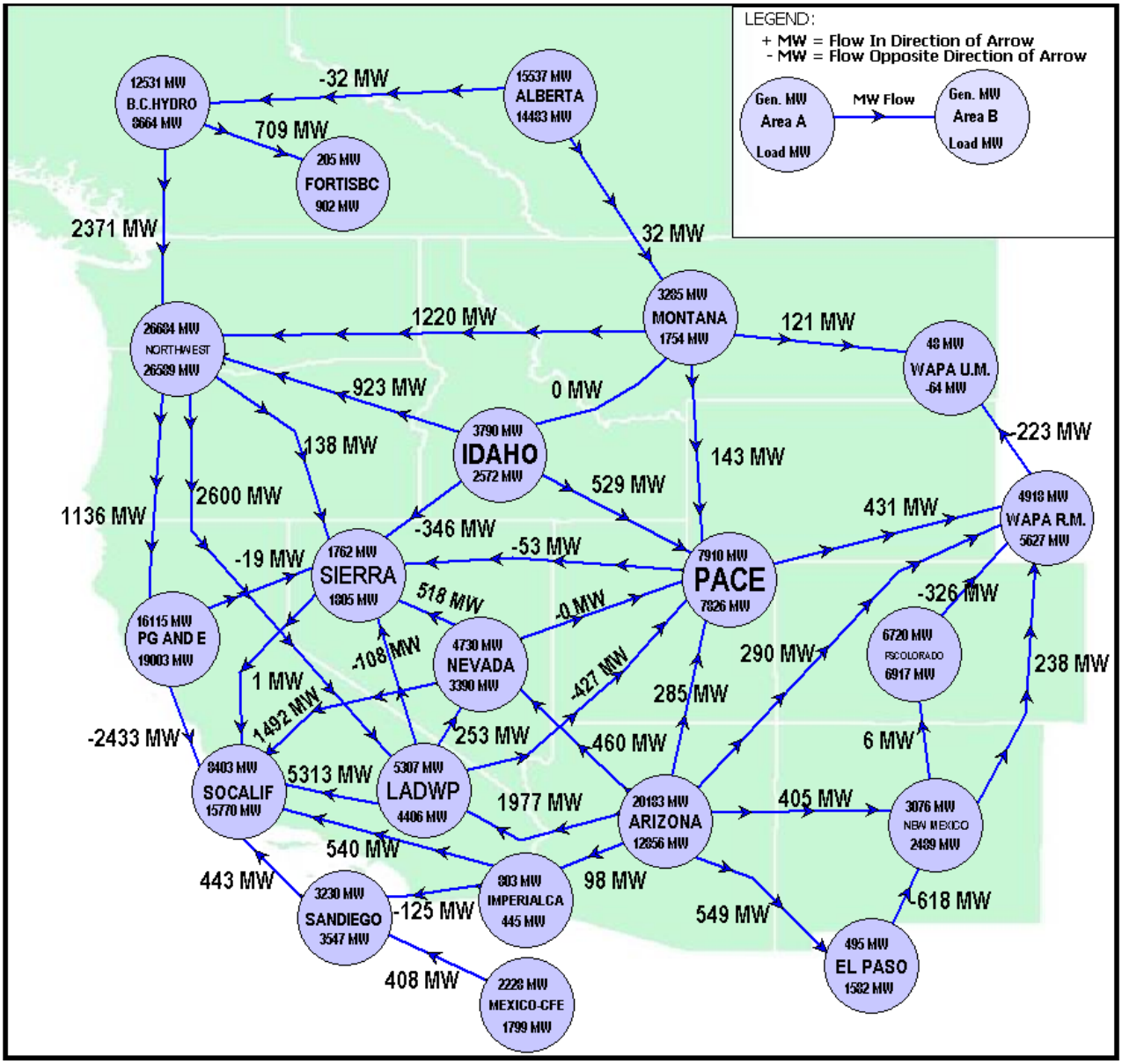

Figure 5 – Core Case DEC 22 Hour 18

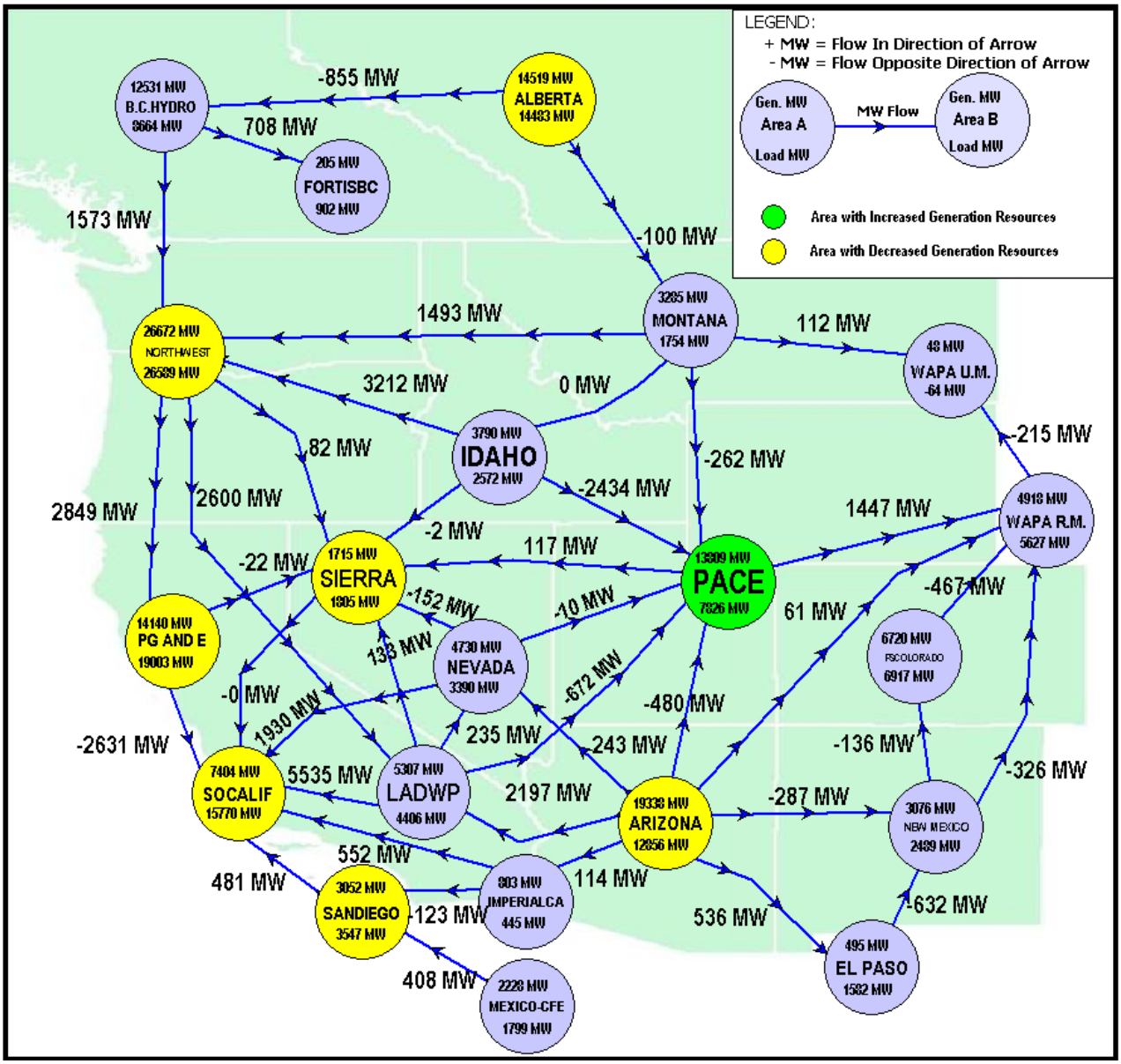

Figure 6 – 6000MW Wyoming: DEC 22 Hour 18 (Pre-Transmission Improvements)

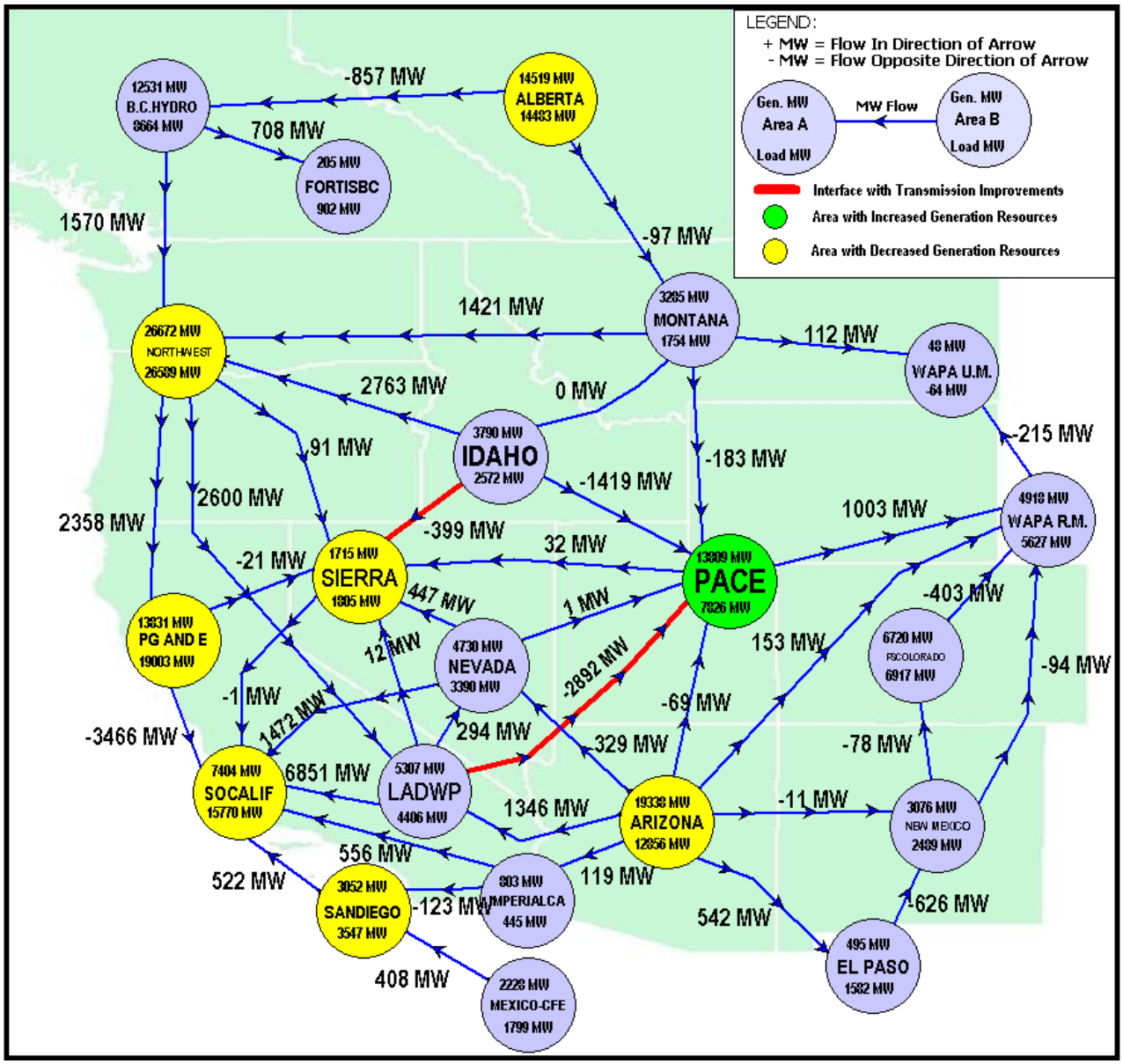

Figure 7 – 6000MW Wyoming: DEC 22 Hour 18 (Post-Transmission Improvements)

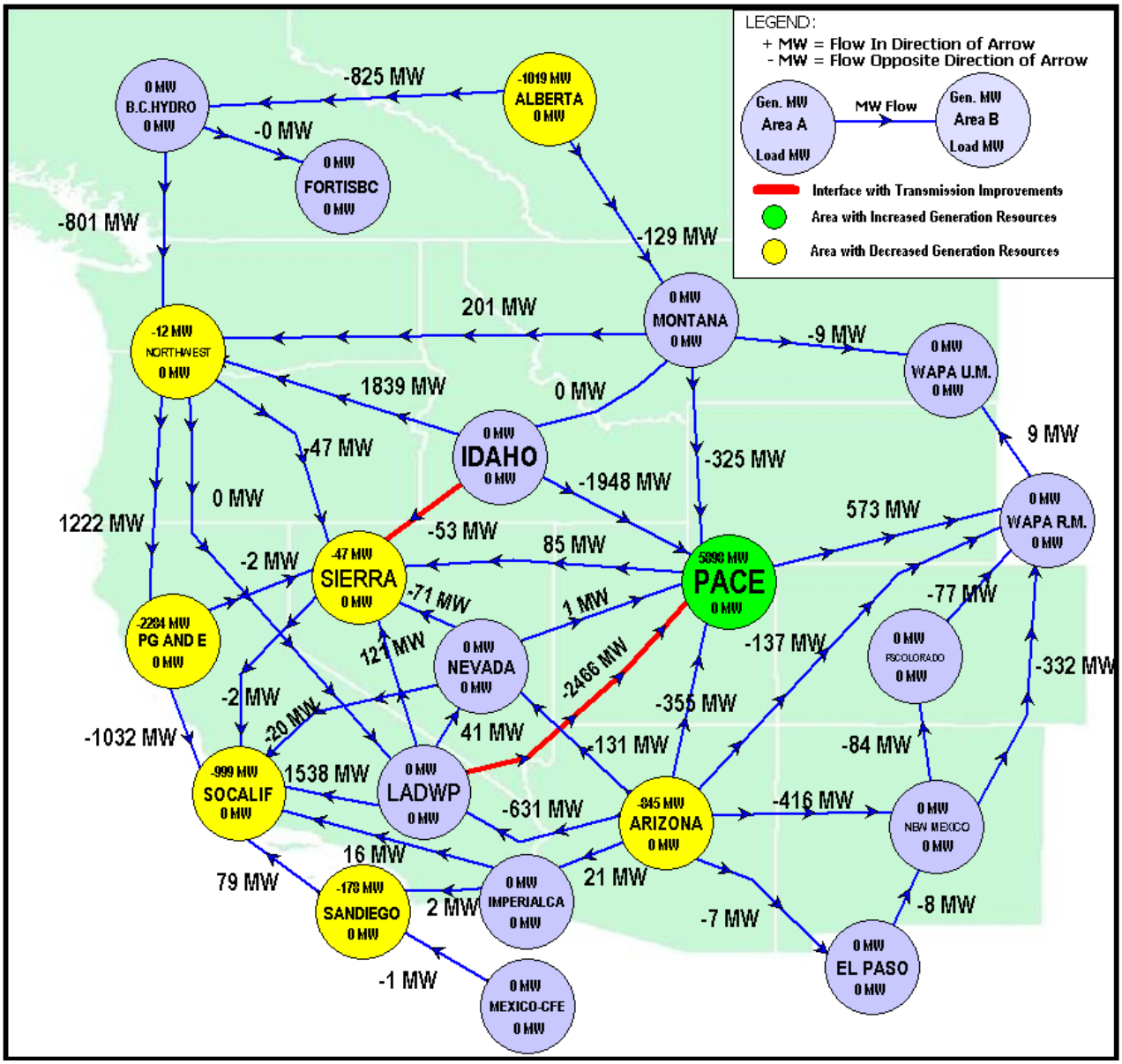

Figure 8 – Difference Flow 6000MW Wyoming: DEC 22 Hour 18 (Core Case vs. Post-Imp)

Bubble Diagrams
for
6000MW in Wyoming
MAR02H21

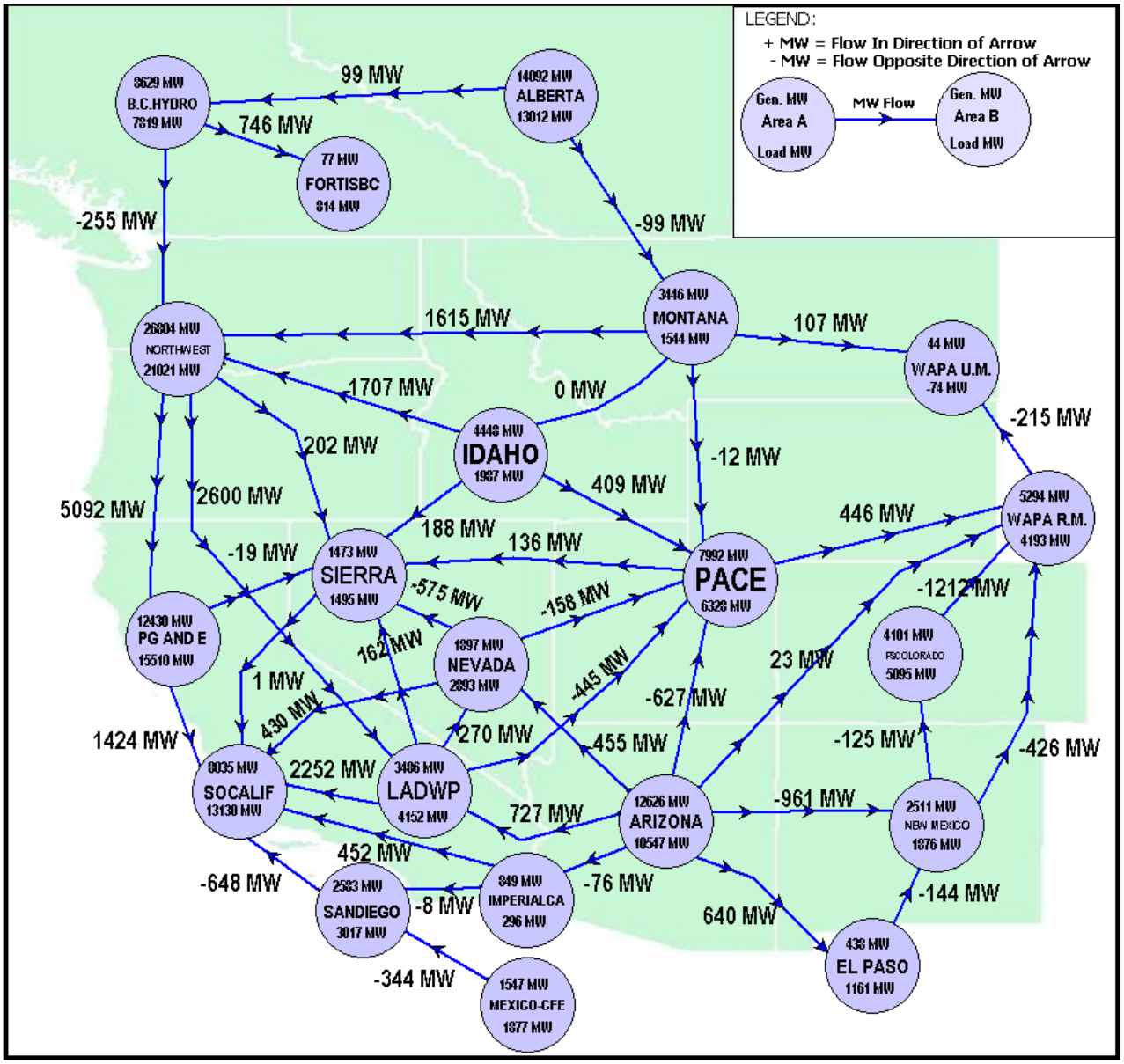

Figure 9 – Core Case MAR 02 Hour 21

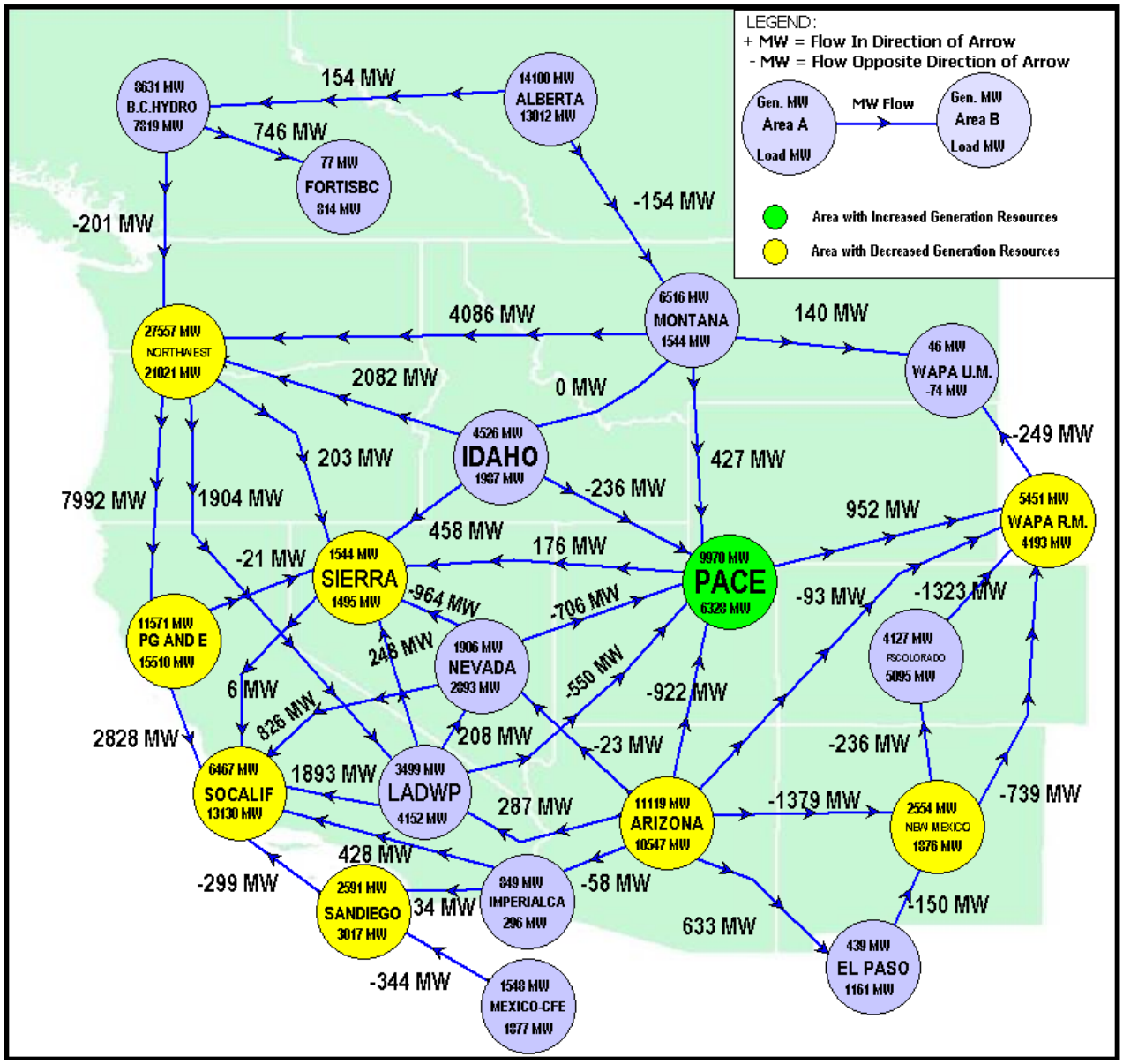

Figure 10 – 6000MW Wyoming: MAR 02 Hour 21 (Pre-Transmission Improvements)

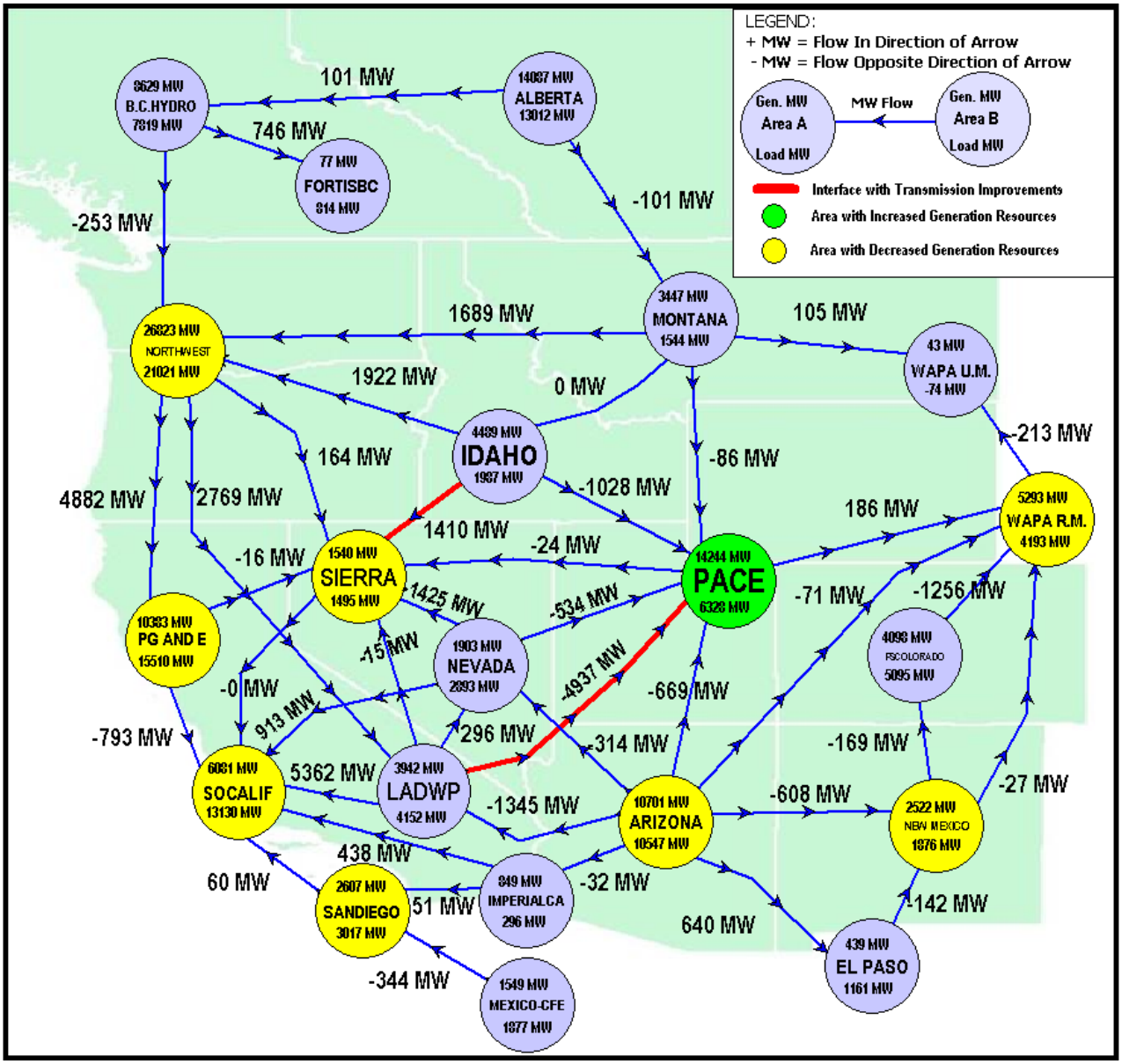

Figure 11 – 6000MW Wyoming: MAR 02 Hour 21 (Post-Trans Imp AC Solution Option)

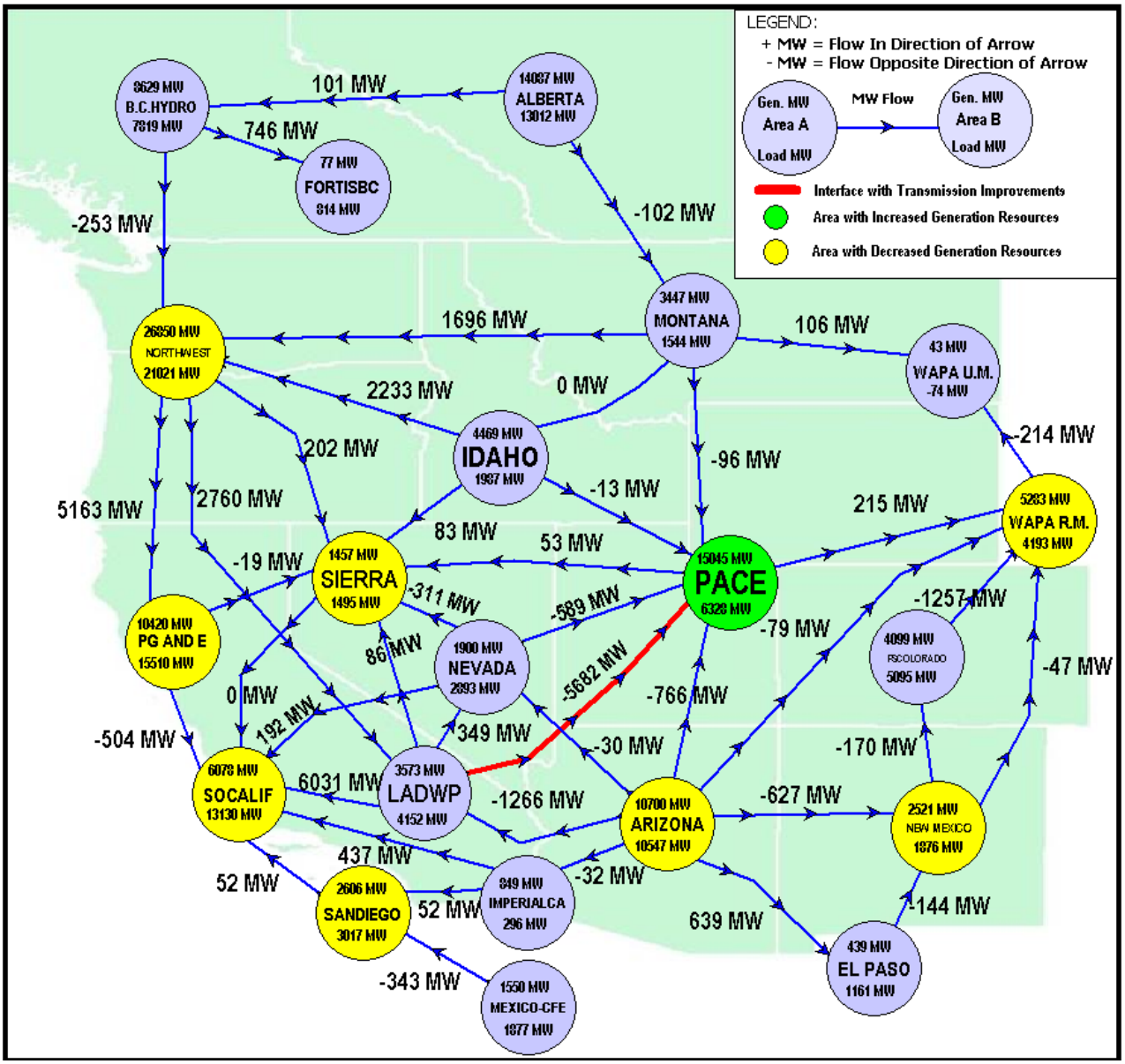

Figure 12 – 6000MW Wyoming: MAR 02 Hour 21 (Post-Trans Imp DC Solution Option)

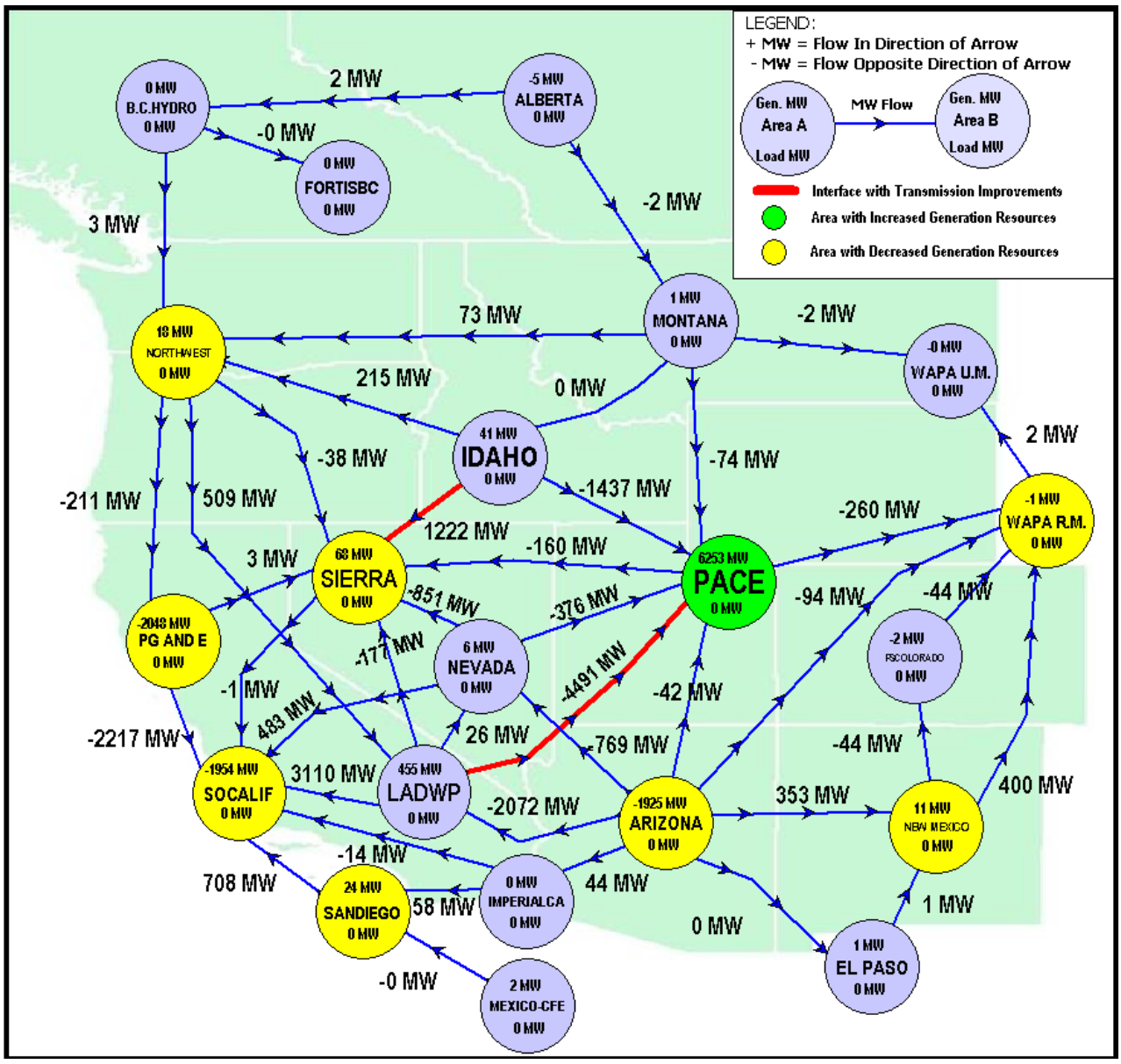

Figure 13 – Difference Flow 6000MW Wyoming: MAR 02 Hour 21 (Core Case vs. Post-Imp AC Solution)

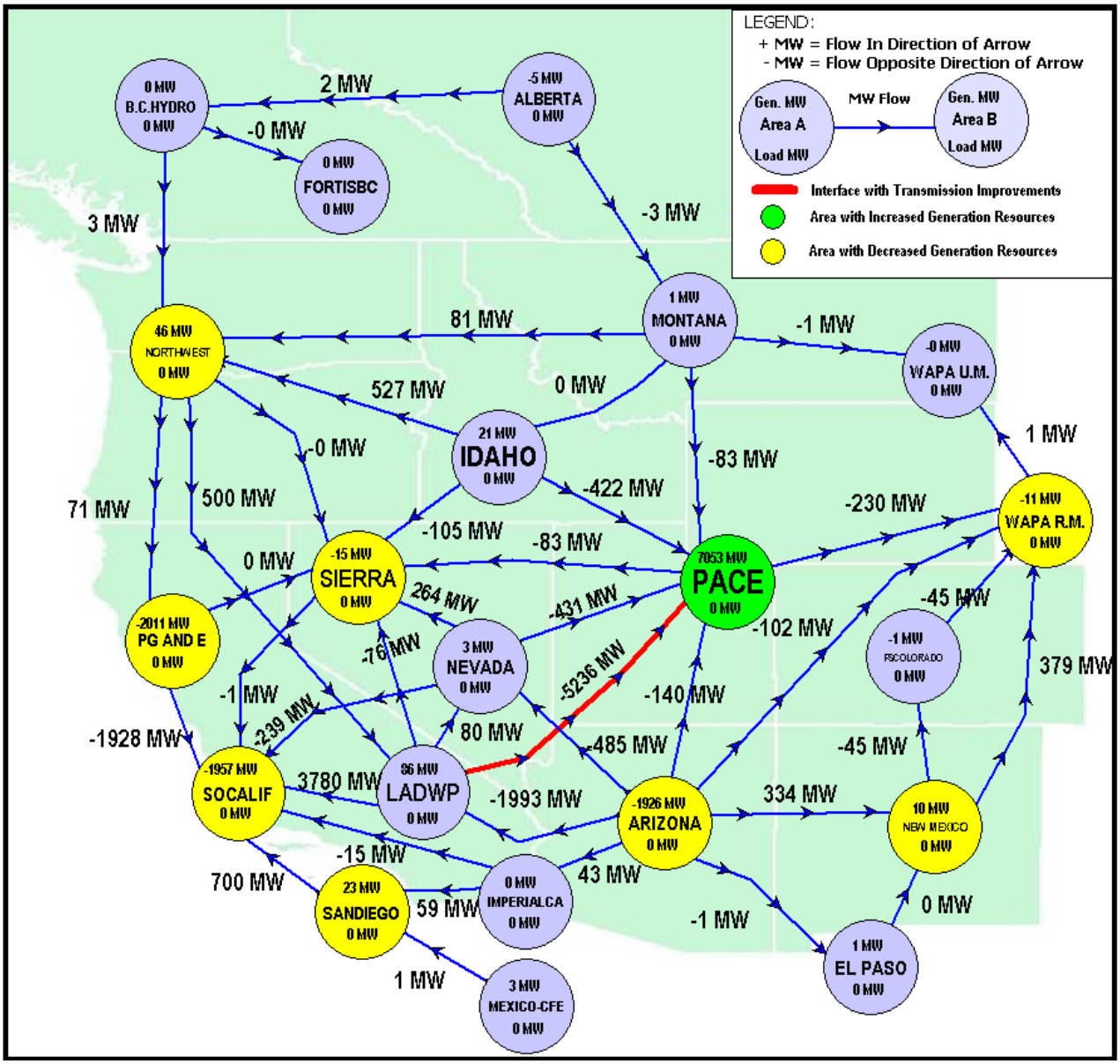

Figure 14 – Difference Flow 6000MW Wyoming: MAR 02 Hour 21 (Core Case vs. Post-Imp DC Solution)

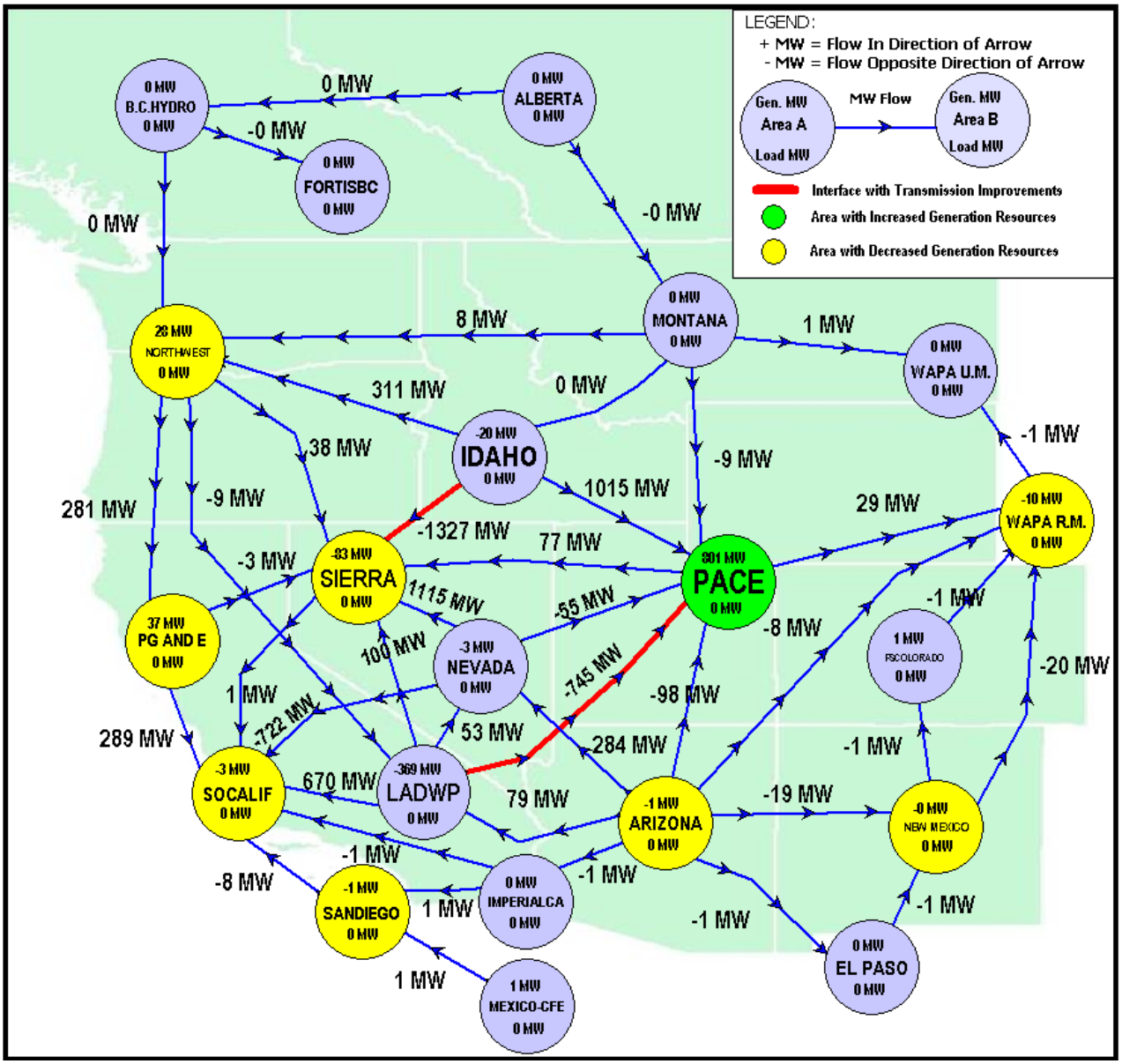

Figure 15 – Difference Flow 6000MW Wyoming: MAR 02 Hour 21 (AC Solution vs. DC Solution)

Bubble Diagrams

for

6000MW in Wyoming

OCT04H21

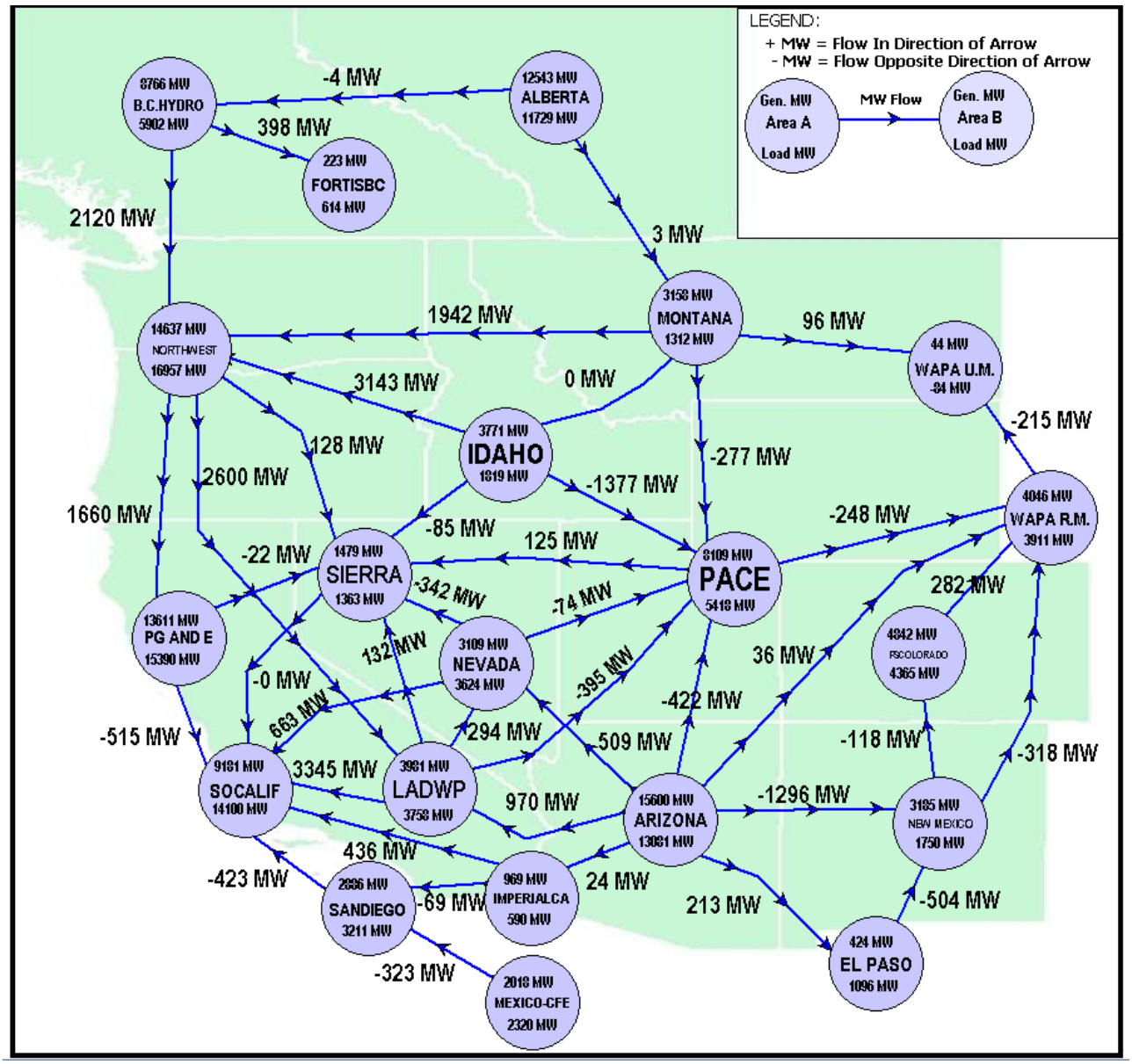

Figure 16 – Core Case: OCT 04 Hour 21

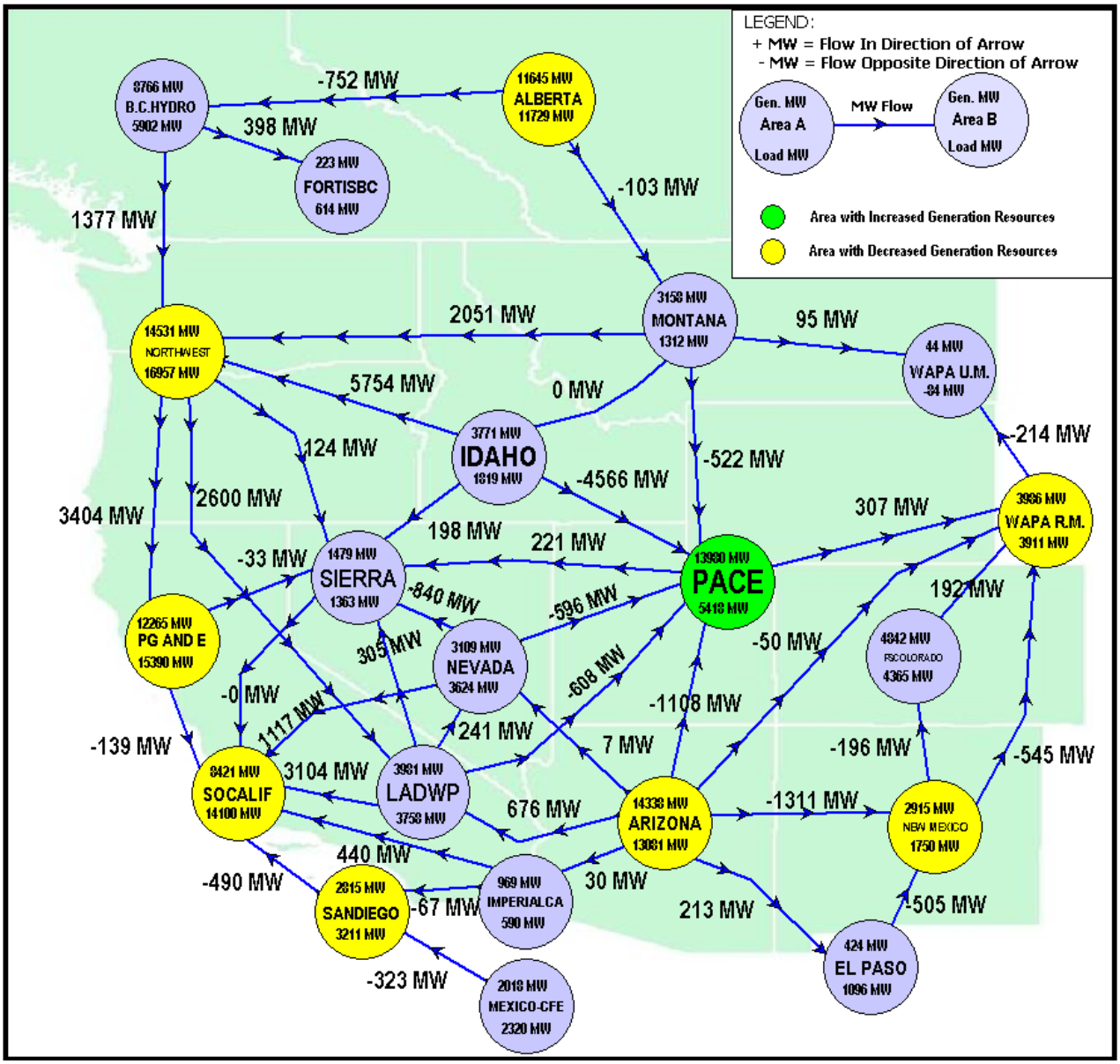

Figure 17 – 6000MW Wyoming: OCT 04 Hour 21 (Pre-Transmission Improvements)

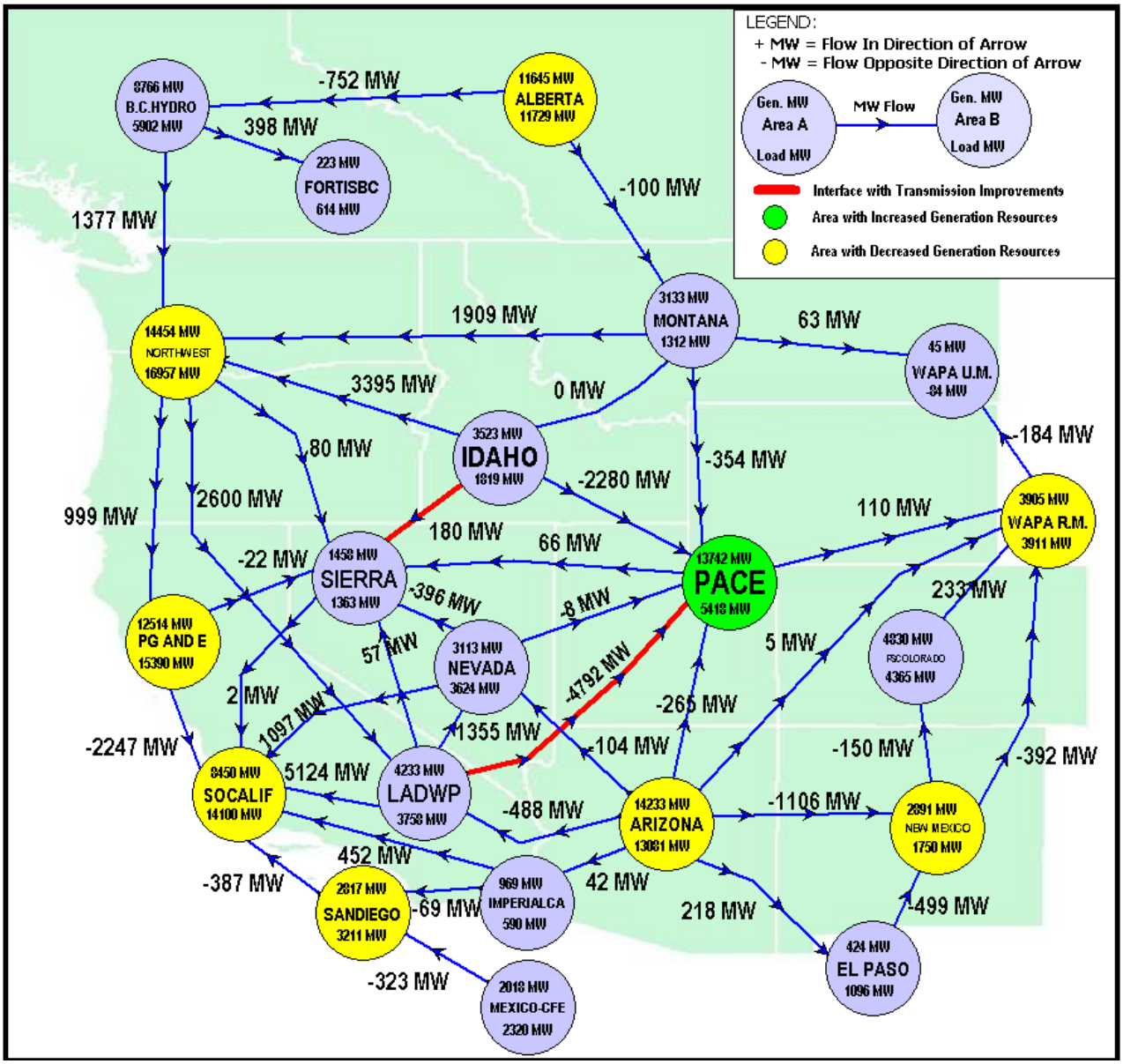

Figure 18 – 6000MW Wyoming: OCT 04 Hour 21 (Post-Transmission Improvements)

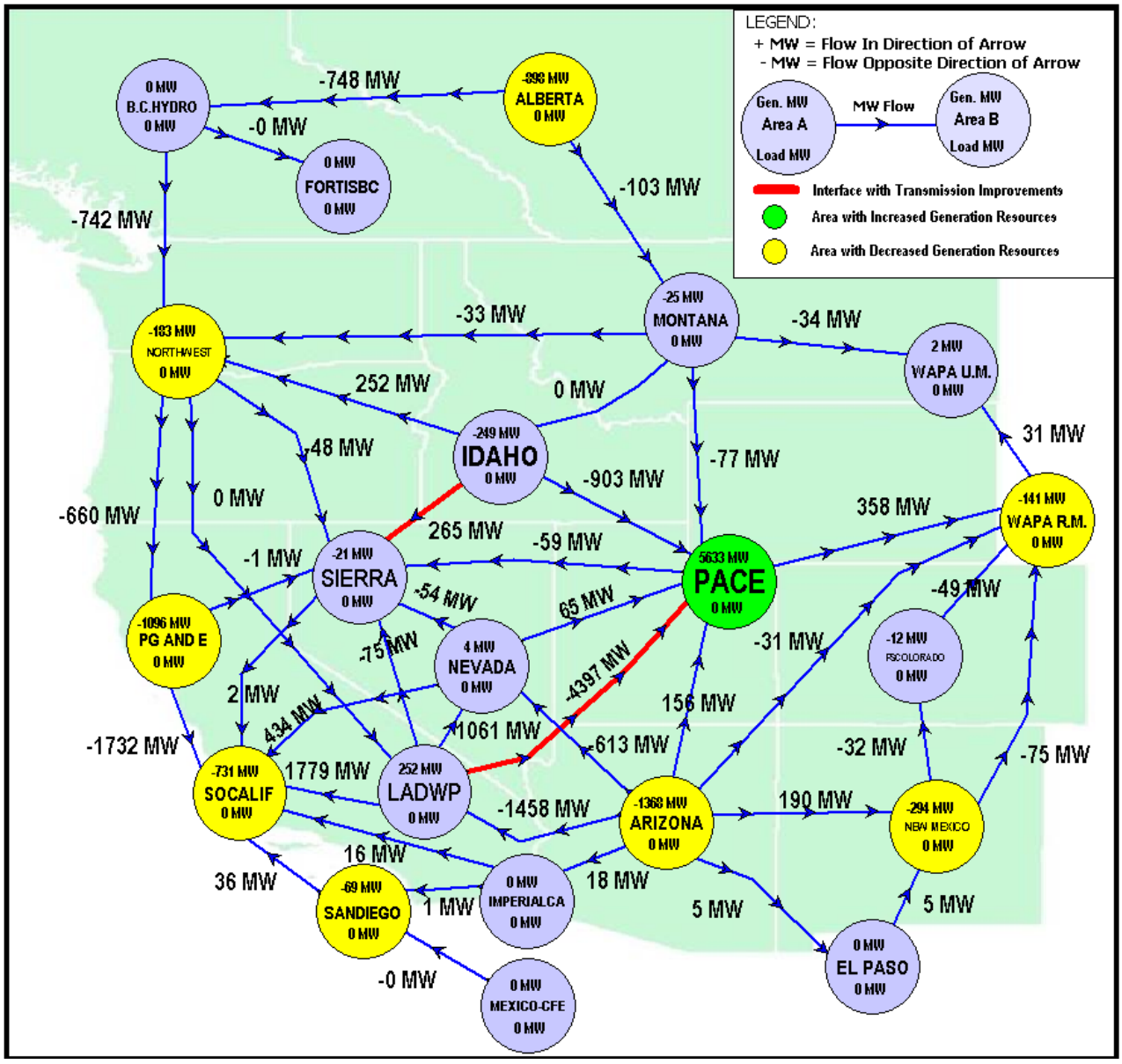

Figure 19 – Difference Flow 6000MW Wyoming: OCT 04 Hour 21 (Core Case vs. Post-Imp)

Bubble Diagrams

for

6000MW in Wyoming

AUG10H13

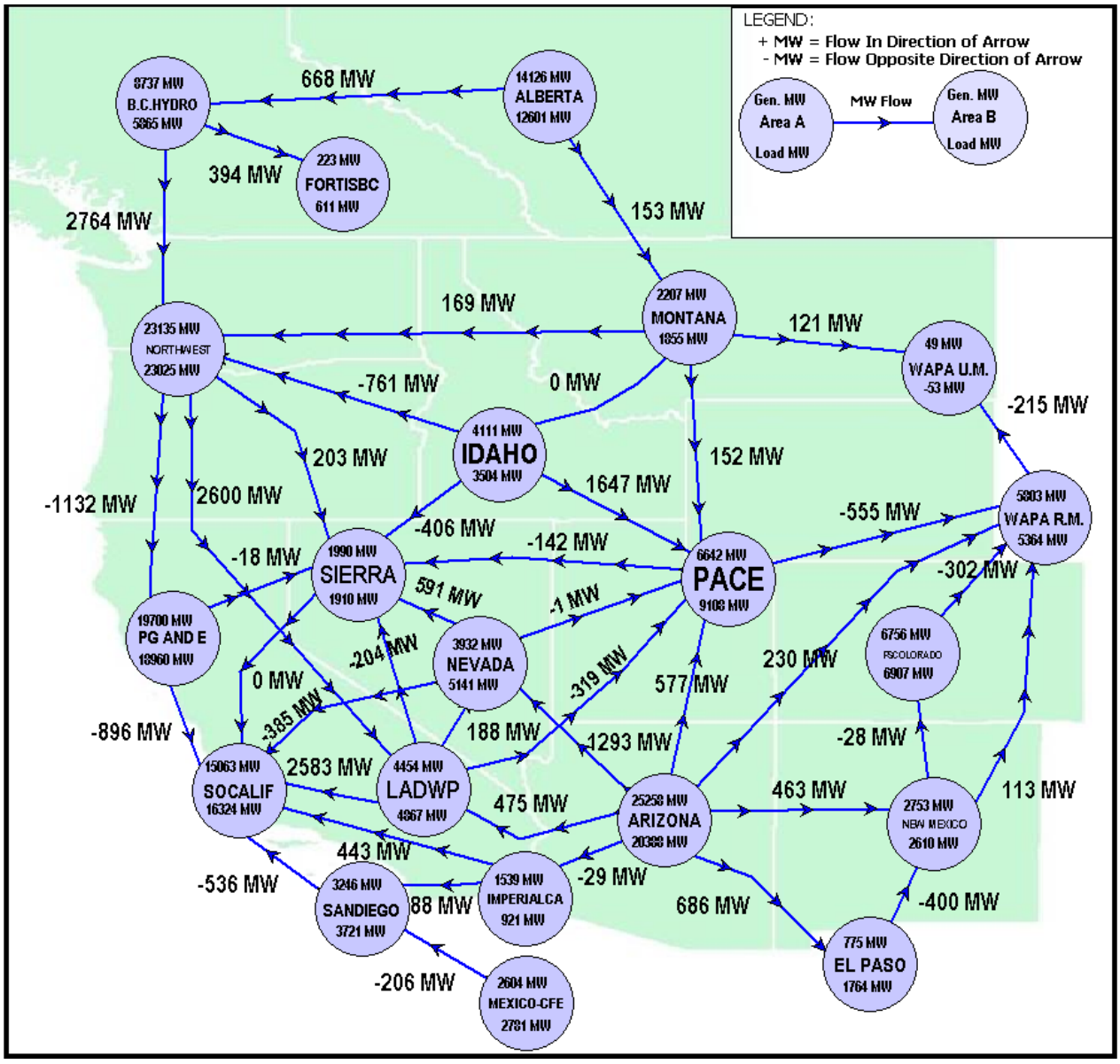

Figure 20 – Core Case: AUG 10 Hour 13

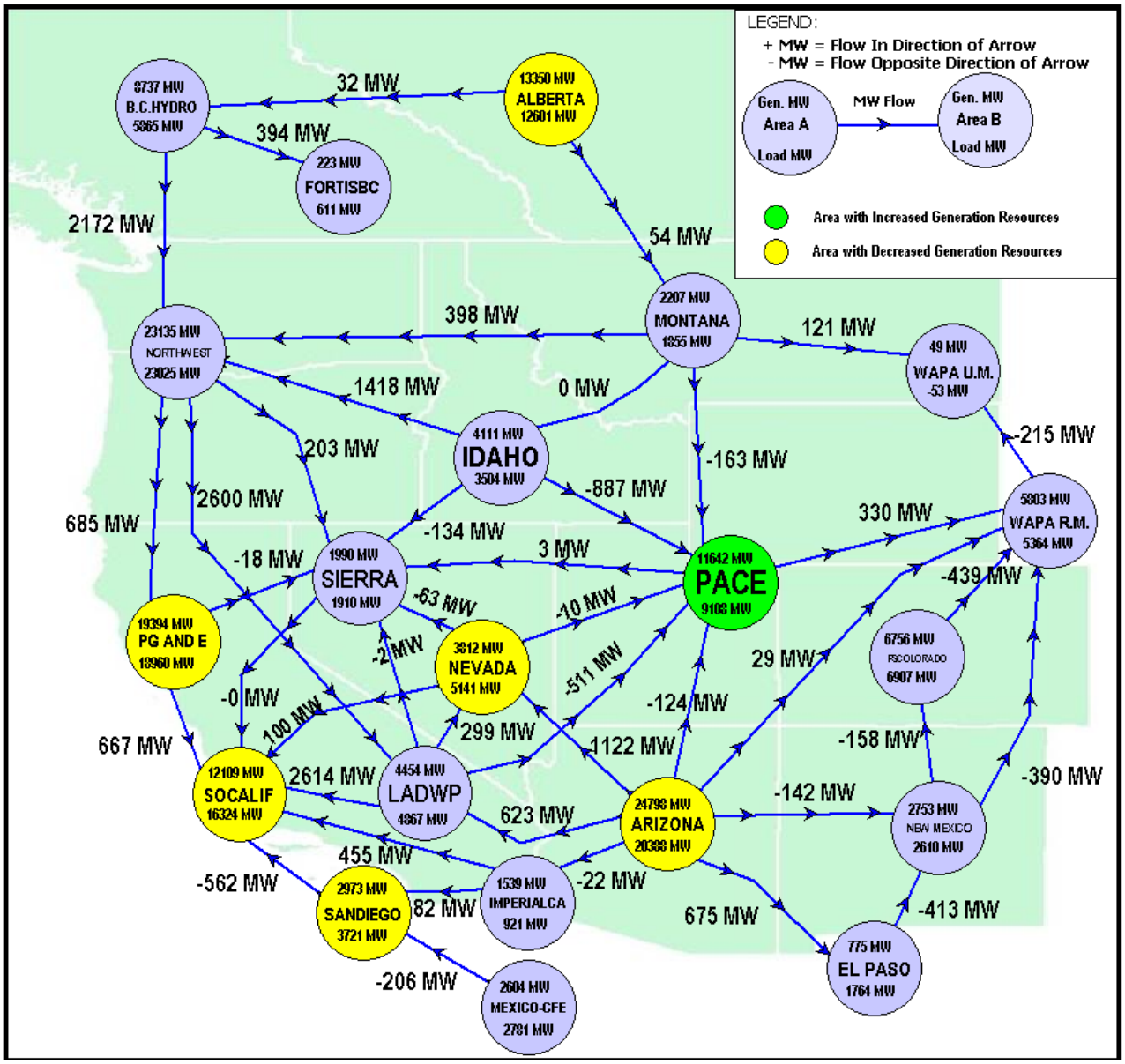

Figure 21 – 6000MW Wyoming: AUG 10 Hour 13 (Pre-Transmission Improvements)

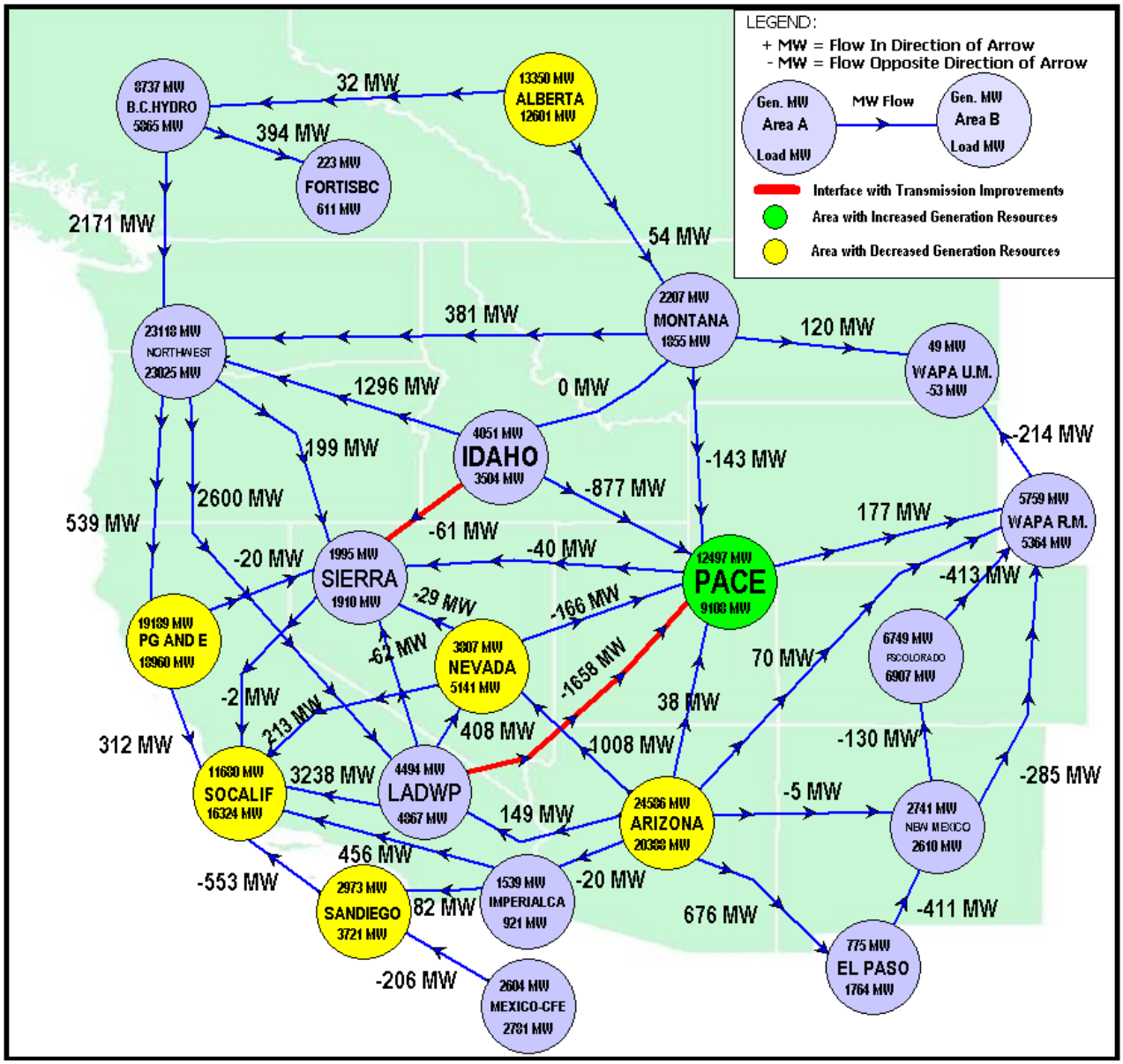

Figure 22 – 6000MW Wyoming: AUG 10 Hour 13 (Post-Transmission Improvements)

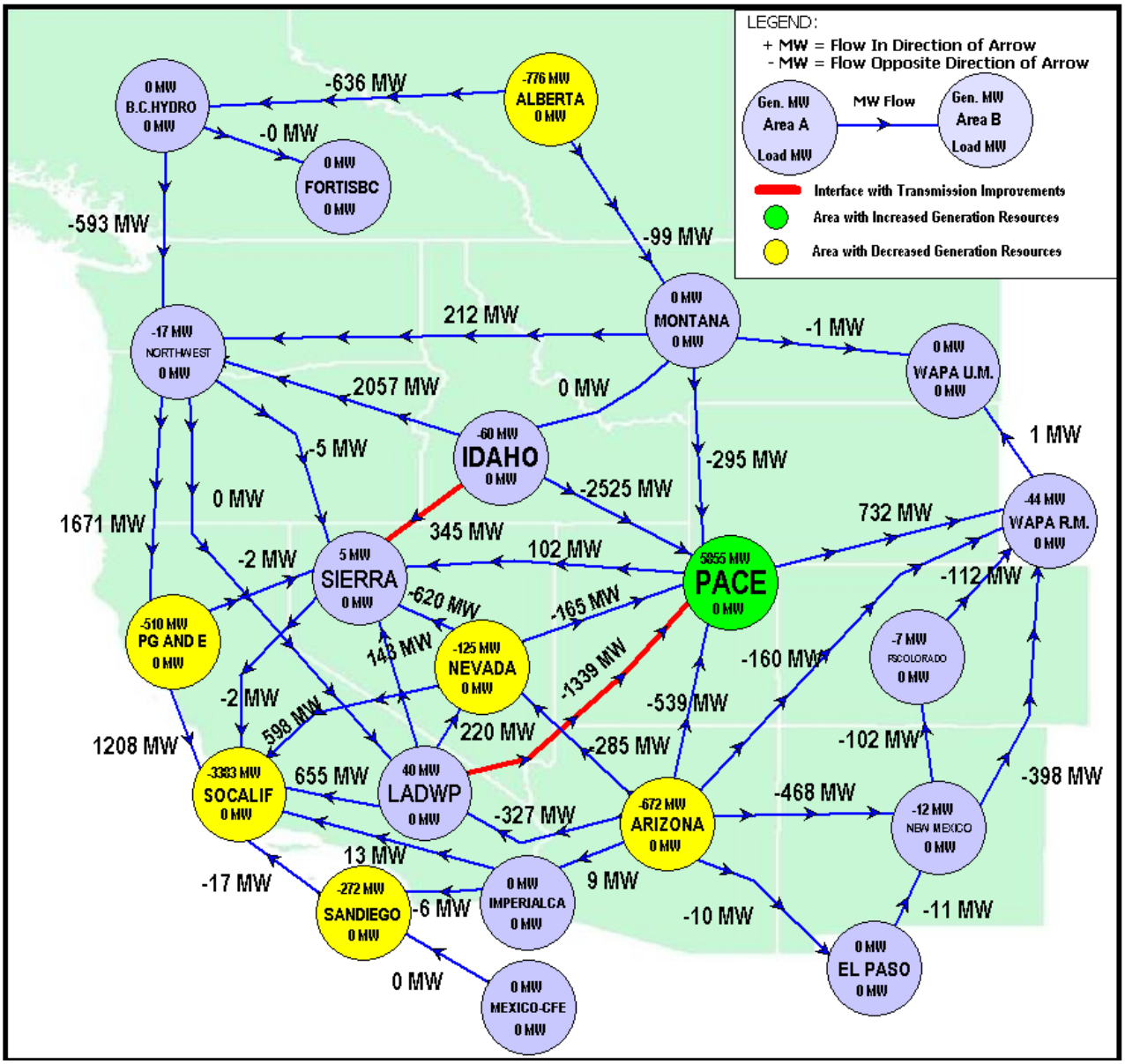

Figure 23 – Difference Flow 6000MW Wyoming: AUG 10 Hour 13 (Core Case vs. Post-Imp)

Bubble Diagrams
for
3000MW in Wyoming
3000MW in Montana
JUL27H16

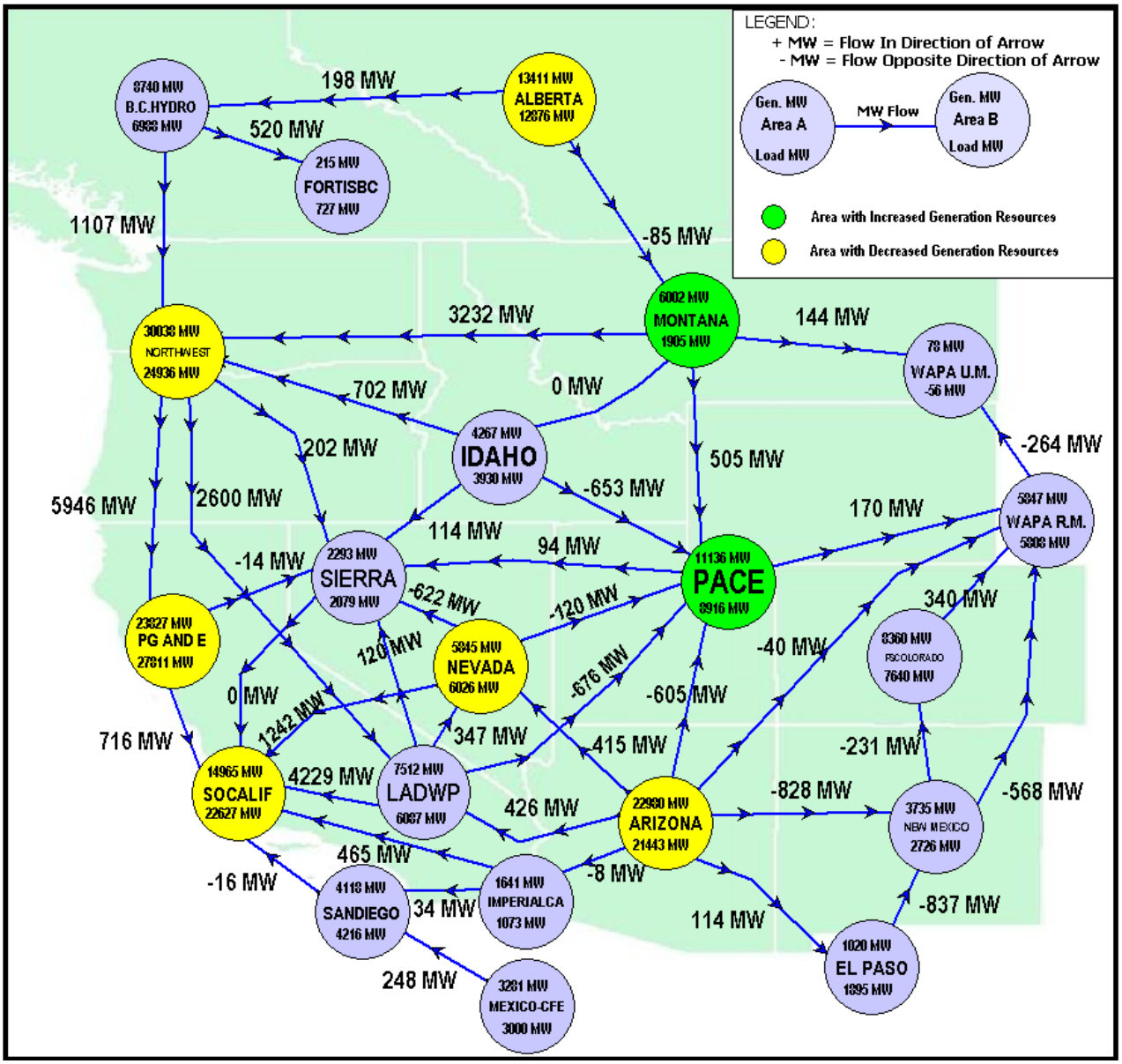

Figure 24 – 3000MW WY, 3000MW MT: JUL 27 Hour 16 (Pre-Transmission Improvements)

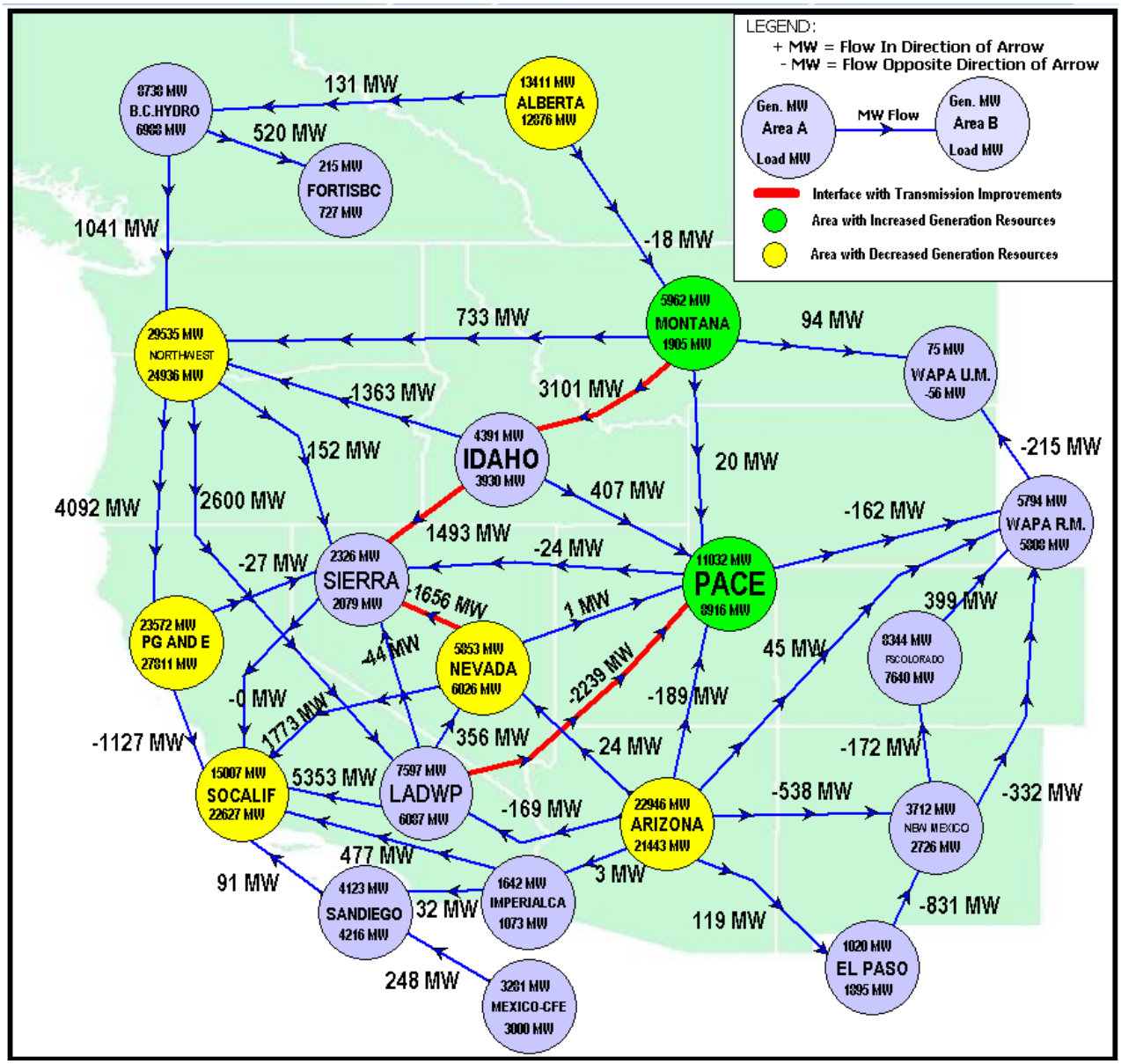

Figure 25 – 3000MW WY, 3000MW MT: JUL 27 Hour 16 (Post-Transmission Improvements)

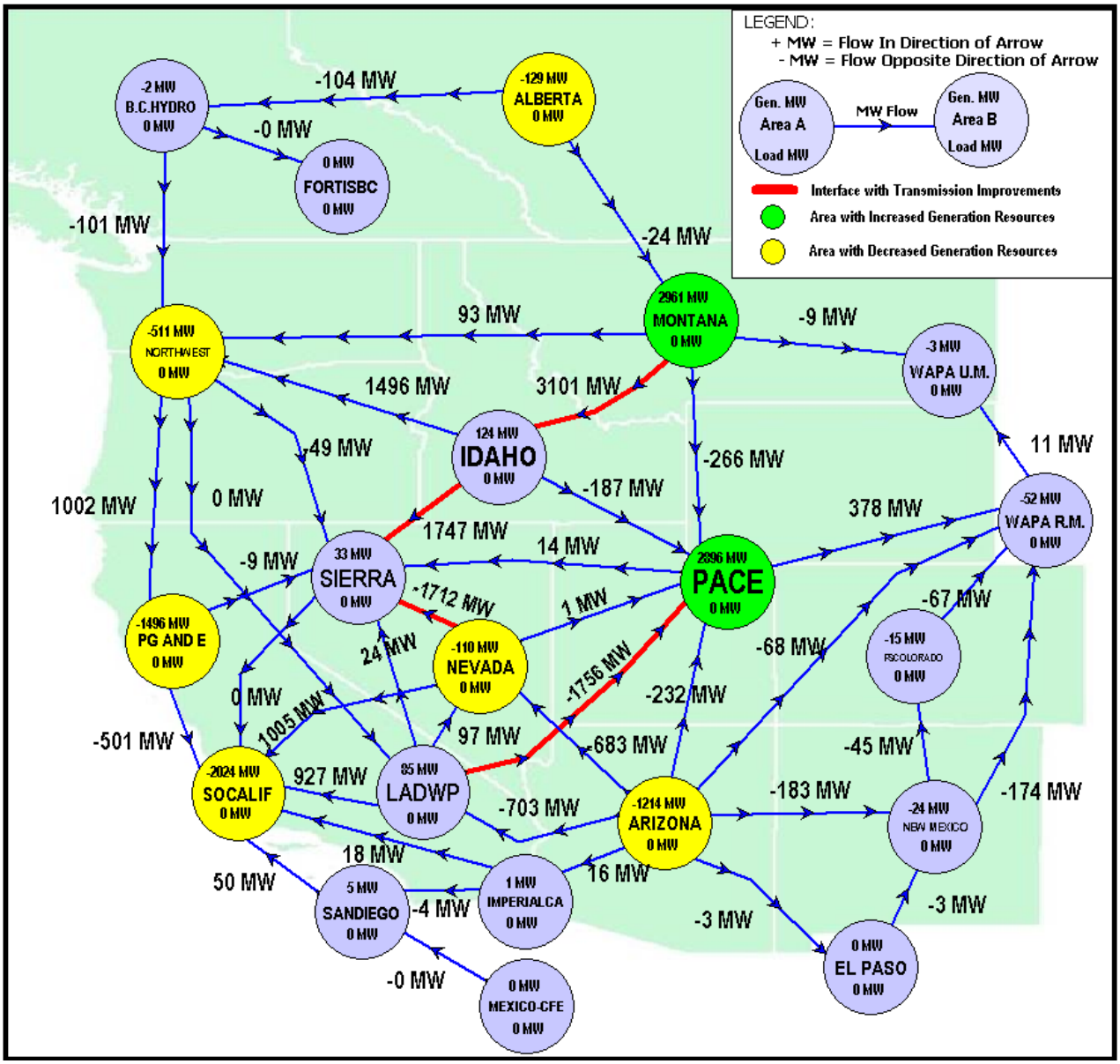

Figure 26 – Difference Flow 3000MW WY, 3000MW MT: JUL 27 Hour 16 (Core Case vs. Post-Imp)

Bubble Diagrams

for

3000MW in Wyoming

3000MW in Montana

DEC22H18

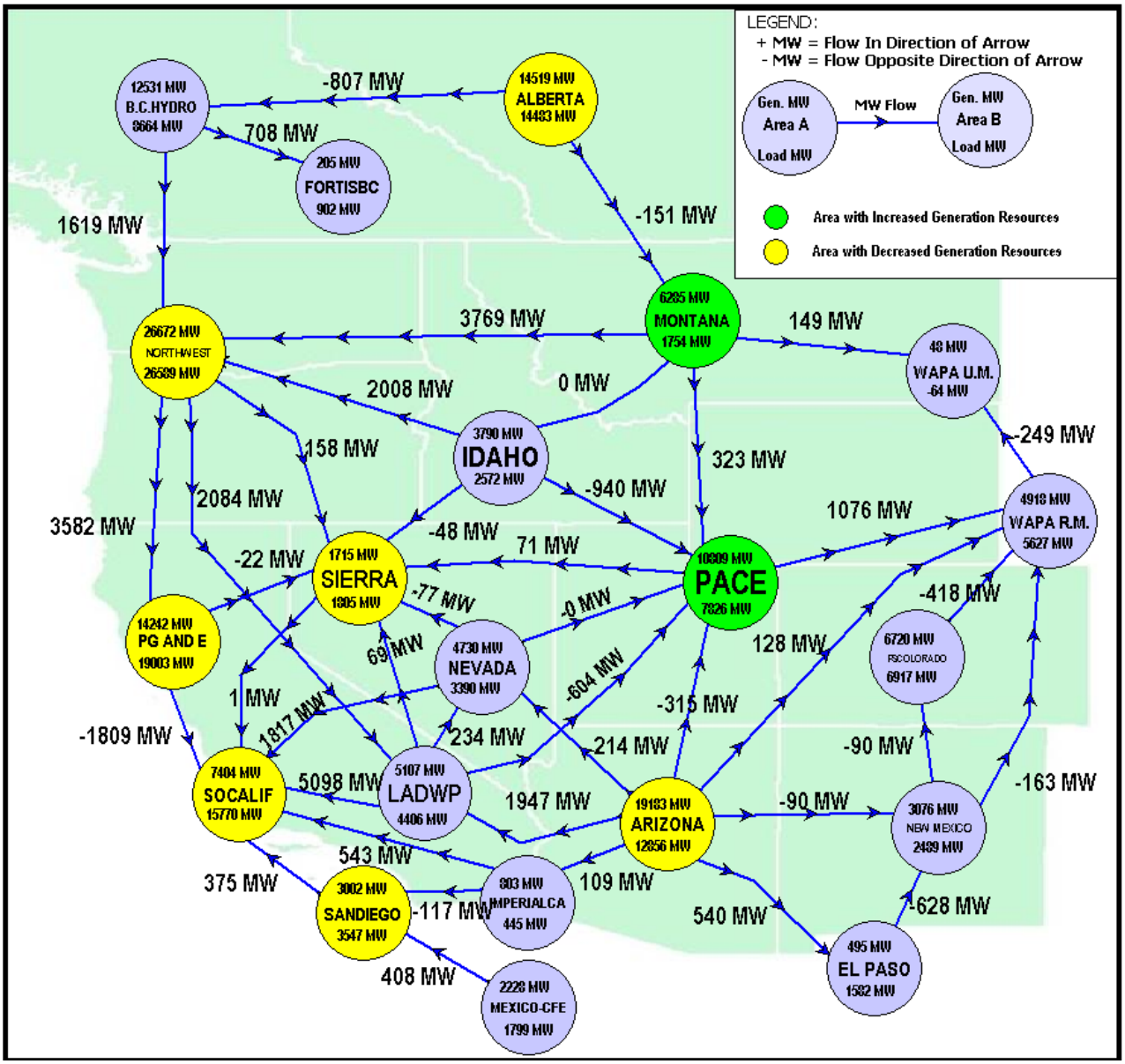

Figure 27 – 3000MW WY, 3000MW MT: DEC 22 Hour 18 (Pre-Transmission Improvements)

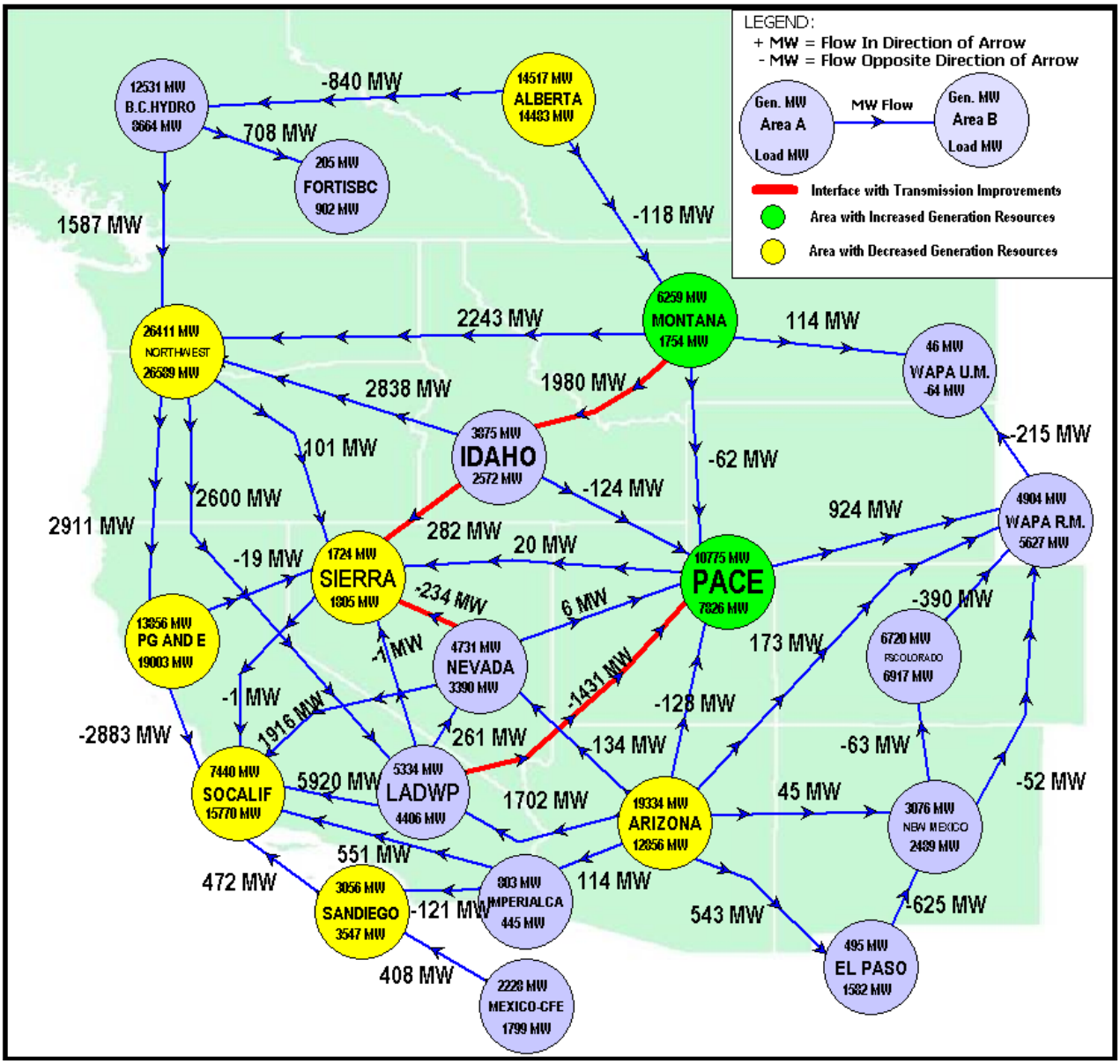

Figure 28 – 3000MW WY, 3000MW MT: DEC 22 Hour 18 (Post-Transmission Improvements)

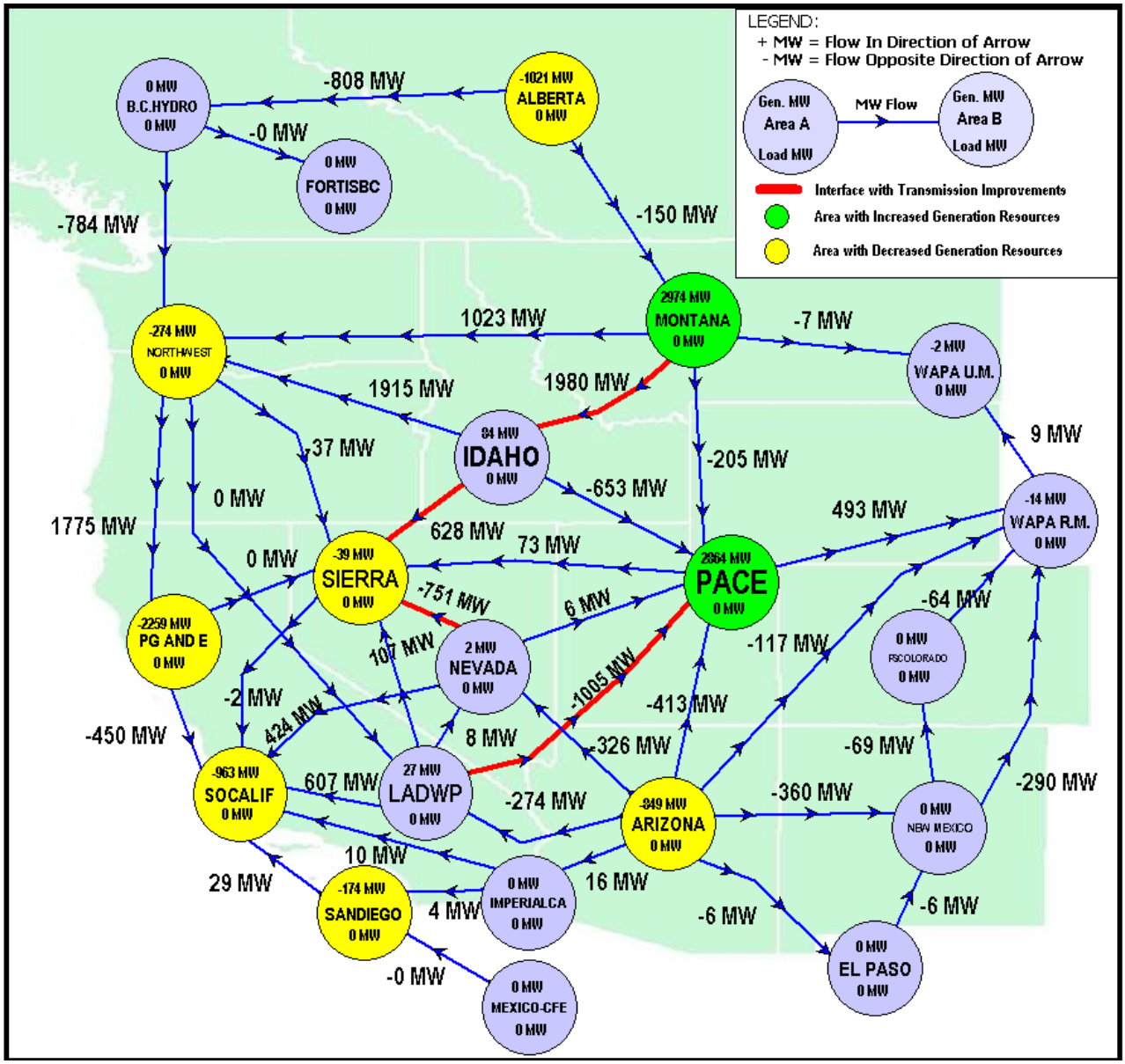

Figure 29 – Difference Flow 3000MW WY, 3000MW MT: DEC 22 Hour 18 (Core Case vs. Post-Imp)

Bubble Diagrams
for
3000MW in Wyoming
3000MW in Montana

MAR02H21

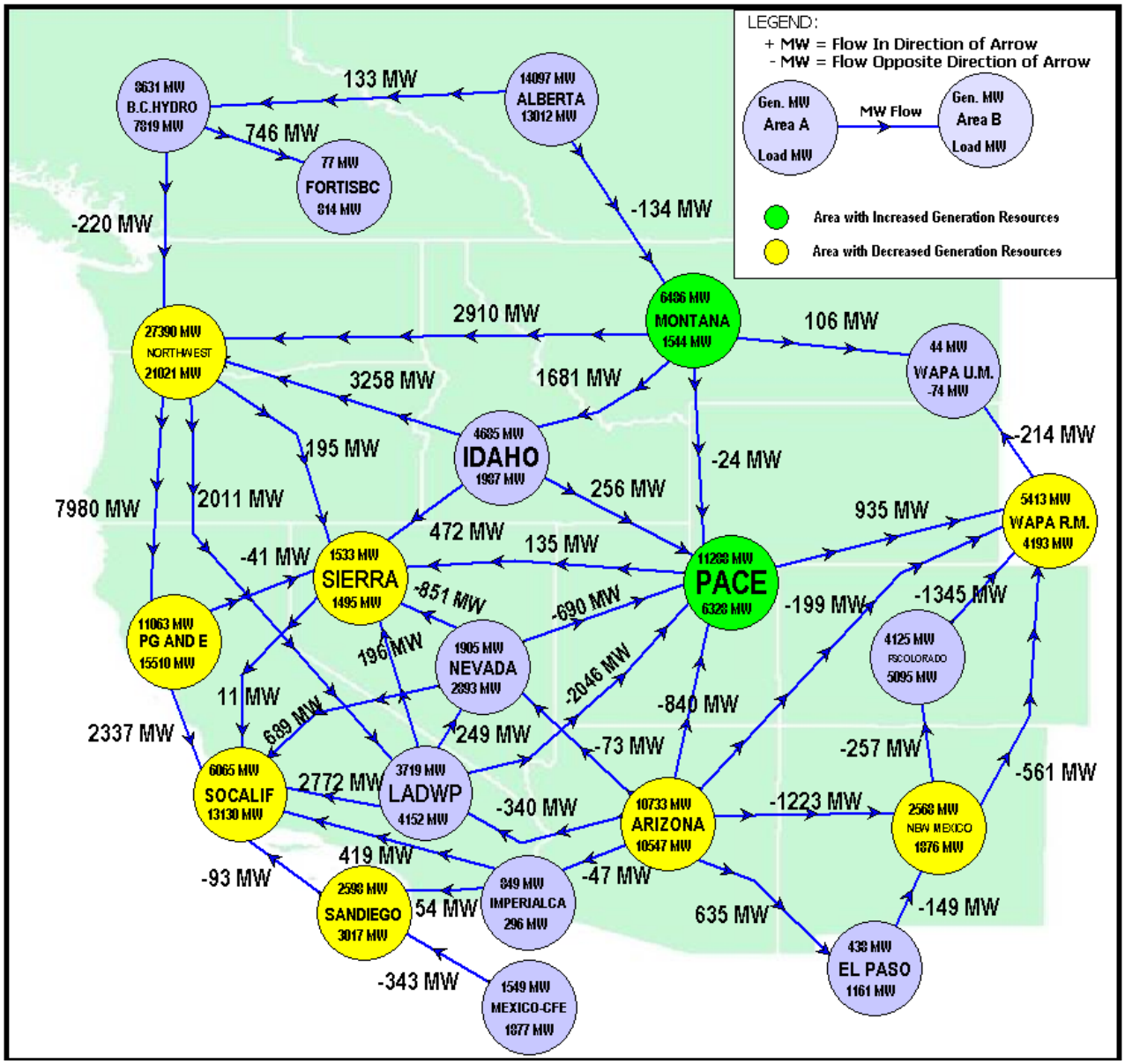

Figure 30 – 3000MW WY, 3000MW MT: MAR 02 Hour 21 (Pre-Transmission Improvements)

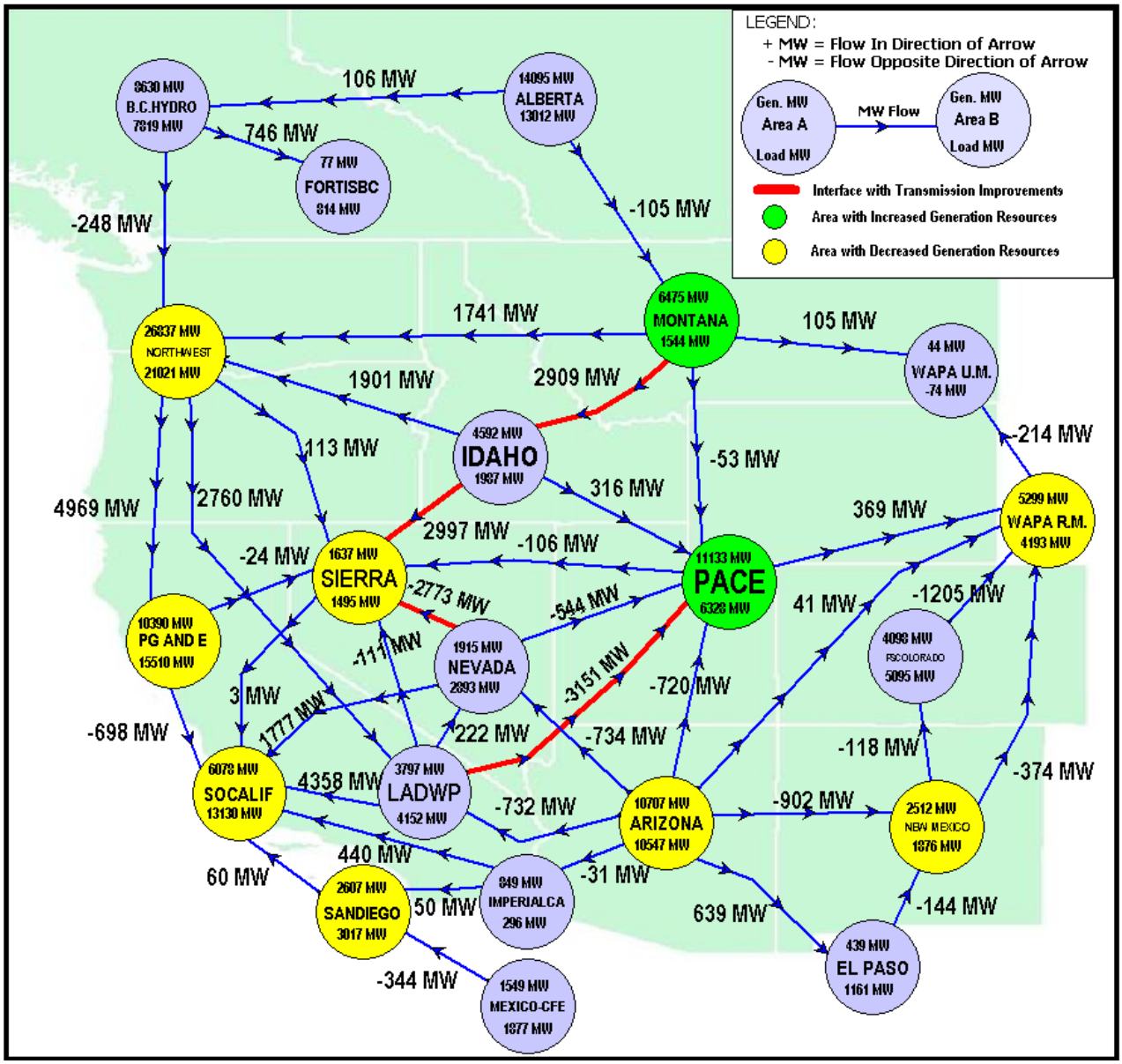

Figure 31 – 3000MW WY, 3000MW MT: MAR 02 Hour 21 (Post-Trans Imp AC Solution Option)

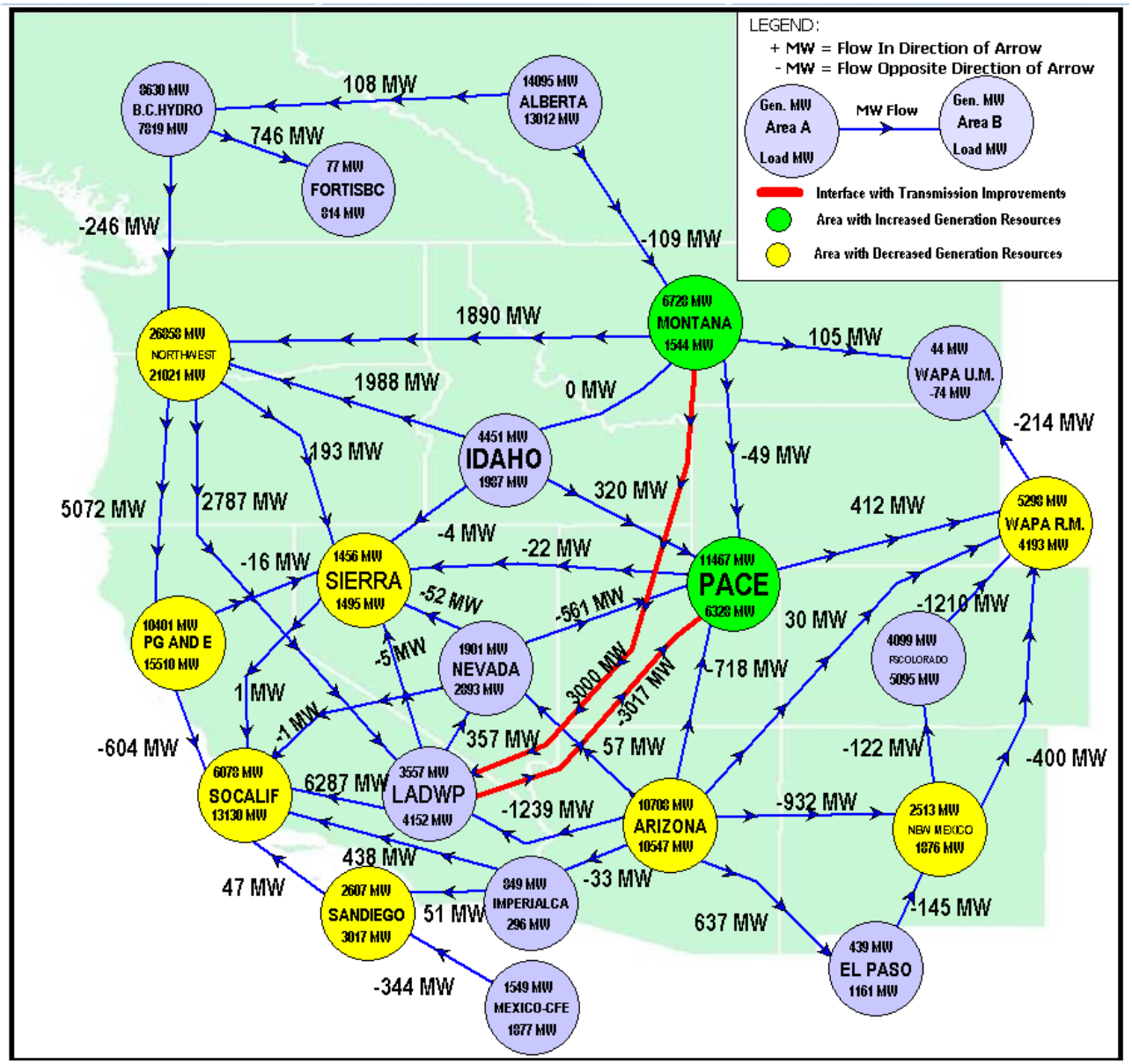

Figure 32 – 3000MW WY, 3000MW MT: MAR 02 Hour 21 (Post-Trans Imp DC Solution Option)

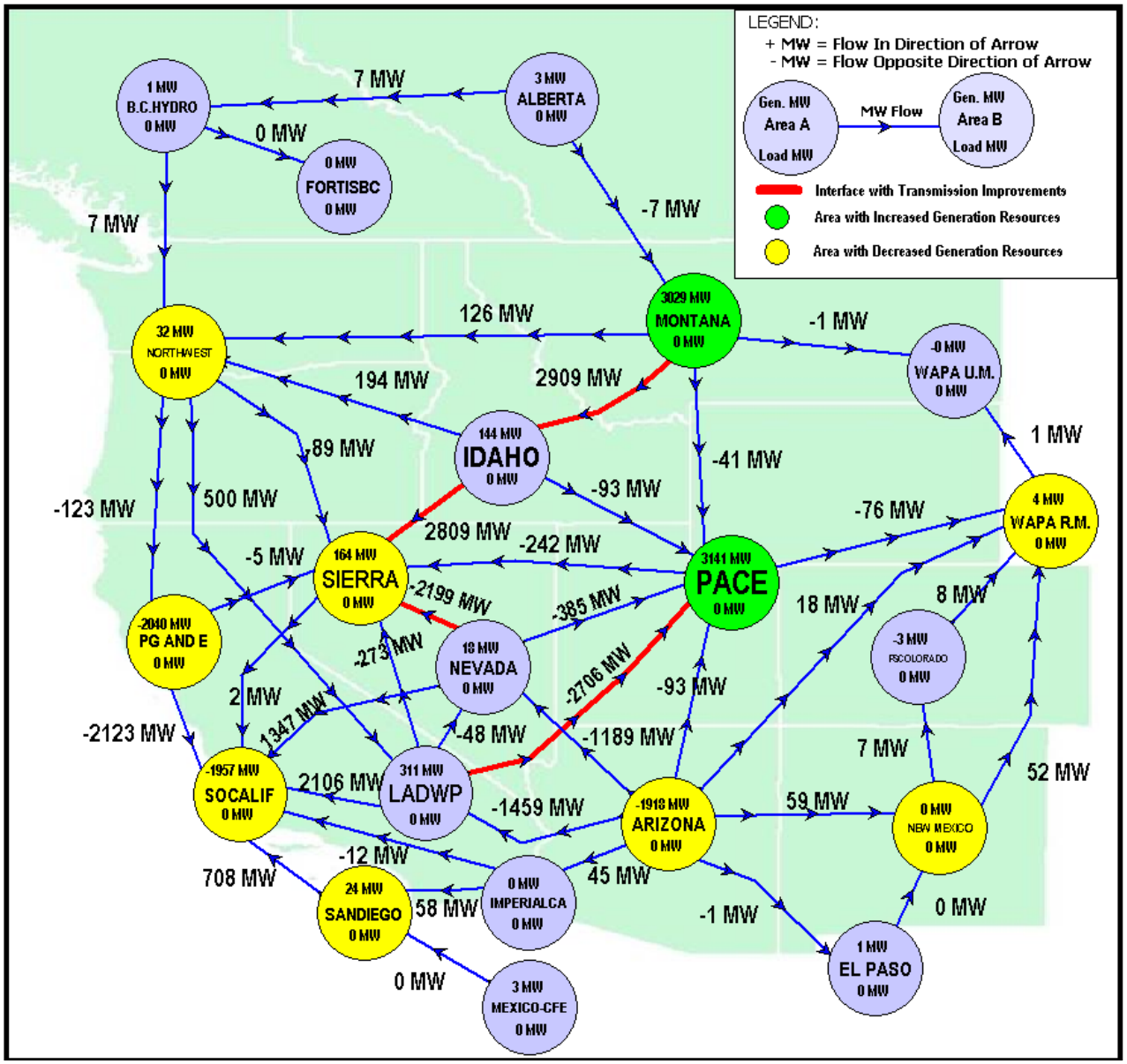

Figure 33 – Difference Flow 3000MW WY, 3000MW MT: MAR 02 Hour 21 (Core Case vs. Post-Imp AC Solution)

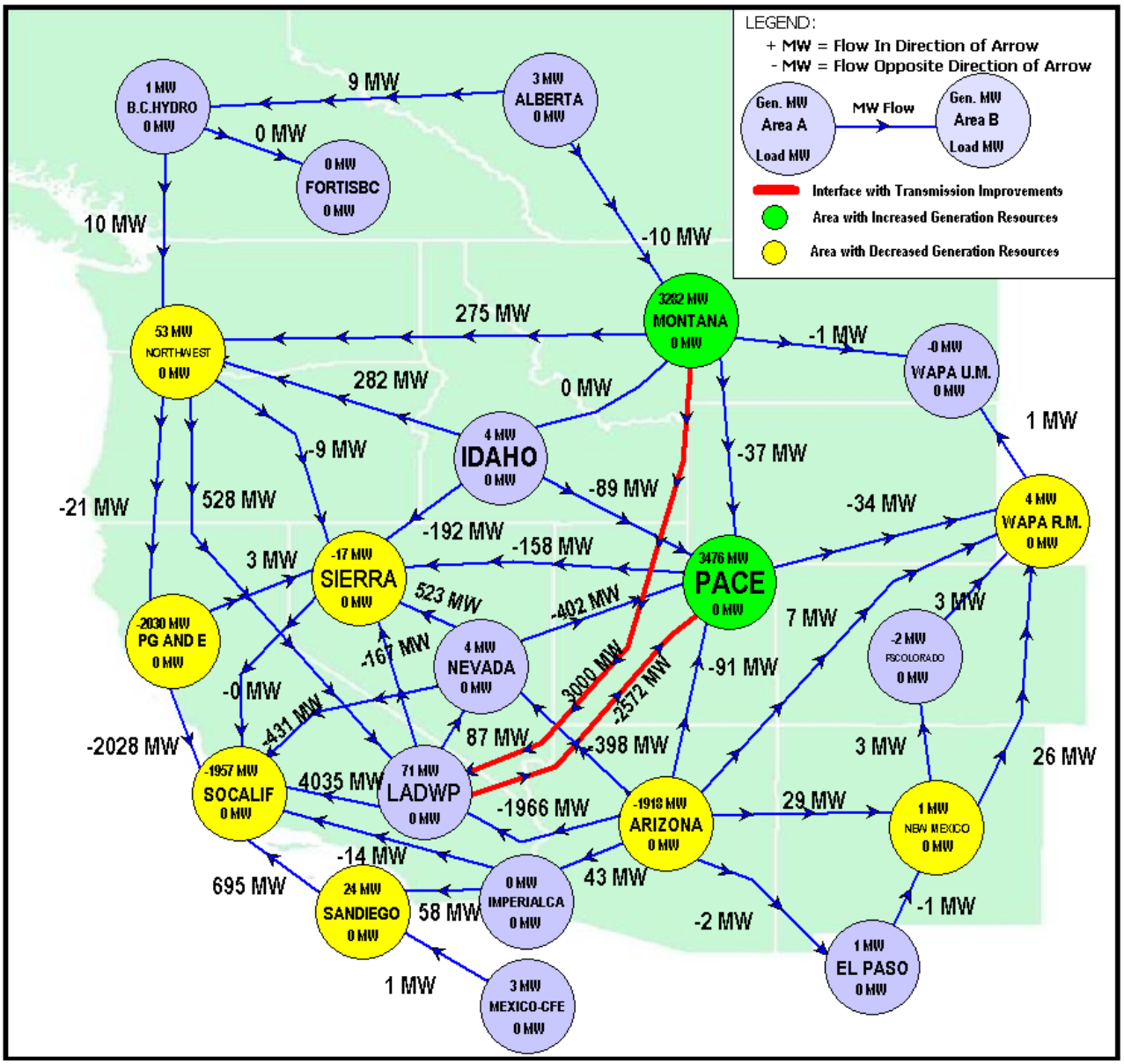

Figure 34 – Difference Flow 3000MW WY, 3000MW MT: MAR 02 Hour 21 (Core Case vs. Post-Imp DC Solution)

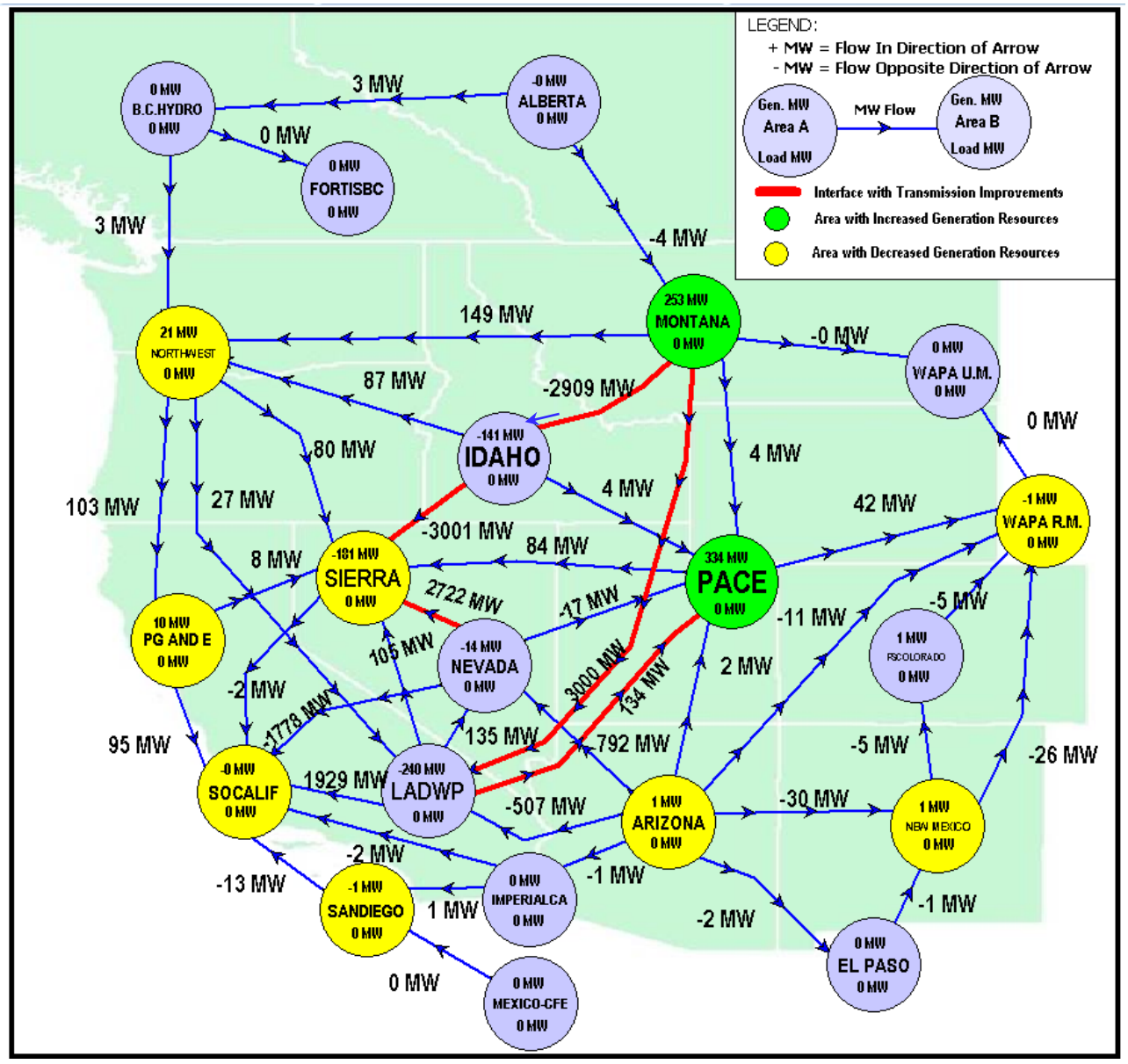

Figure 35 – Difference Flow 3000MW WY, 3000MW MT: MAR 02 Hour 21 (AC Solution vs. DC Solution)

Bubble Diagrams
for
3000MW in Wyoming
3000MW in Montana
OCT04H21

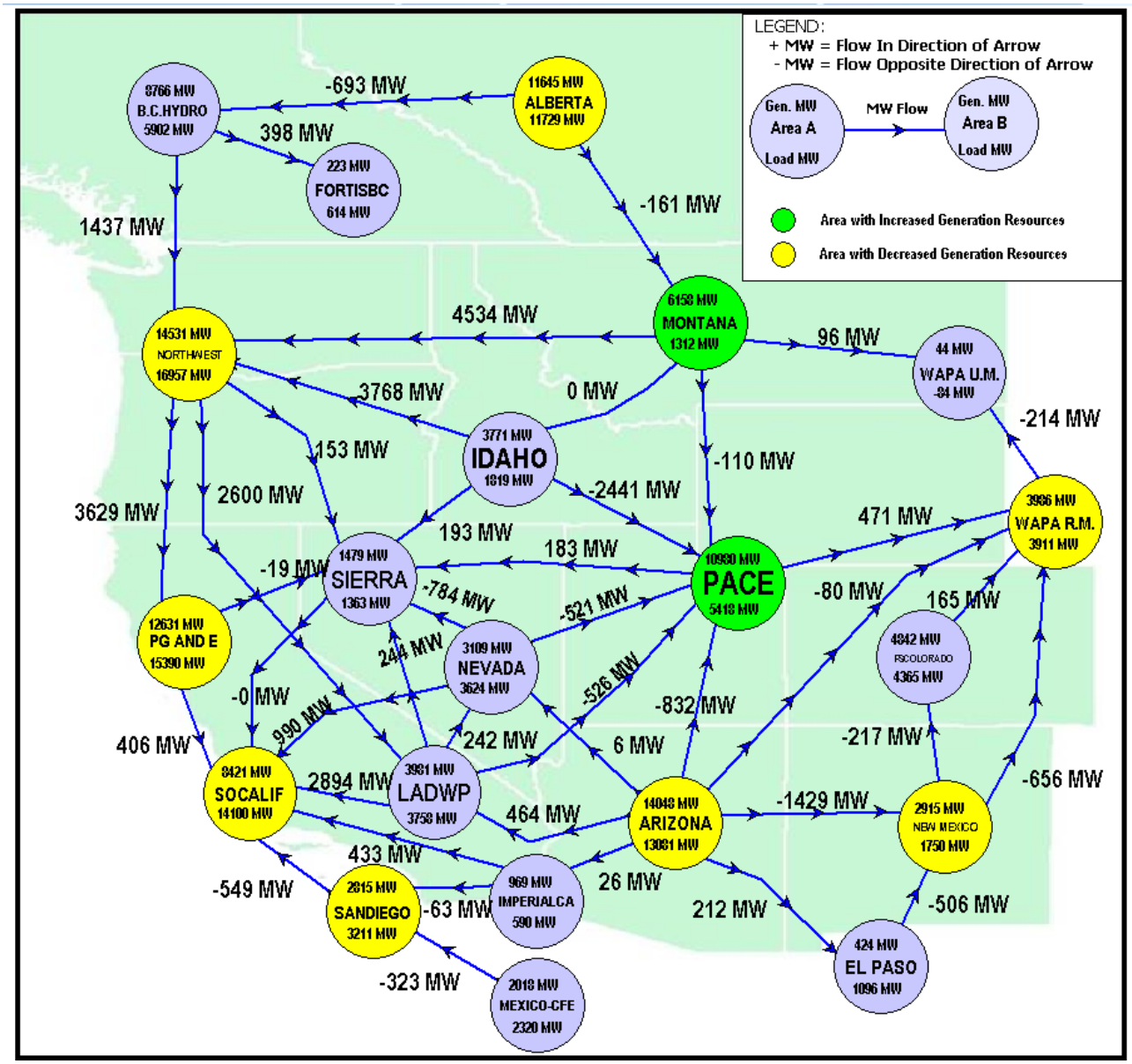

Figure 36 – 3000MW WY, 3000MW MT: OCT 04 Hour 21 (Pre-Transmission Improvements)

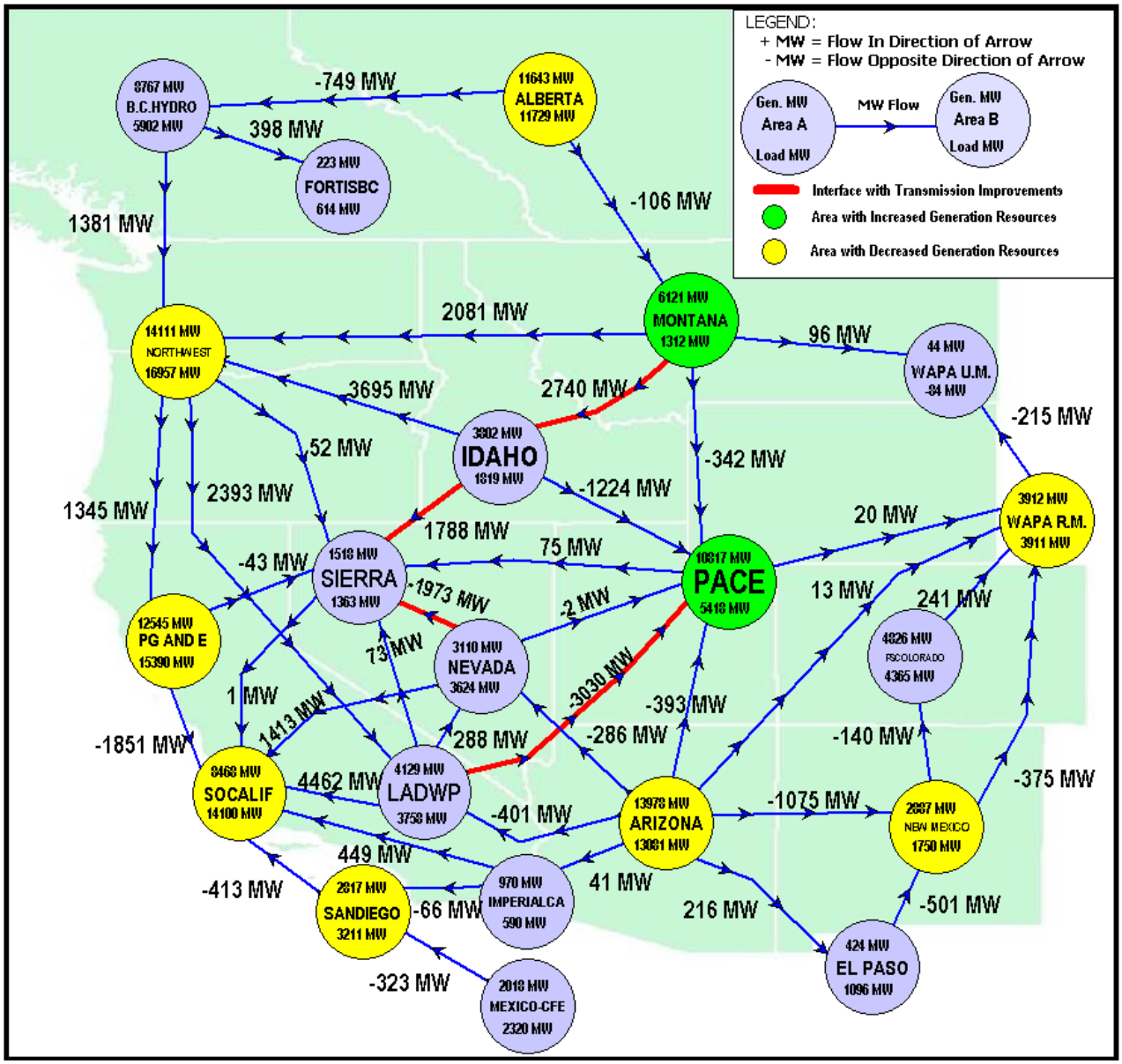

Figure 37 – 3000MW WY, 3000MW MT: OCT 04 Hour 21 (Post-Transmission Improvements)

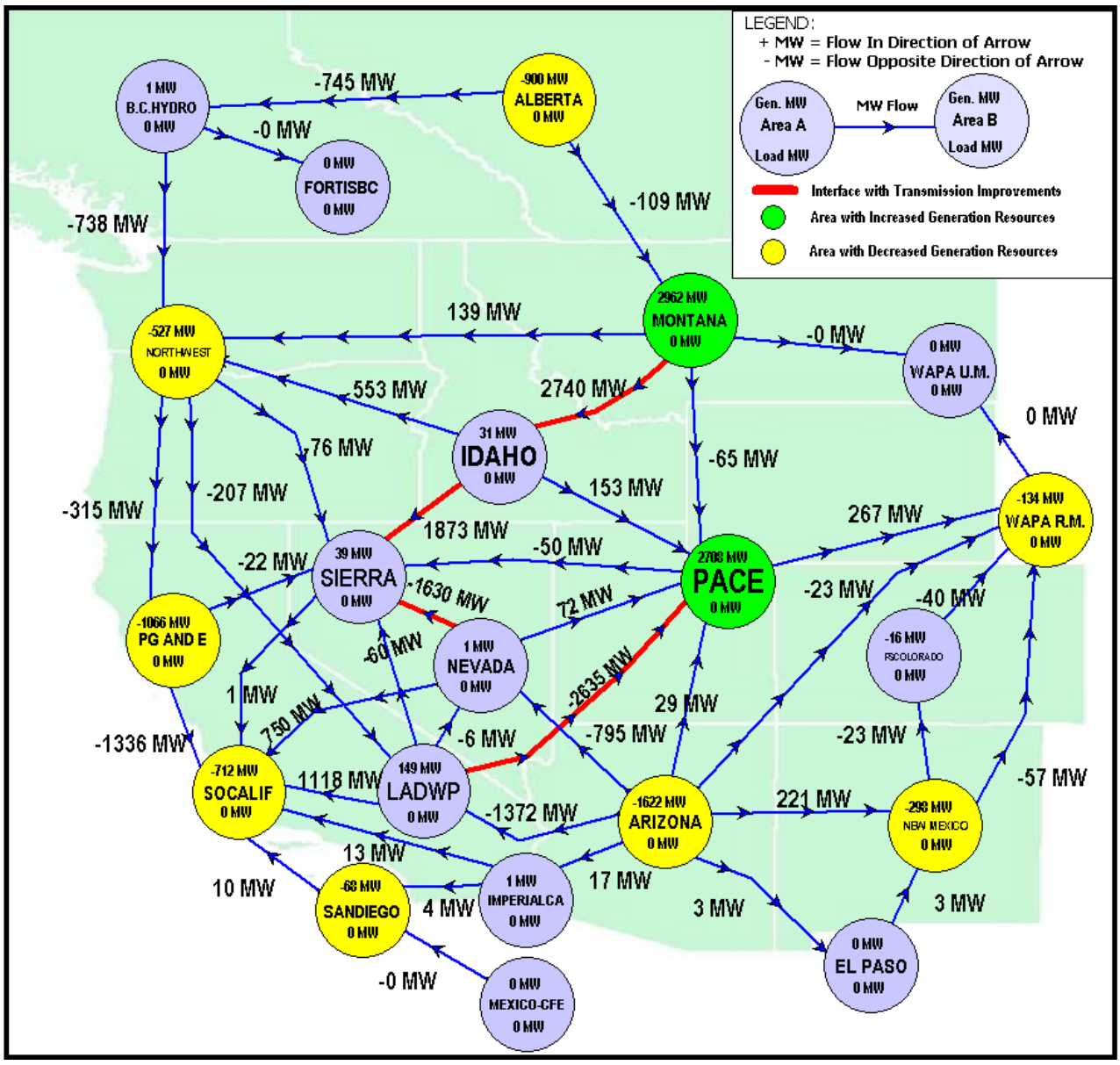

Figure 38 – Difference Flow 3000MW WY, 3000MW MT: OCT 04 Hour 21 (Core Case vs. Post-Imp)

Bubble Diagrams

for

3000MW in Wyoming

3000MW in Montana

AUG10H13

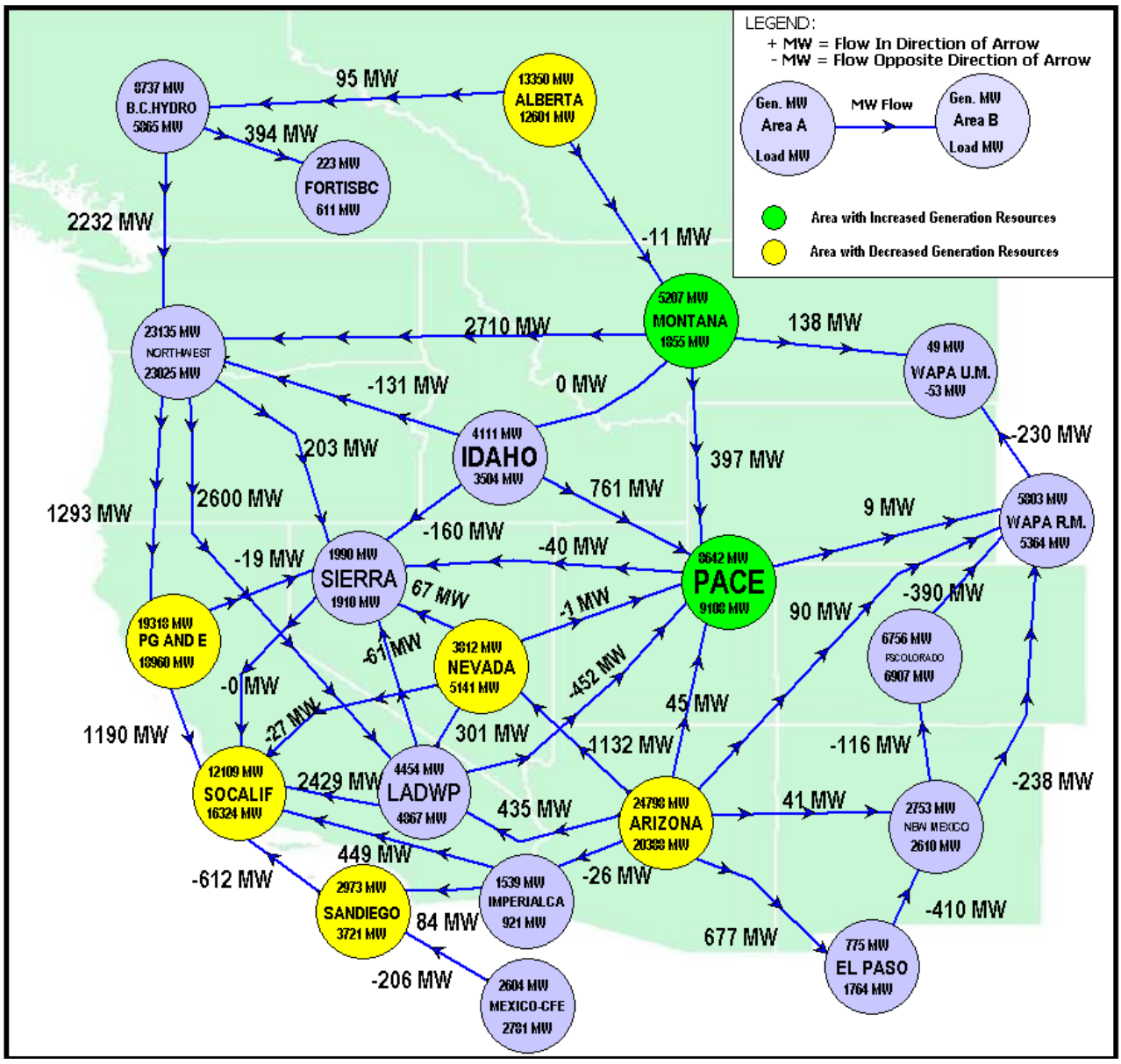

Figure 39 – 3000MW WY, 3000MW MT: AUG 10 Hour 13 (Pre-Transmission Improvements)

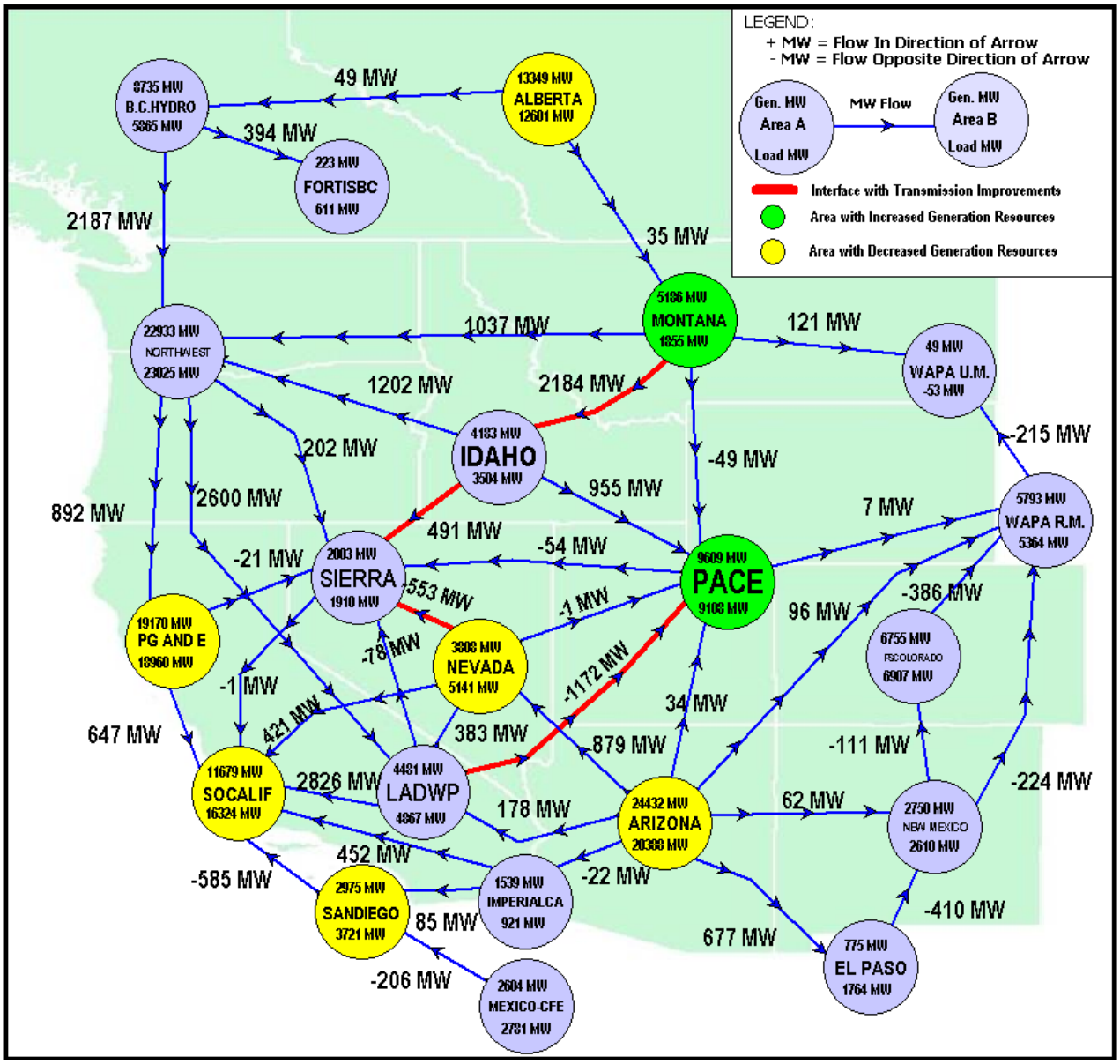

Figure 40 – 3000MW WY, 3000MW MT: AUG 10 Hour 13 (Post-Transmission Improvements)

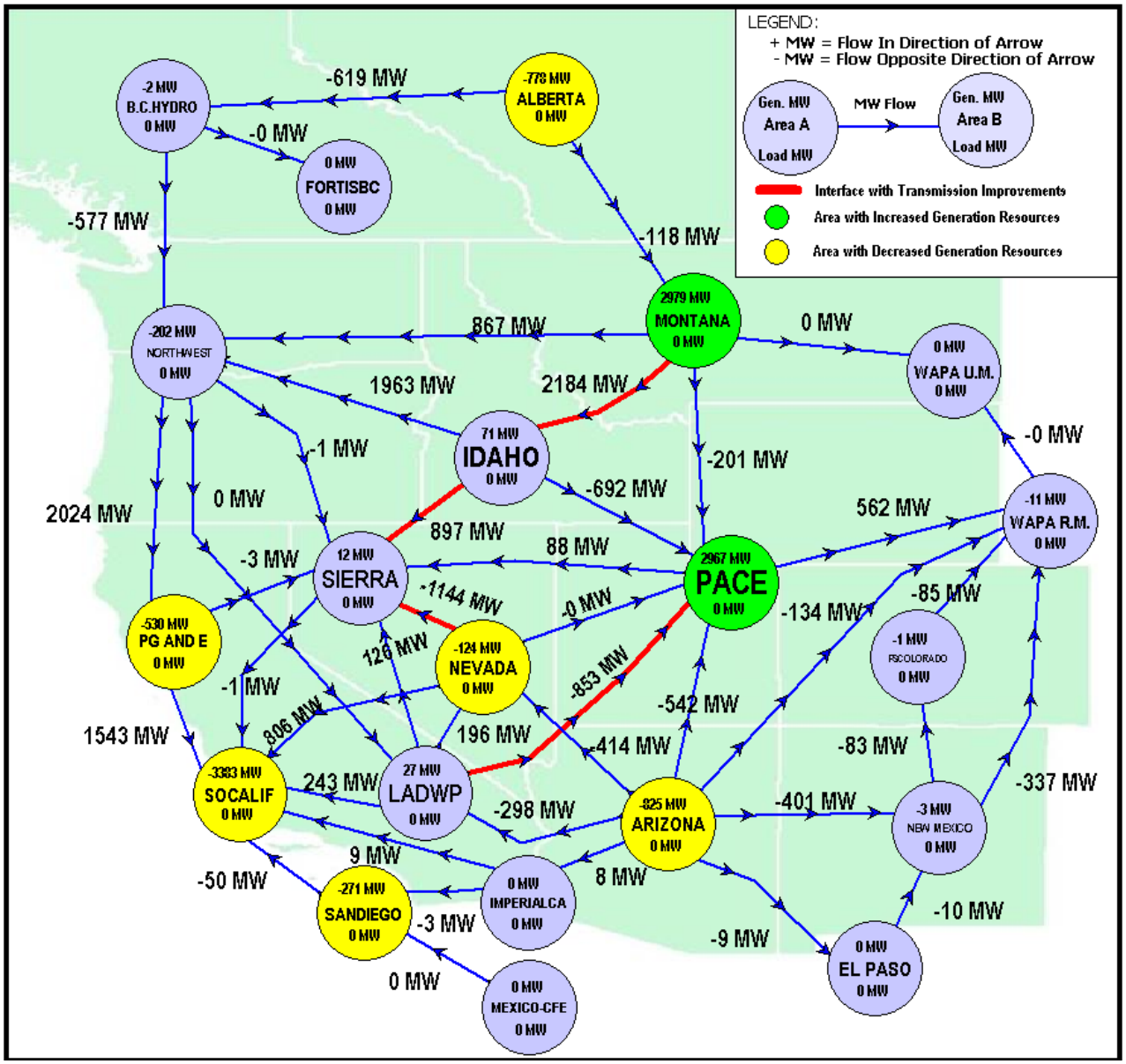

Figure 41 – Difference Flow 3000MW WY, 3000MW MT: AUG 10 Hour 13 (Core Case vs. Post-Imp)

Bubble Diagrams

for

3000MW in Montana

JUL27H16

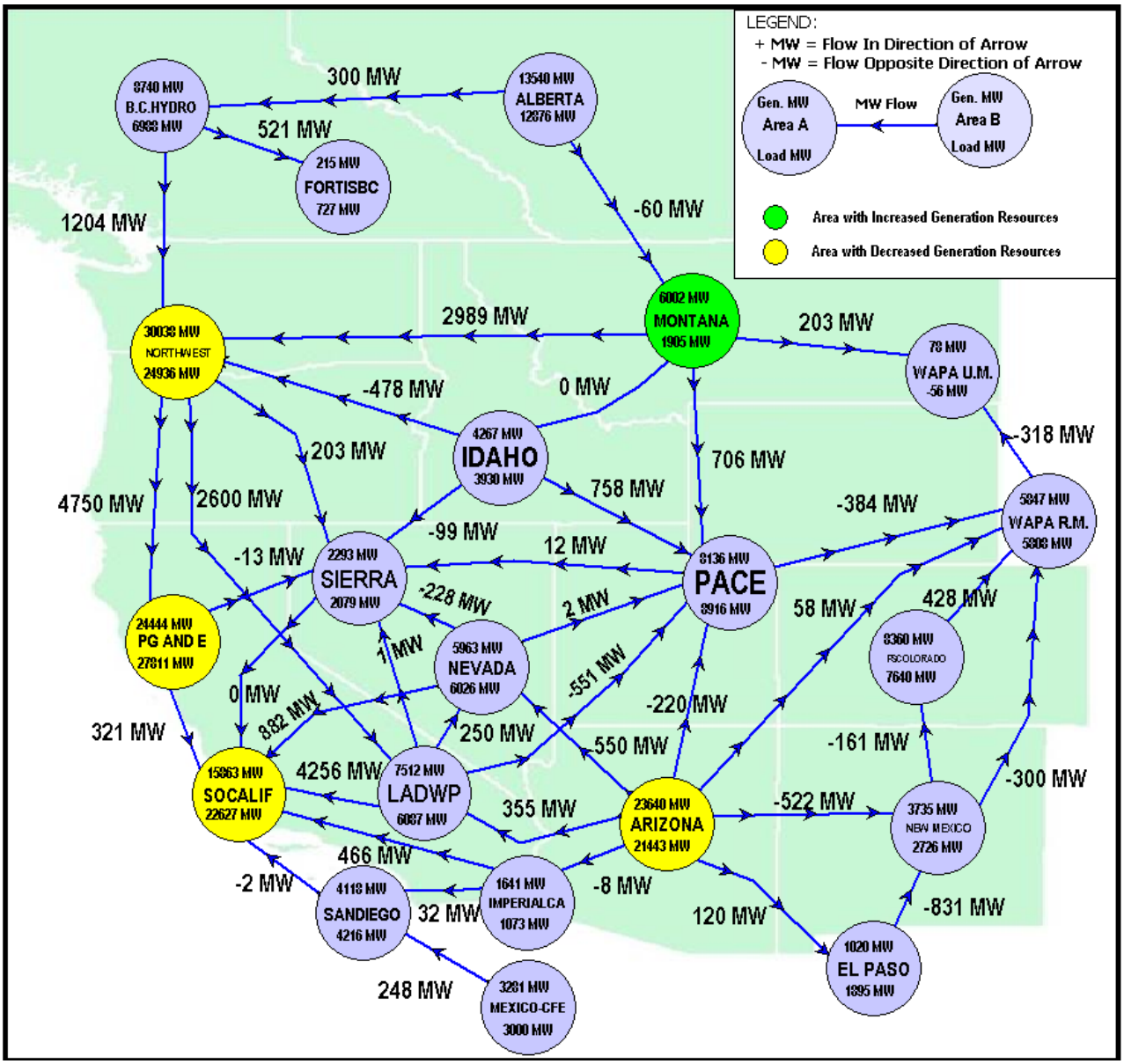

Figure 42 – 3000MW Montana: JUL 27 Hour 16 (Pre-Transmission Improvements)

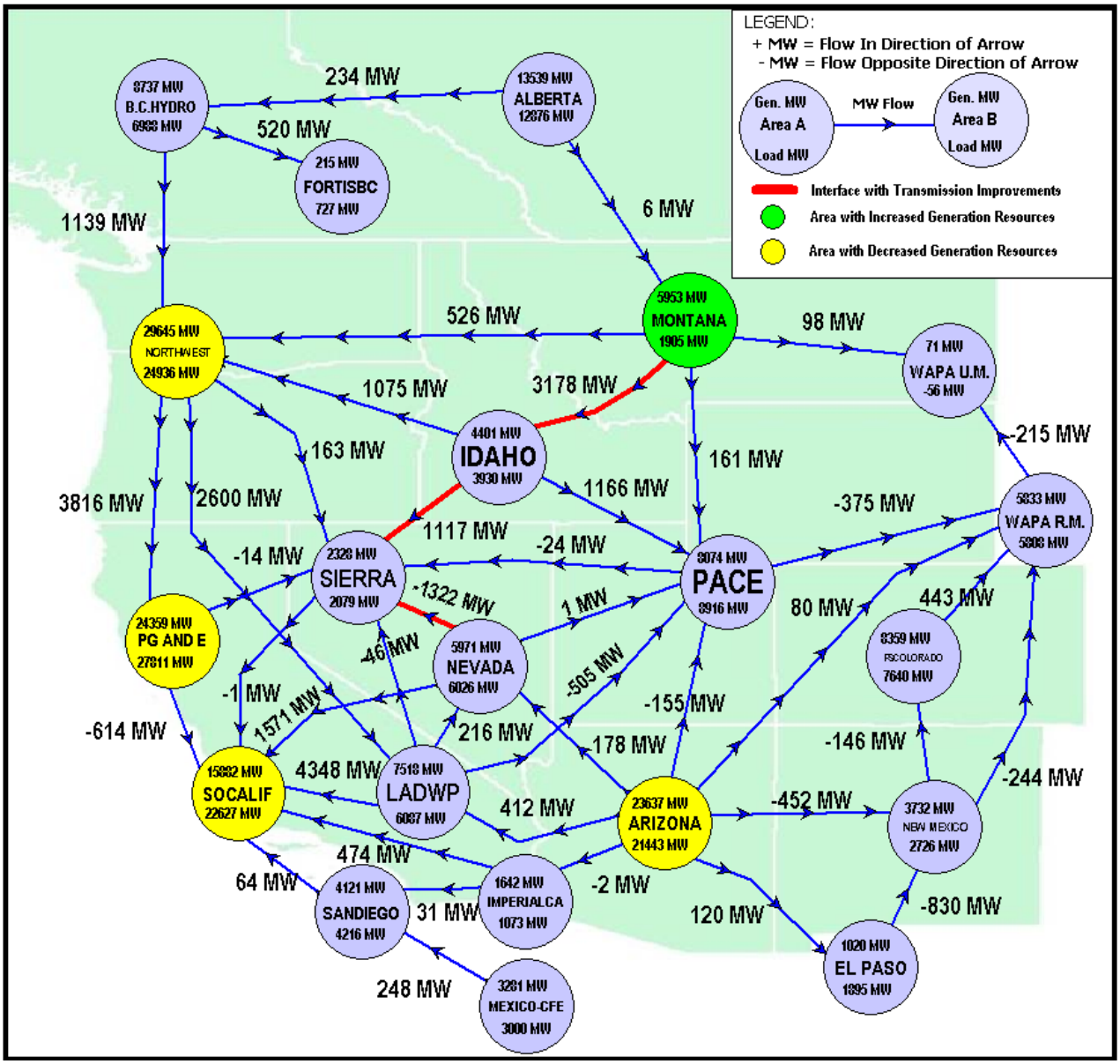

Figure 43 – 3000MW Montana: JUL 27 Hour 16 (Post-Transmission Improvements)

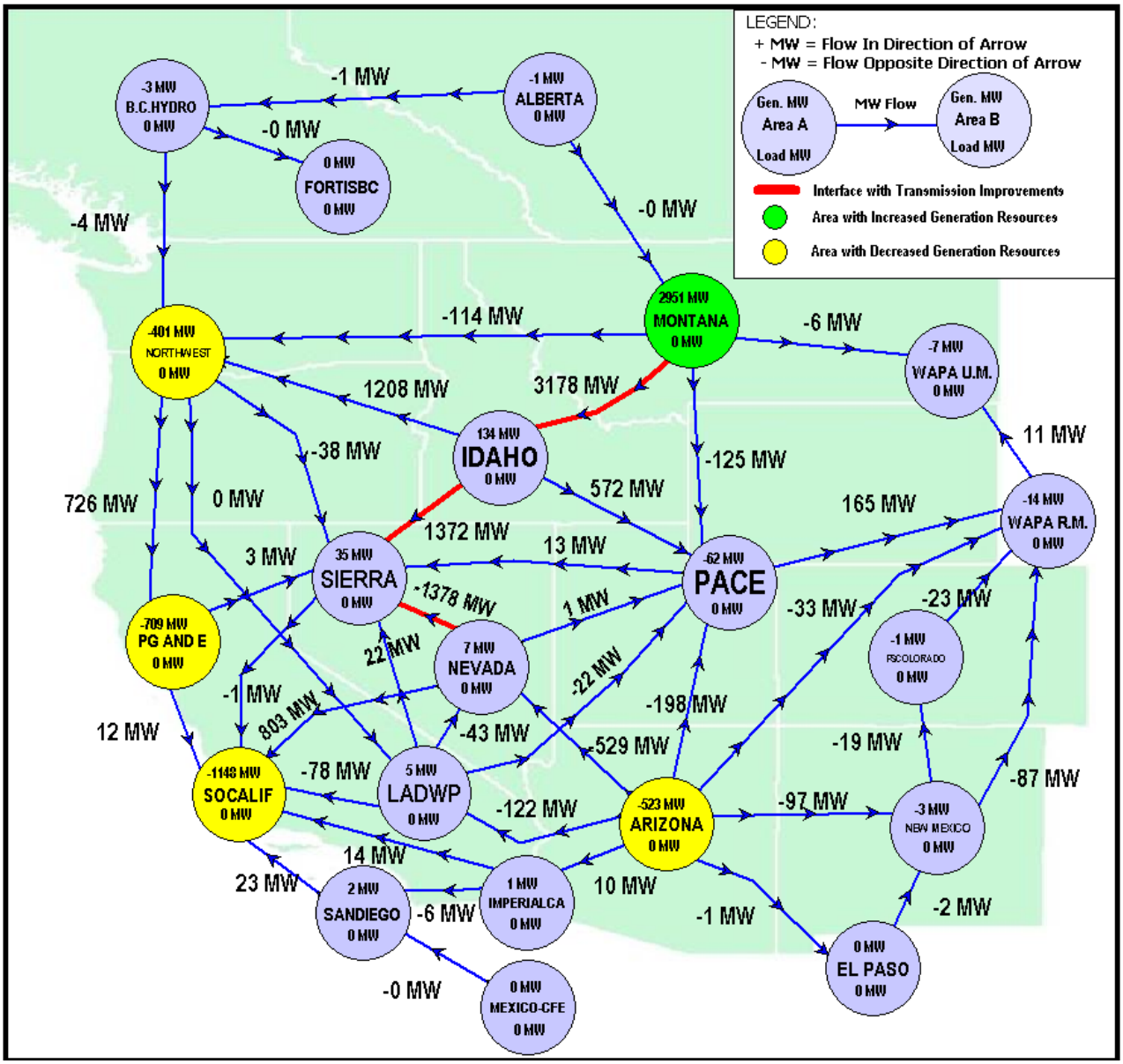

Figure 44 – Difference Flow 3000MW Montana: JUL 27 Hour 16 (Core Case vs. Post-Imp)

Bubble Diagrams

for

3000MW in Montana

DEC22H18

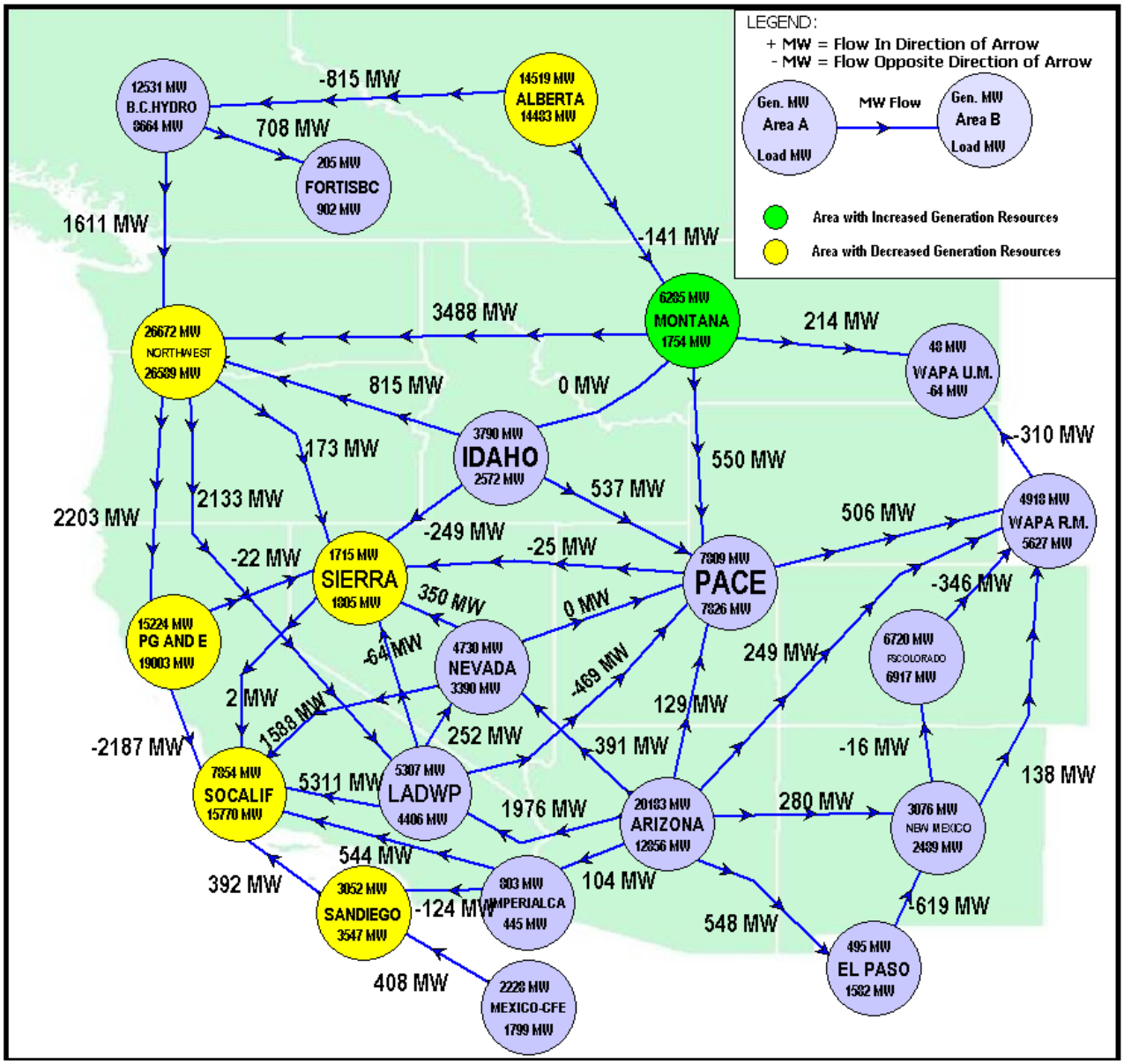

Figure 45 – 3000MW Montana: DEC 22 Hour 18 (Pre-Transmission Improvements)

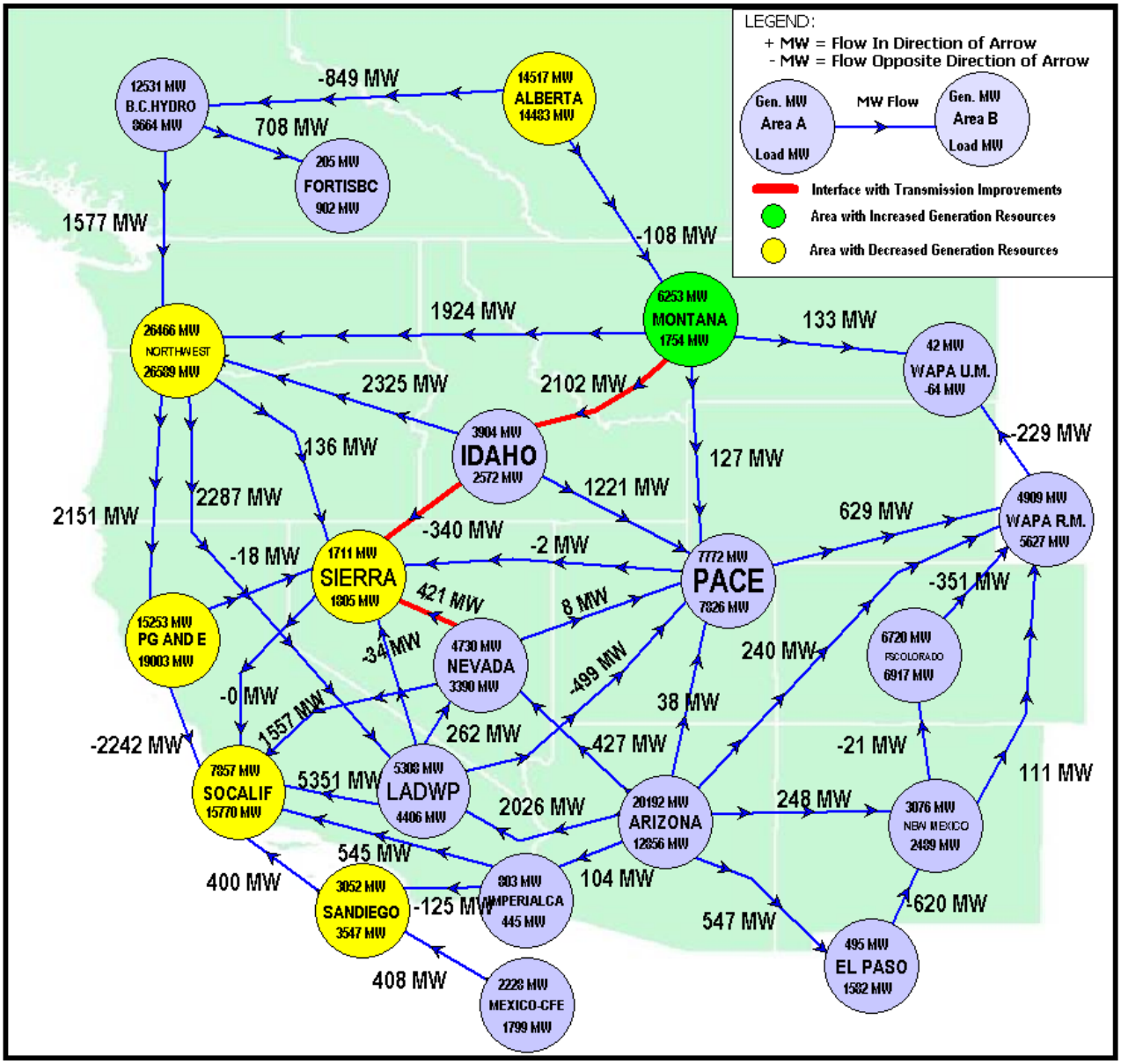

Figure 46 – 3000MW Montana: DEC 22 Hour 18 (Post-Transmission Improvements)

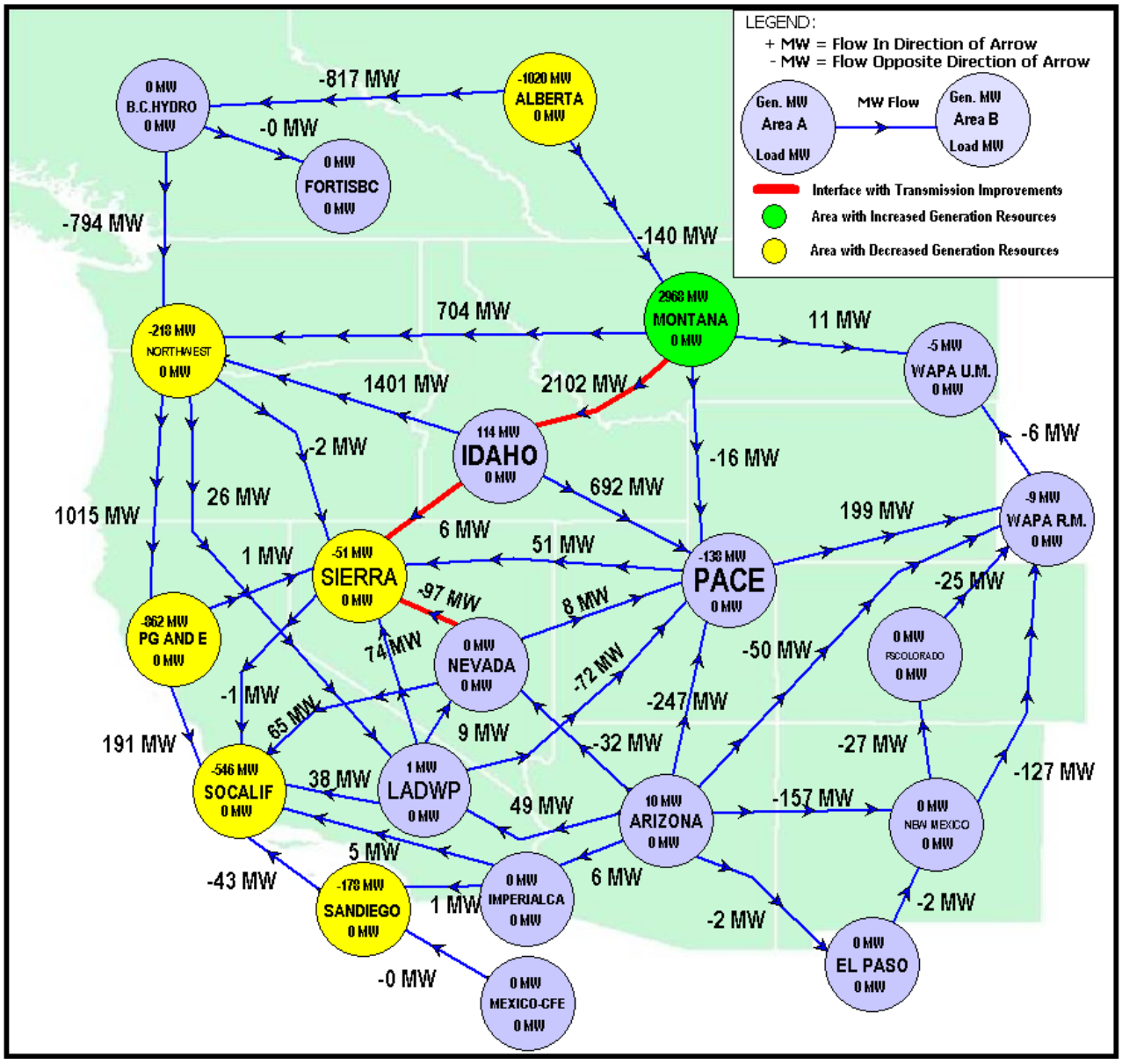

Figure 47 – Difference Flow 3000MW Montana: DEC 22 Hour 18 (Core Case vs. Post-Imp)

Bubble Diagrams
for
3000MW in Montana
MAR02H21

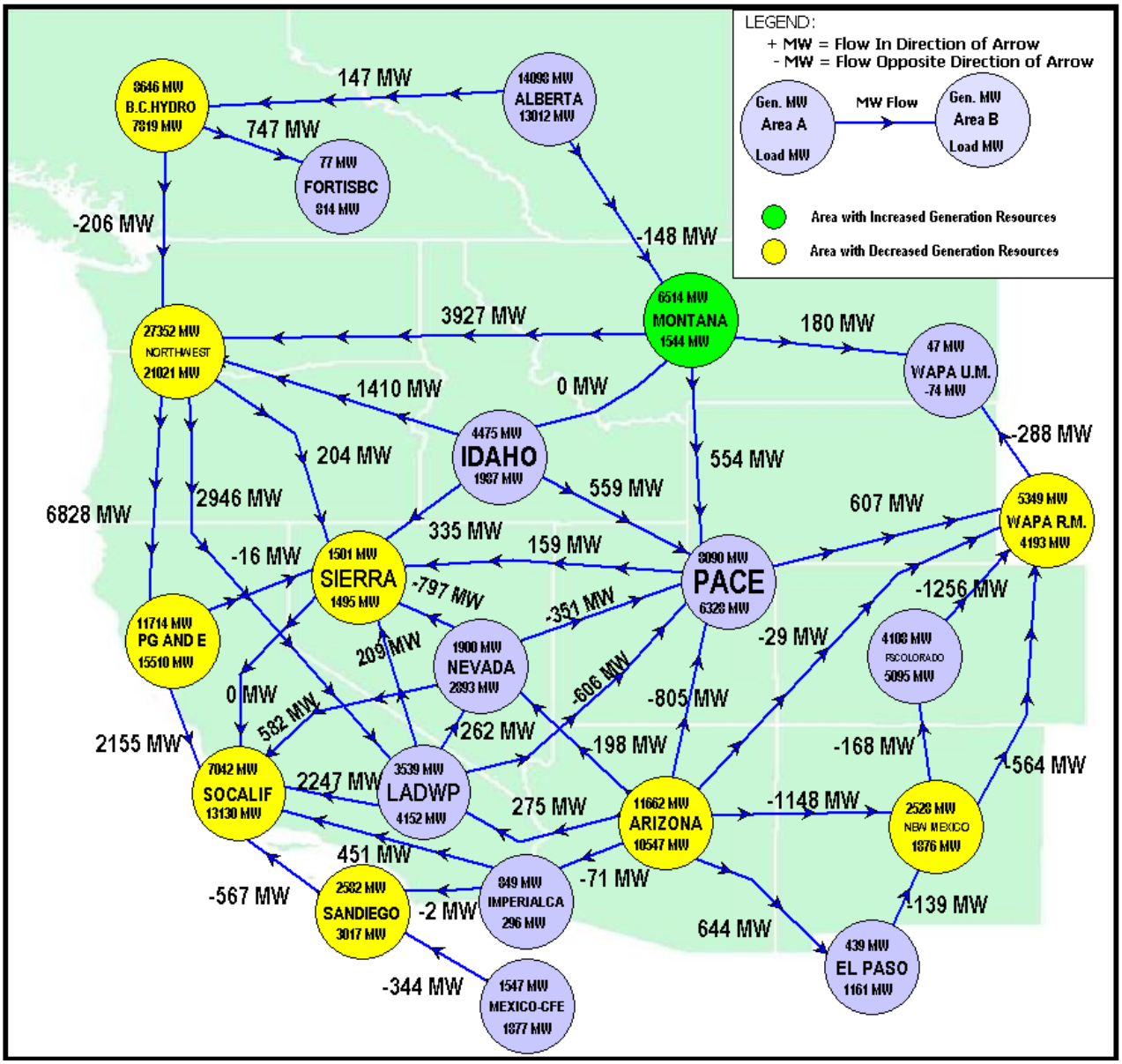

Figure 48 – 3000MW Montana: MAR 02 Hour 21 (Pre-Transmission Improvements)

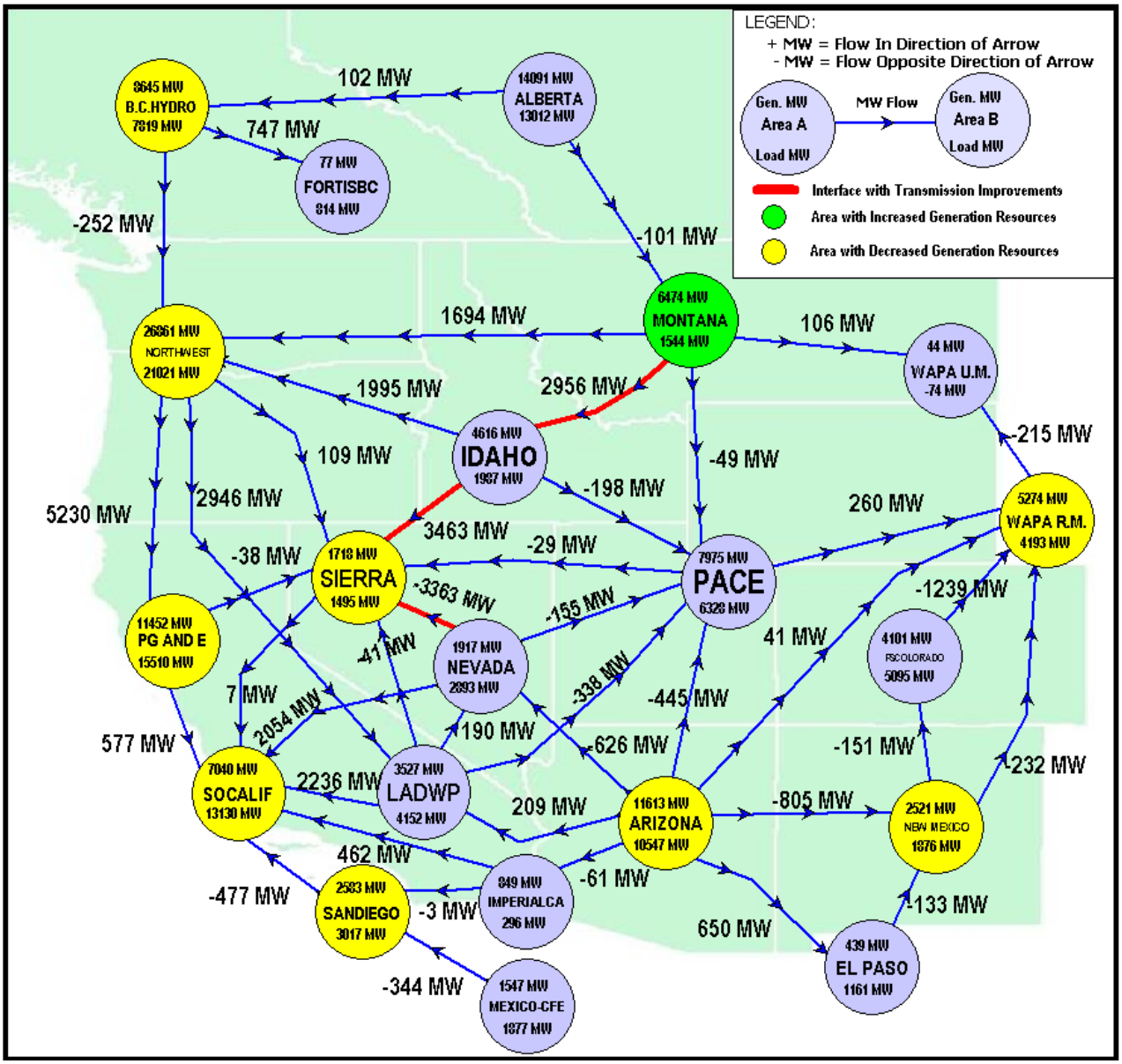

Figure 49 – 3000MW Montana: MAR 02 Hour 21 (Post-Trans Improvements)

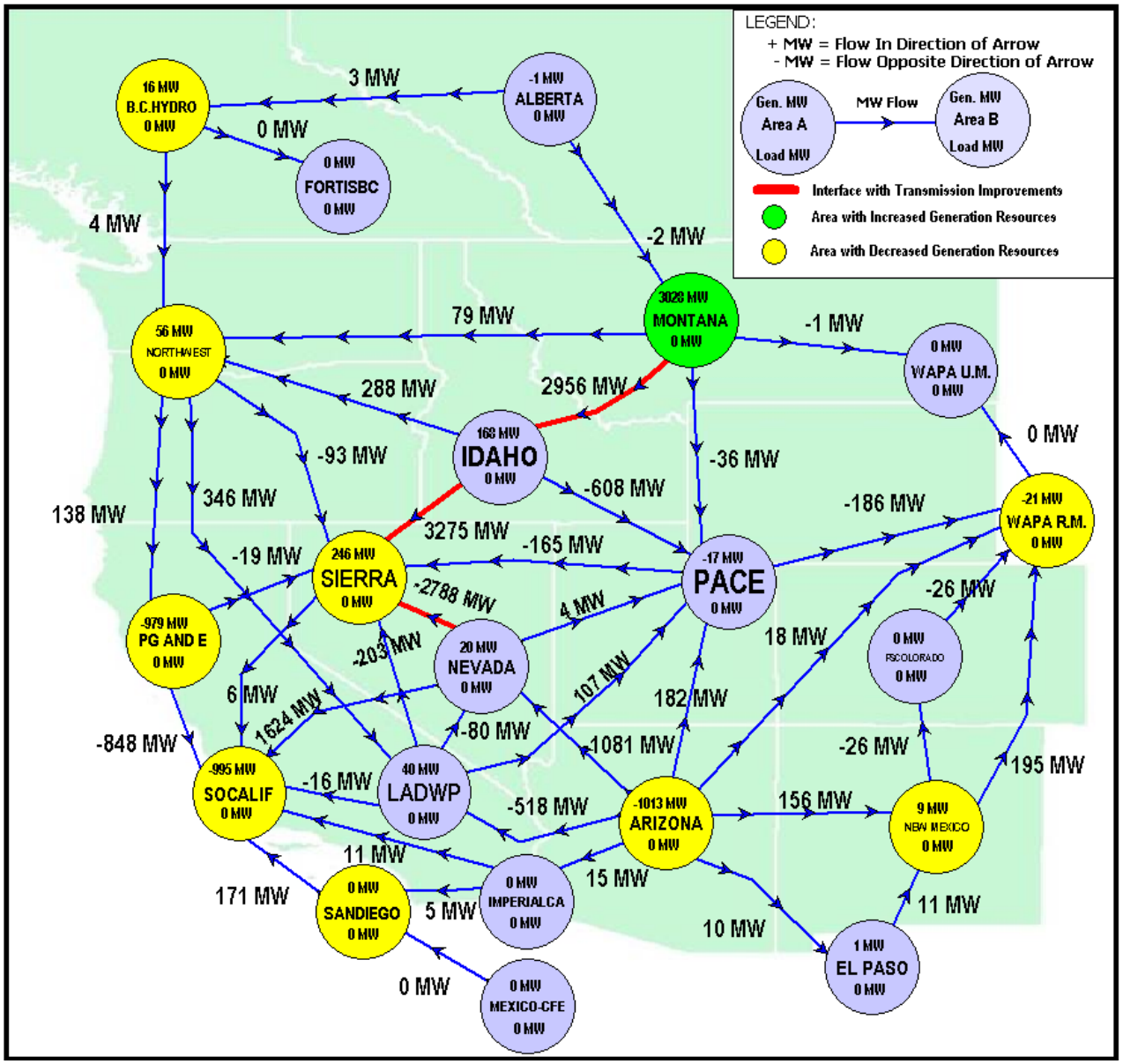

Figure 50 – Difference Flow 3000MW Montana: MAR 02 Hour 21 (Core Case vs. Post-Imp AC Solution)

Bubble Diagrams

for

3000MW in Montana

OCT04H21

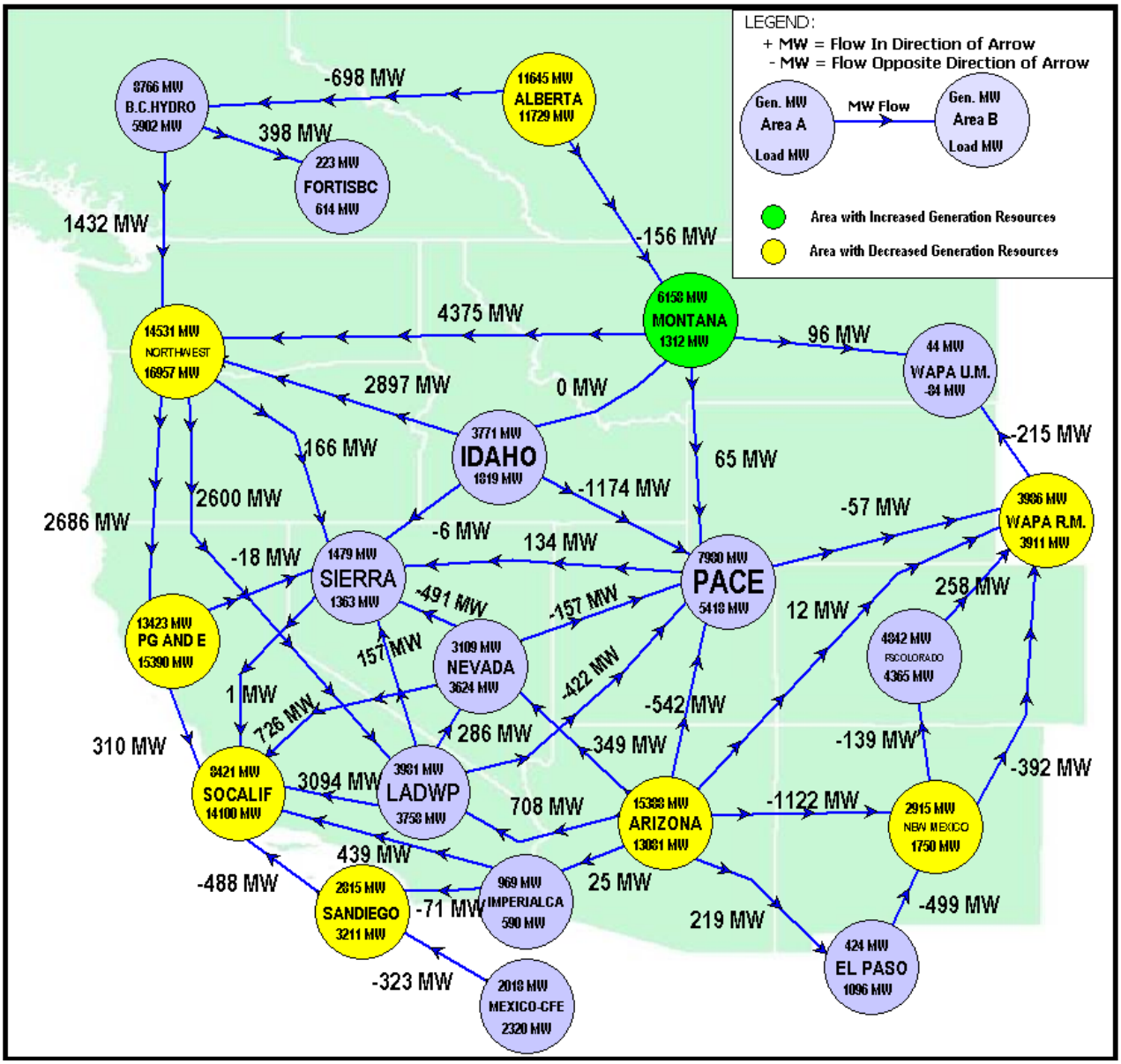

Figure 51 – 3000MW Montana: OCT 04 Hour 21 (Pre-Transmission Improvements)

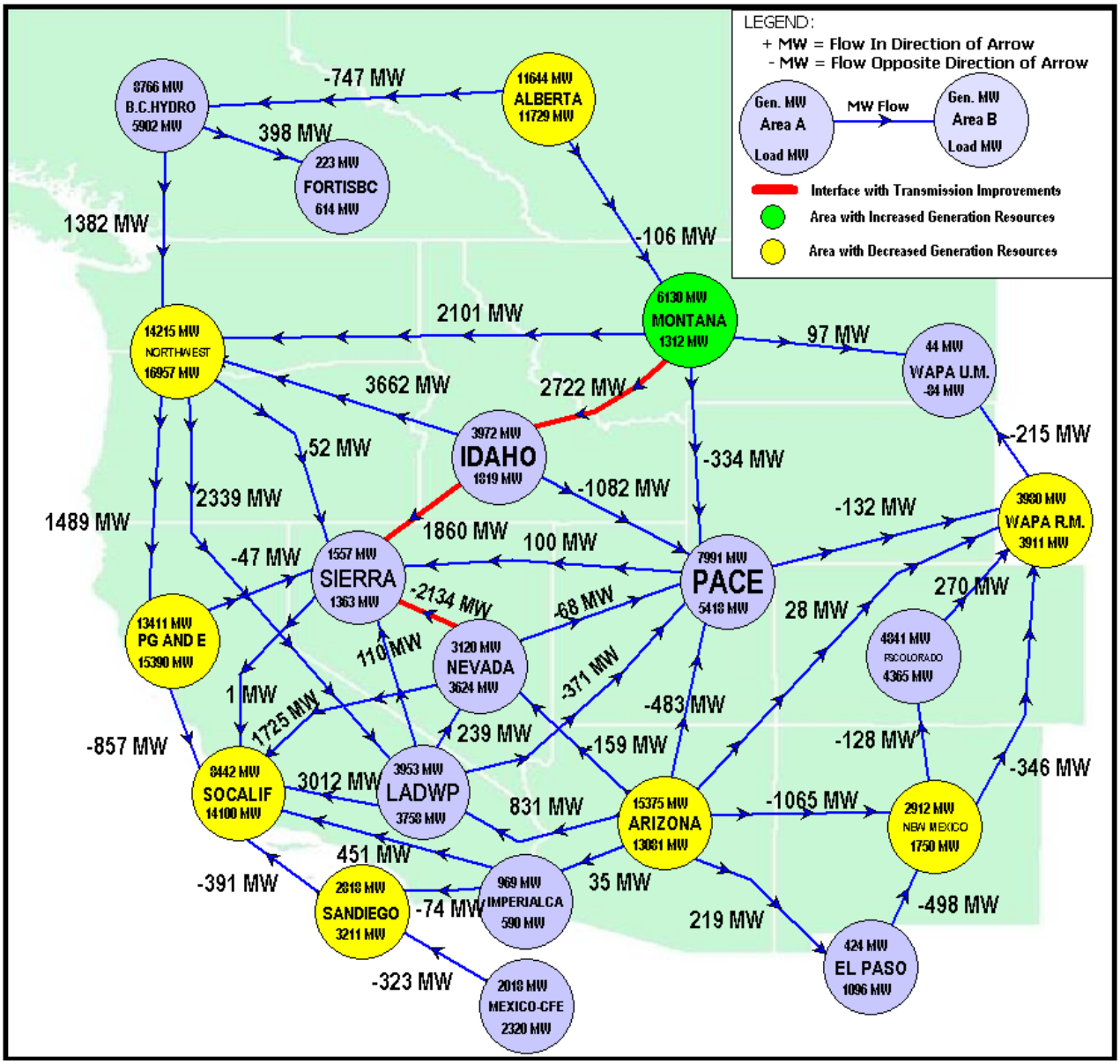

Figure 52 – 3000MW Montana: OCT 04 Hour 21 (Post-Transmission Improvements)

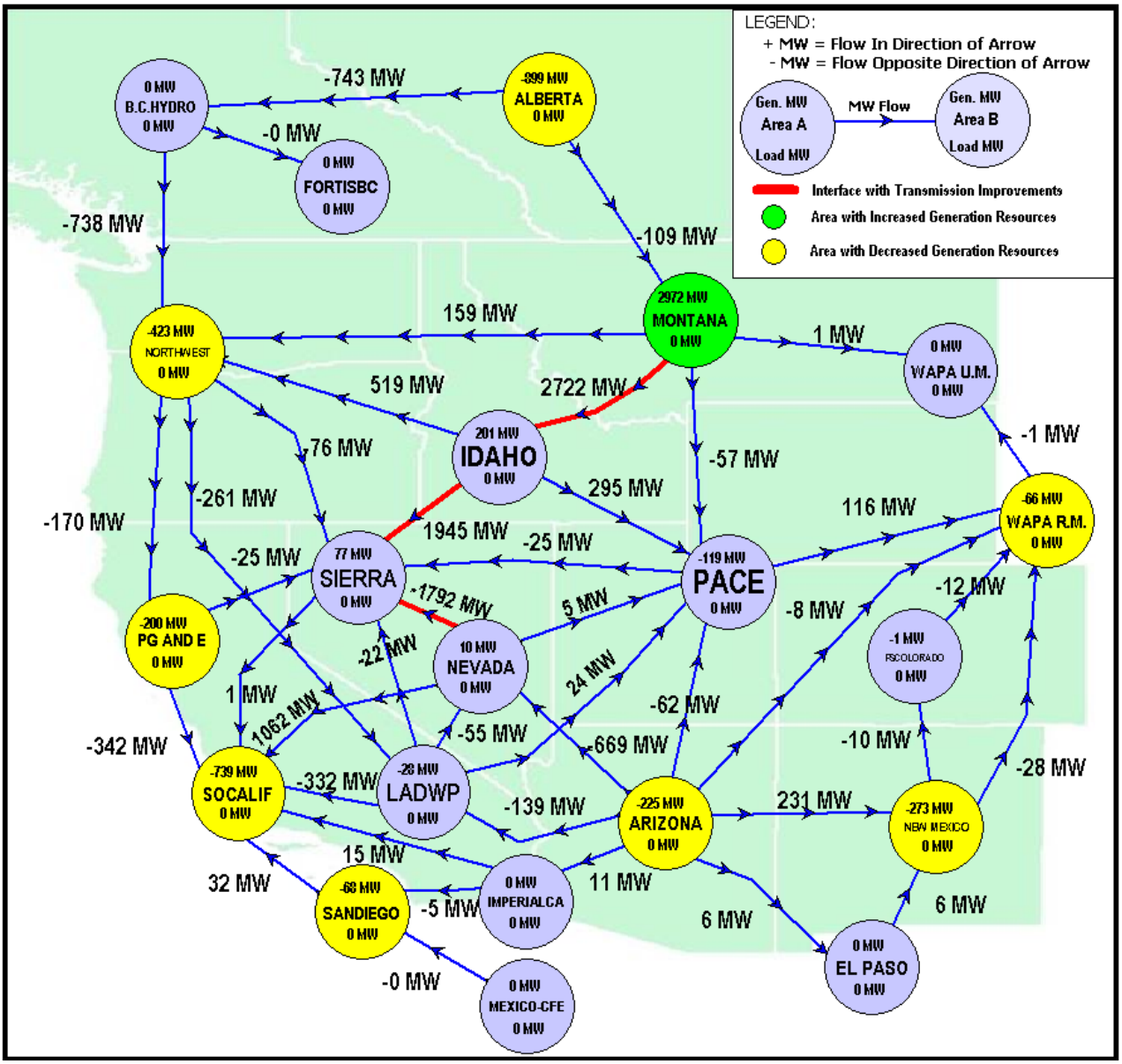

Figure 53 – Difference Flow 3000MW Montana: OCT 04 Hour 21 (Core Case vs. Post-Imp)

Bubble Diagrams

for

3000MW in Montana

AUG10H13

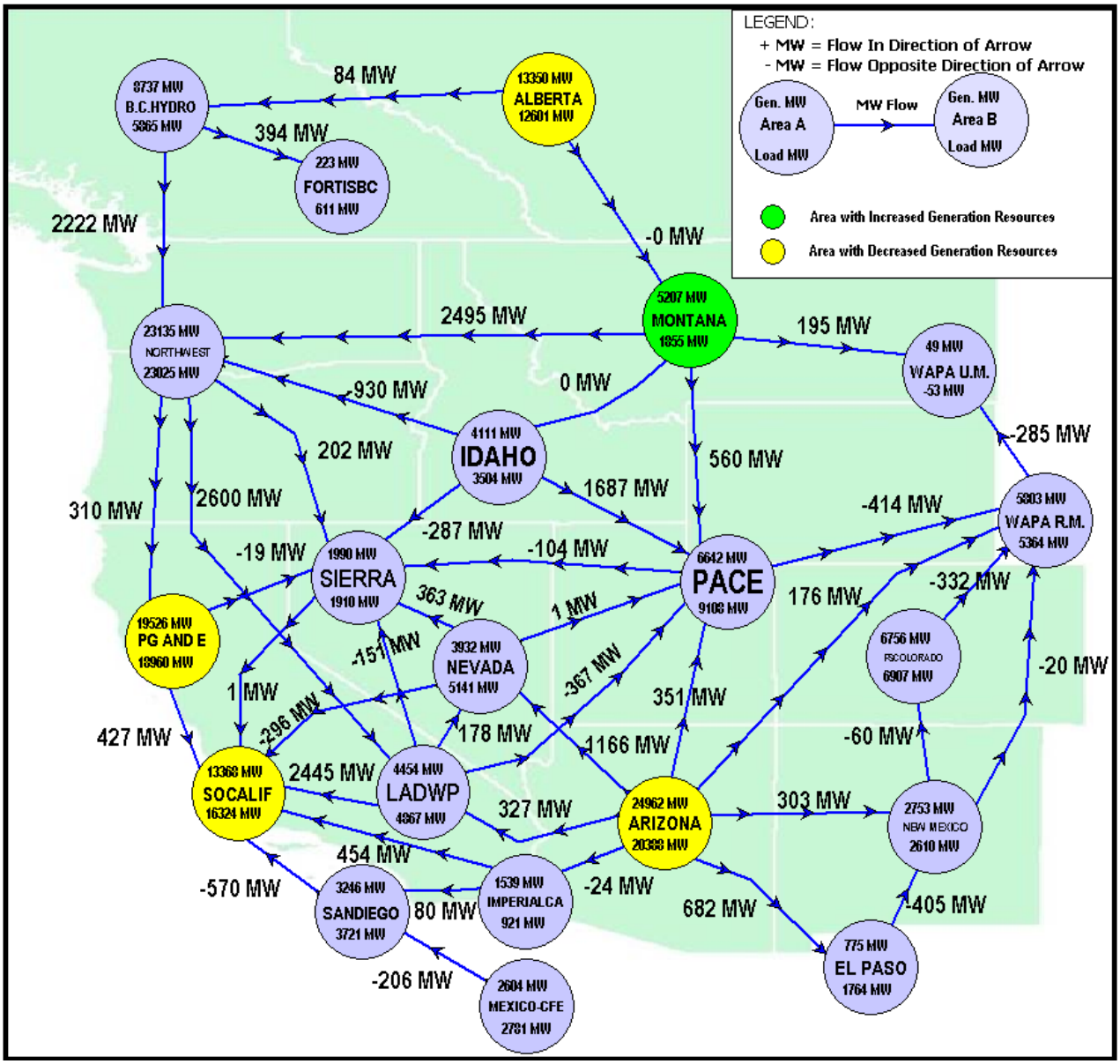

Figure 54 – 3000MW Montana: AUG 10 Hour 13 (Pre-Transmission Improvements)

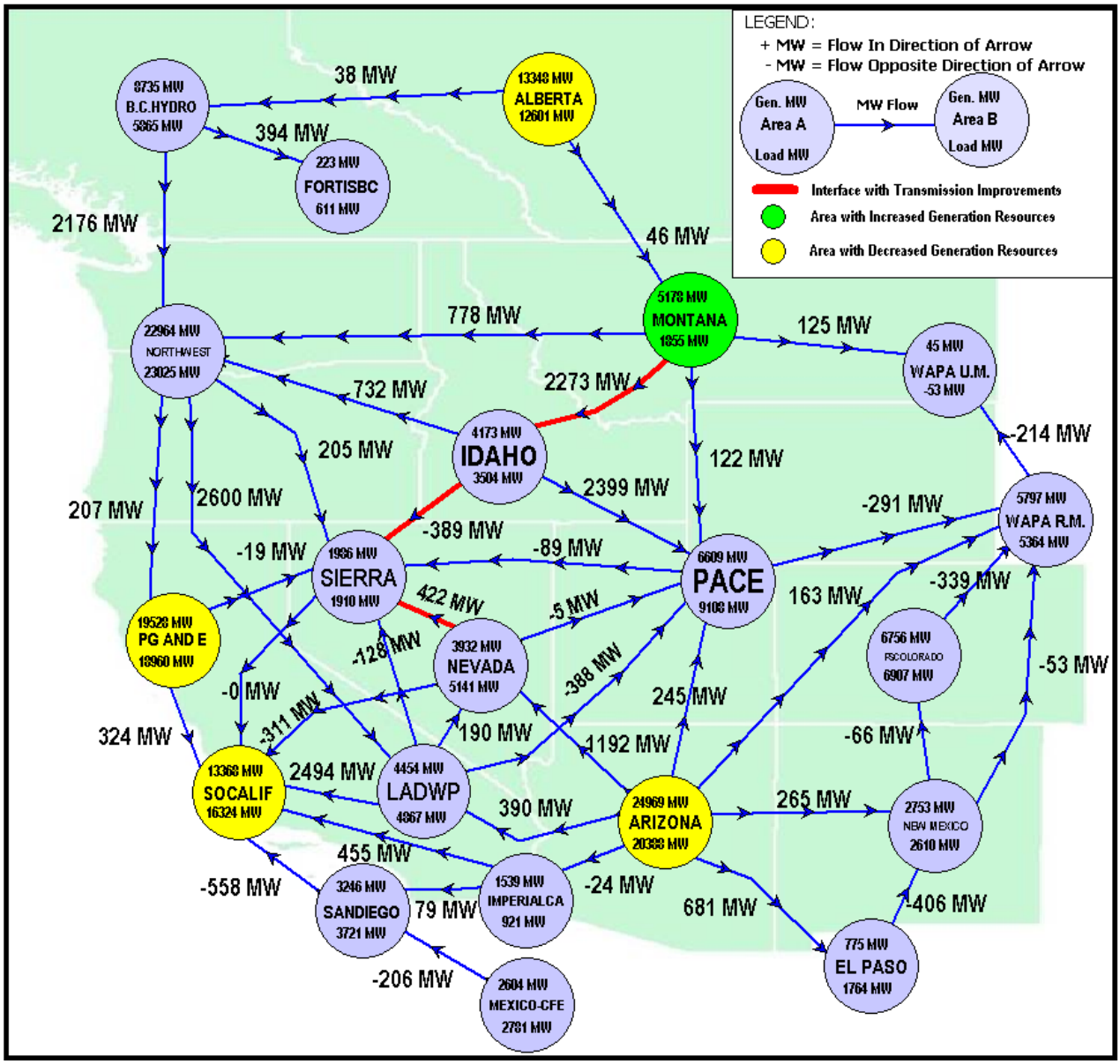

Figure 55 – 3000MW Montana: AUG 10 Hour 13 (Post-Transmission Improvements)

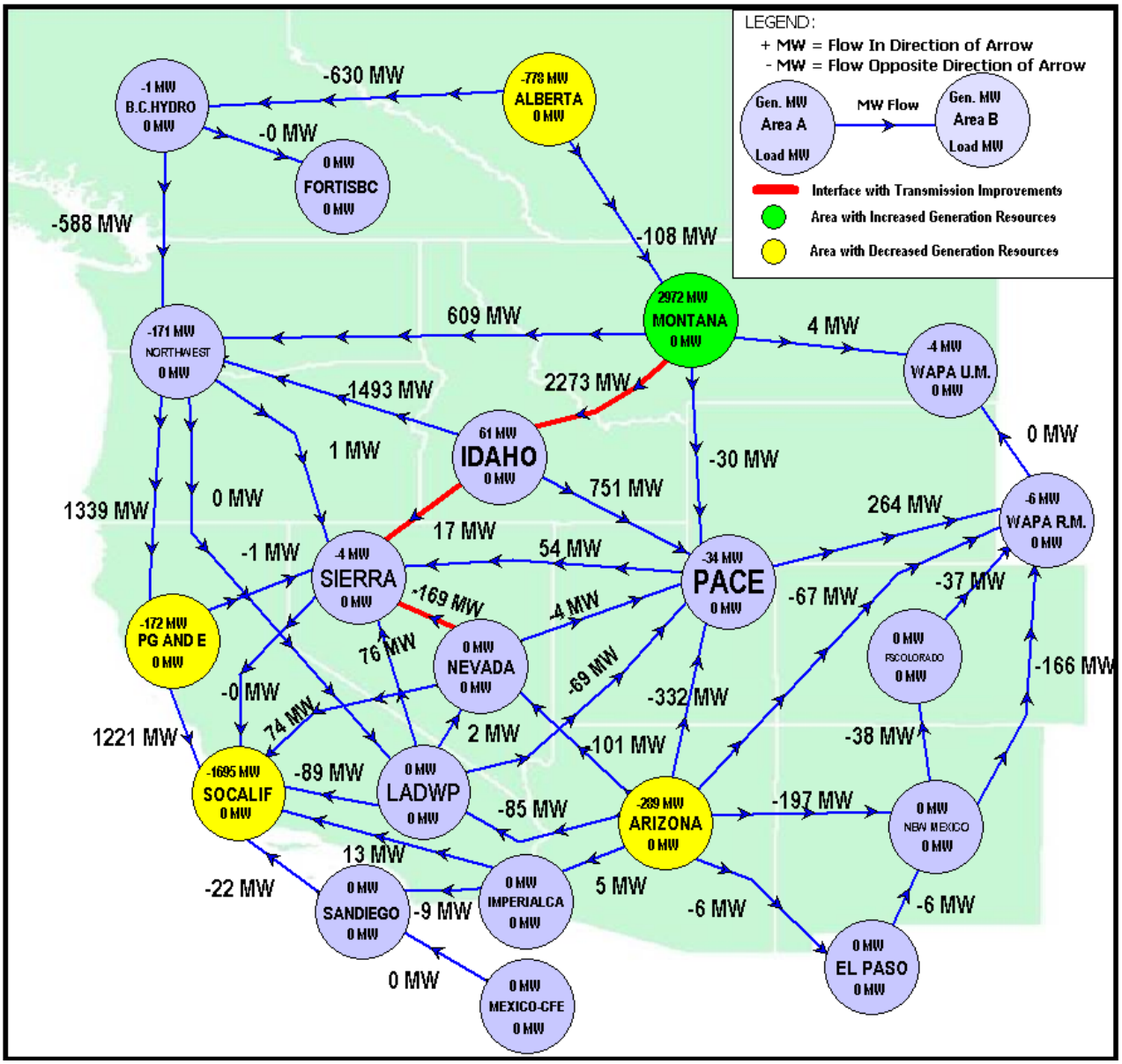

Figure 56 – Difference Flow 3000MW Montana: AUG 10 Hour 13 (Core Case vs. Post-Imp)

Bubble Diagrams

for

3000MW in Wyoming

JUL27H16

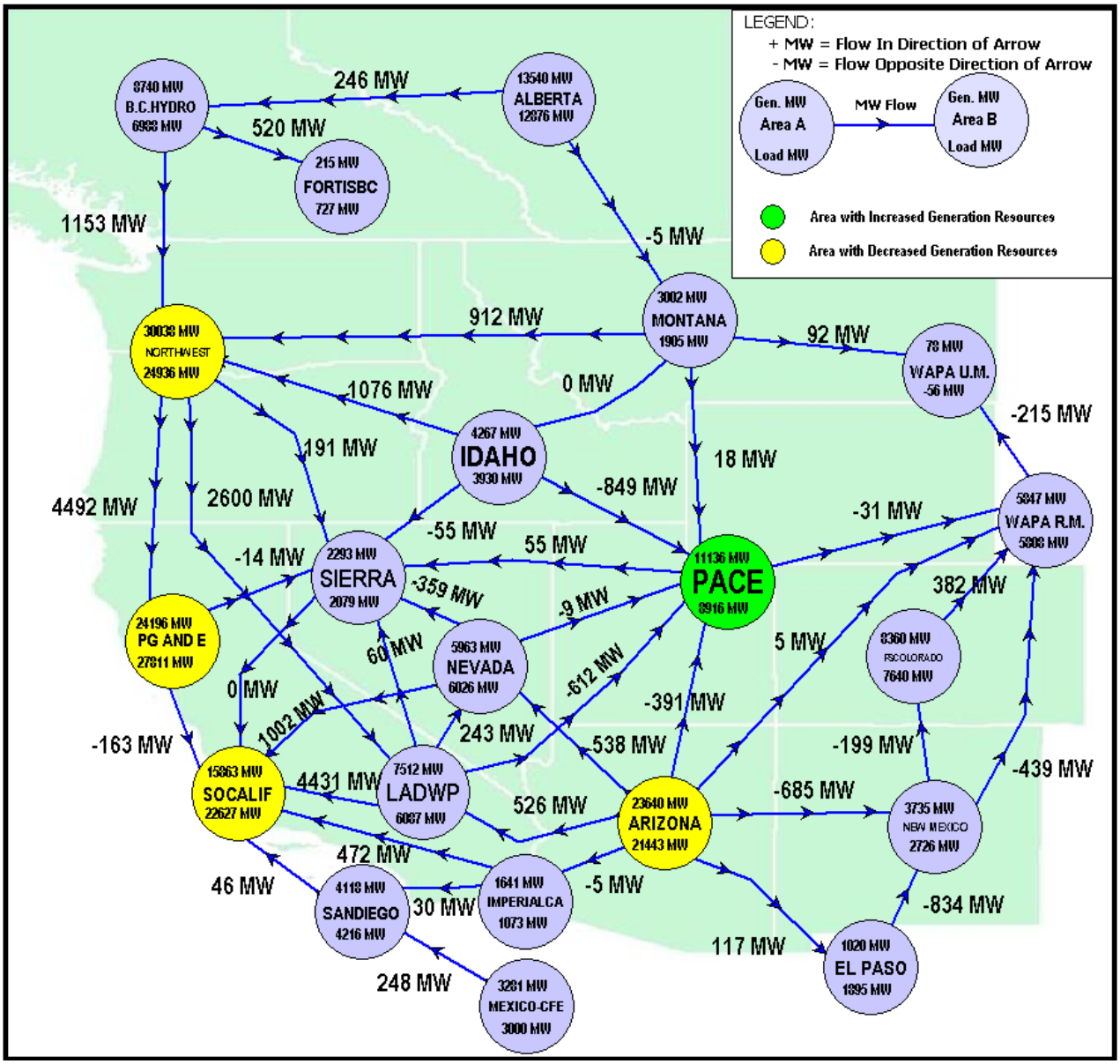

Figure 57 – 3000MW Wyoming: JUL 27 Hour 16 (Pre-Transmission Improvements)

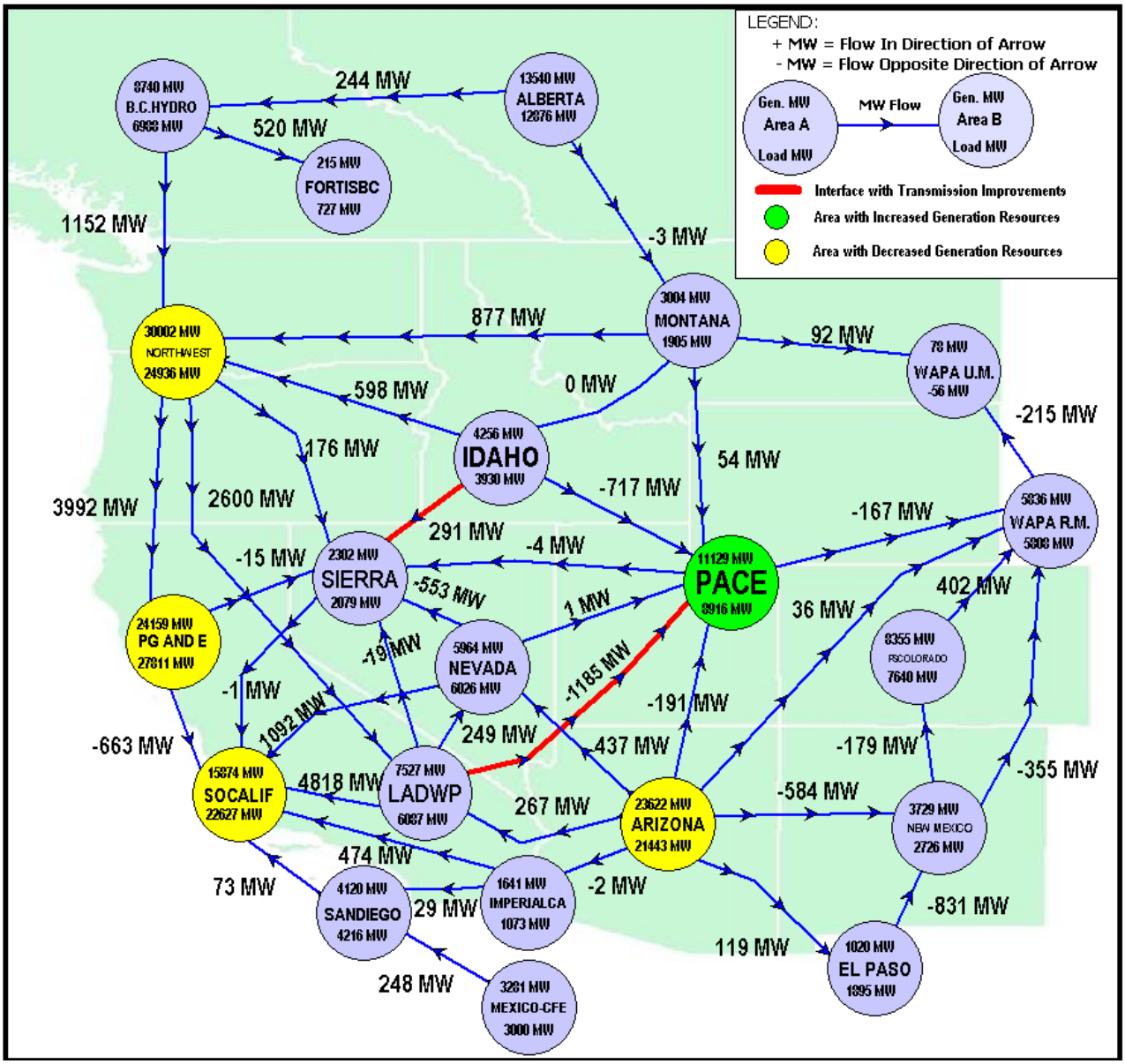

Figure 58 – 3000MW Wyoming: JUL 27 Hour 16 (Post-Transmission Improvements)

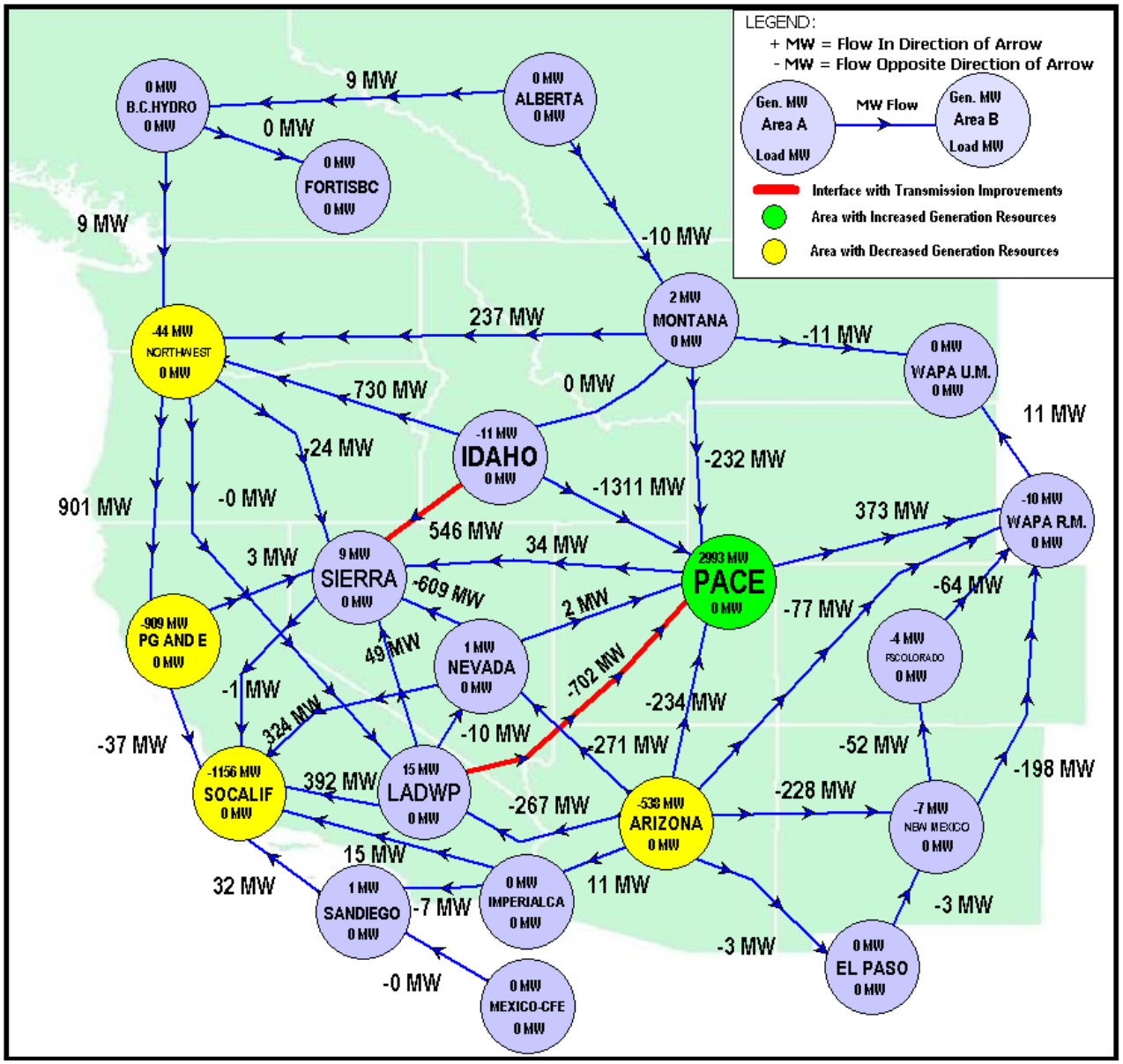

Figure 59 – Difference Flow 3000MW Wyoming: JUL 27 Hour 16 (Core Case vs. Post-Imp)

Bubble Diagrams

for

3000MW in Wyoming

DEC22H18

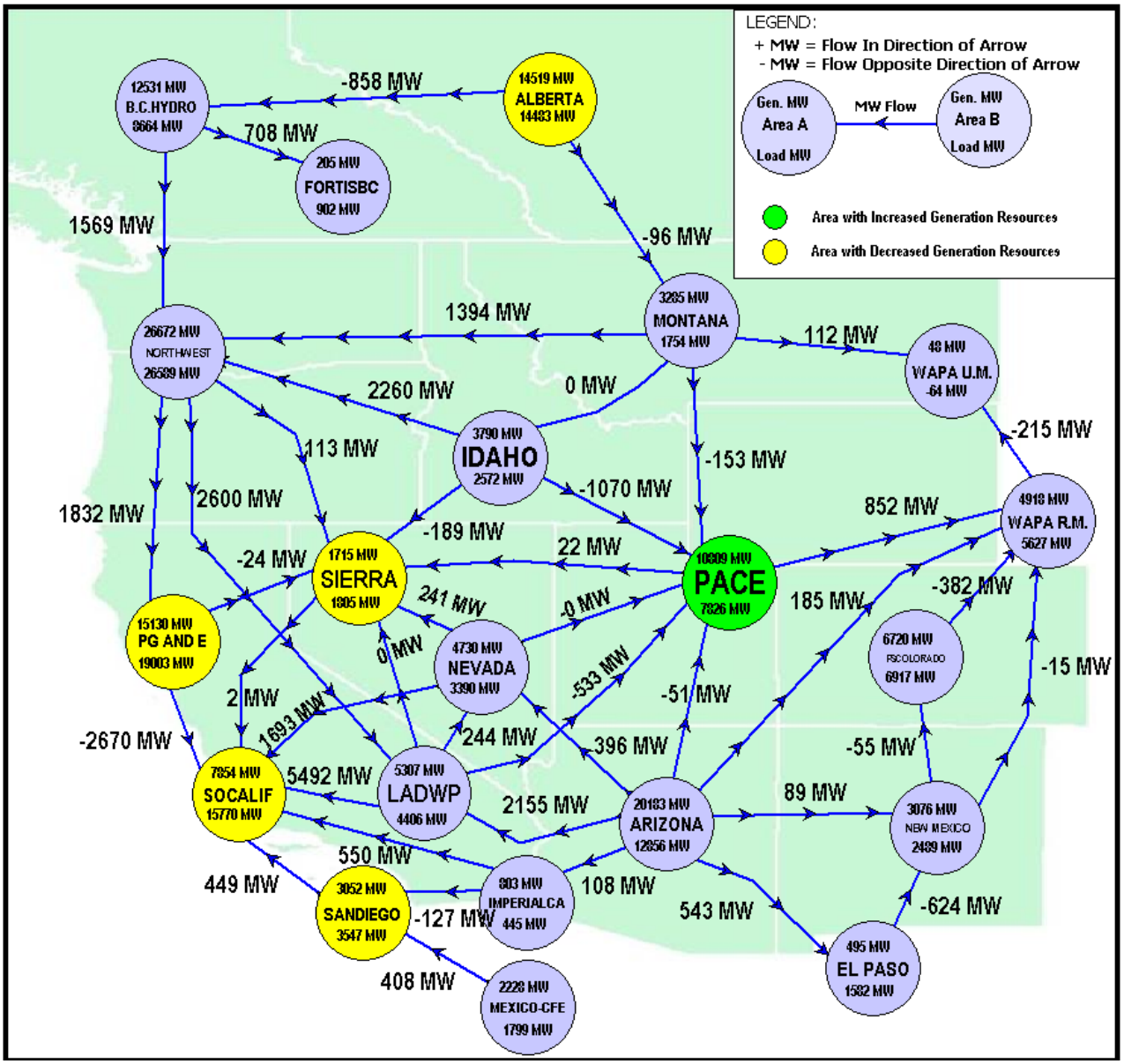

Figure 60 – 3000MW Wyoming: DEC 22 Hour 18 (Pre-Transmission Improvements)

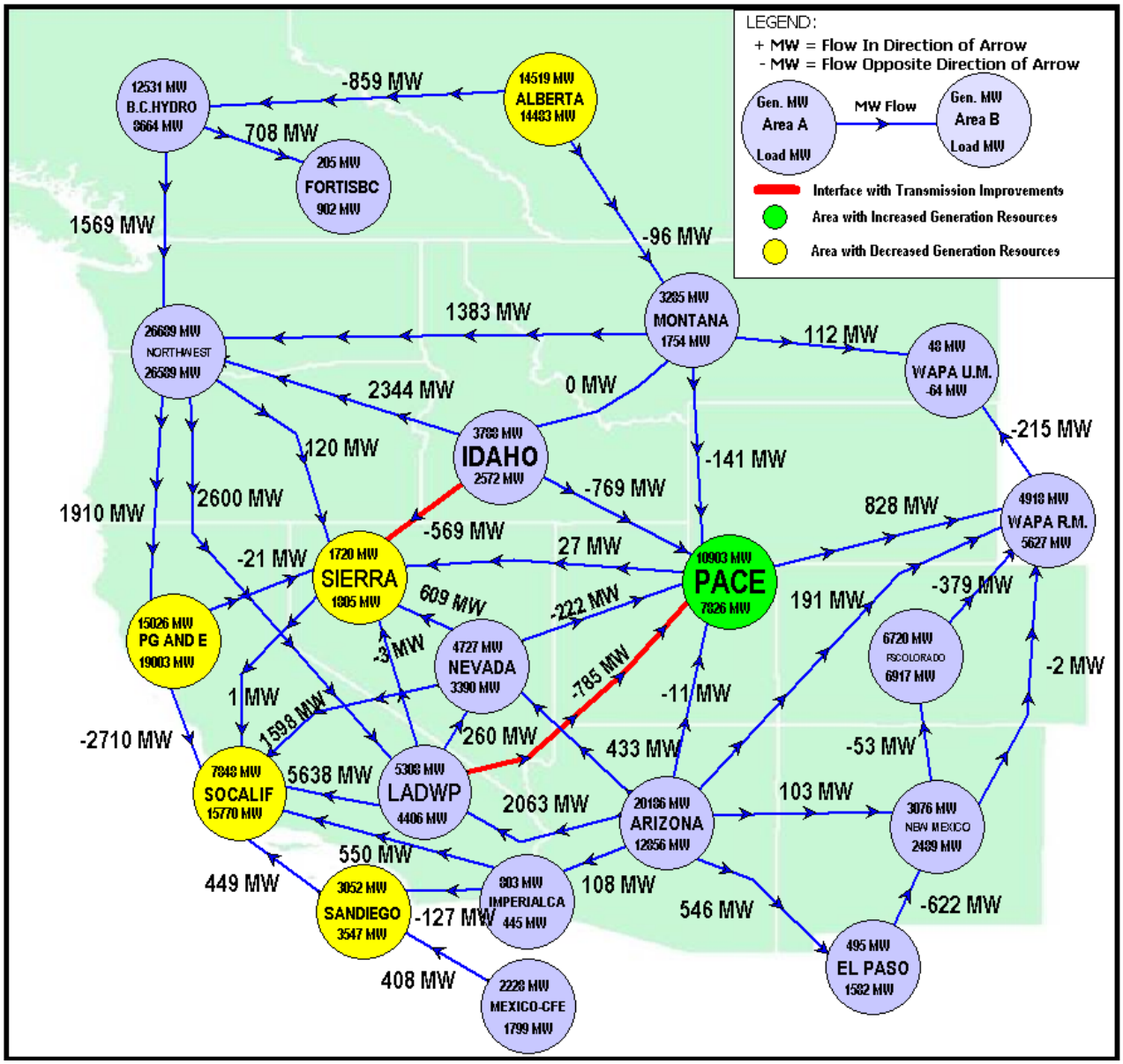

Figure 61 – 3000MW Wyoming: DEC 22 Hour 18 (Post-Transmission Improvements)

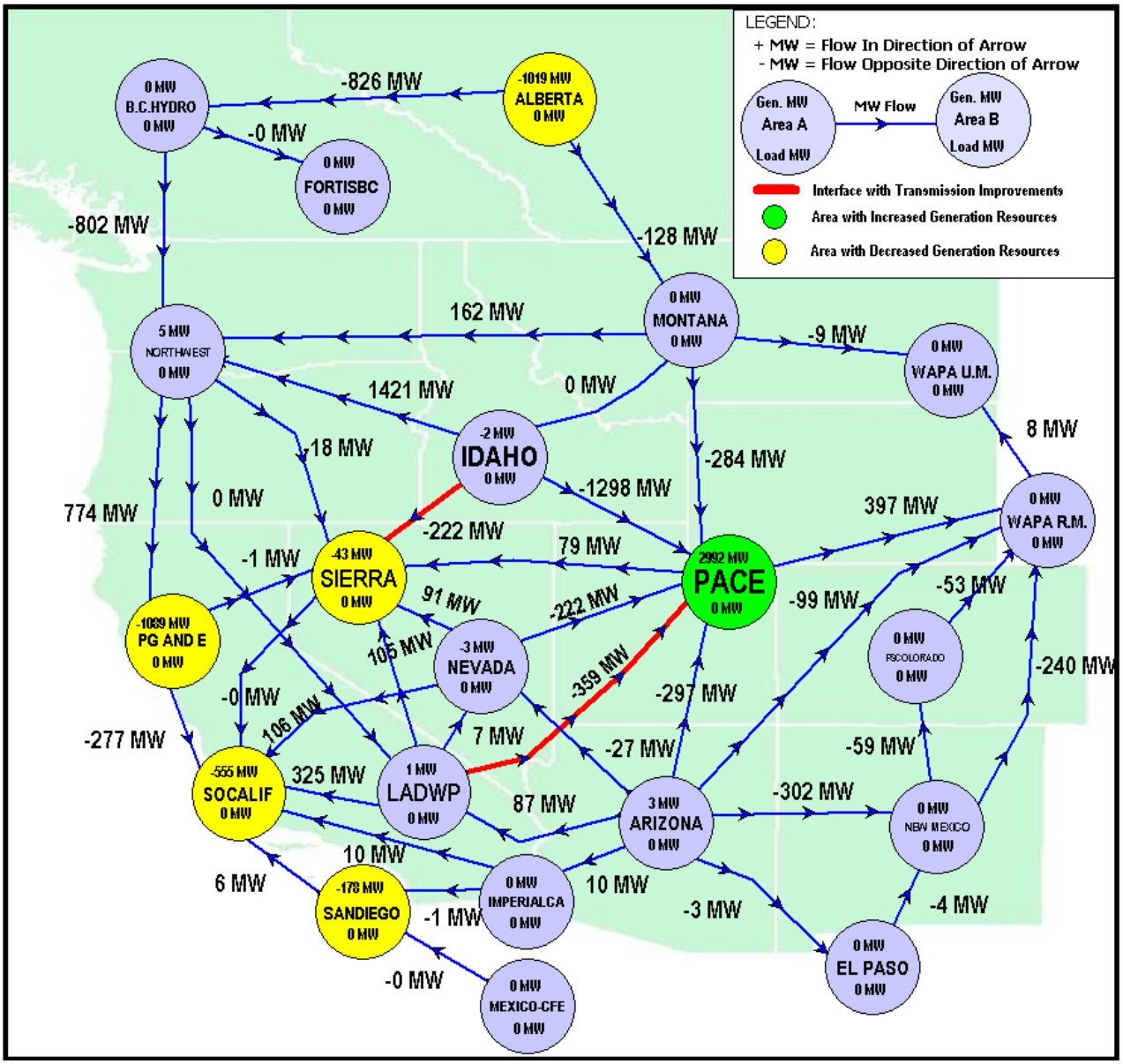

Figure 62 – Difference Flow 3000MW Wyoming: DEC 22 Hour 18 (Core Case vs. Post-Imp)

Bubble Diagrams
for
3000MW in Wyoming
MAR02H21

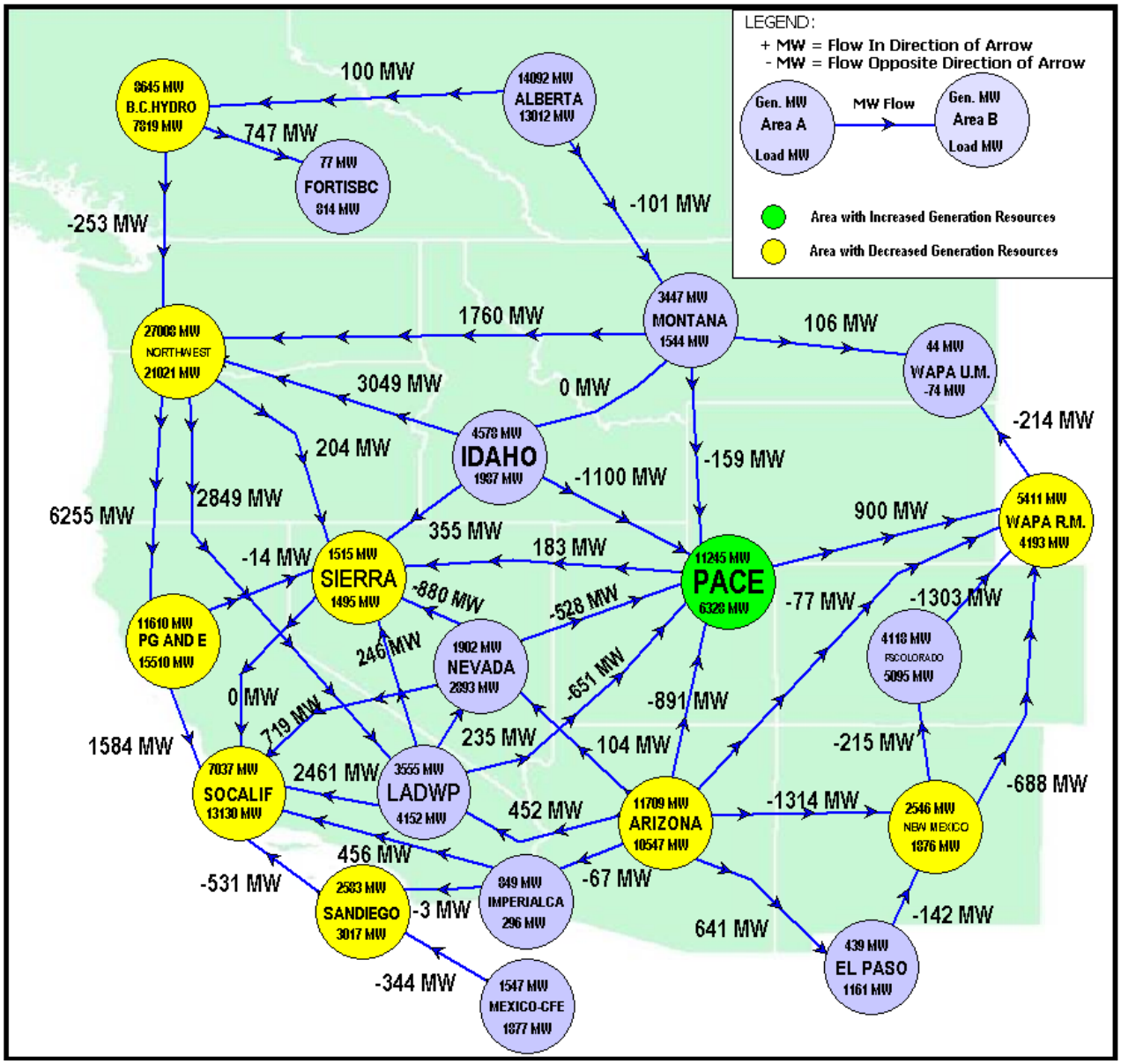

Figure 63 – 3000MW Wyoming: MAR 02 Hour 21 (Pre-Transmission Improvements)

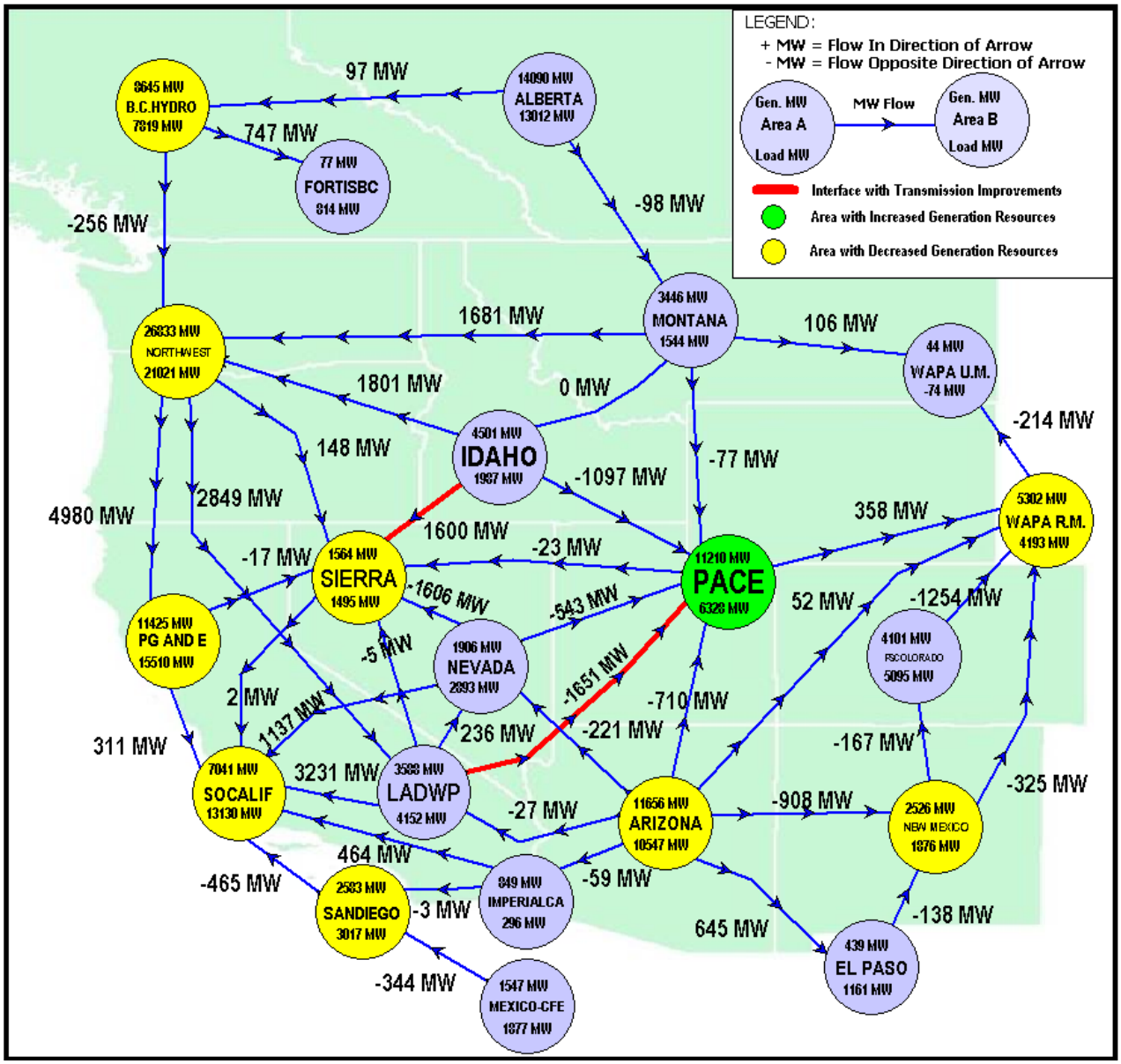

Figure 64 – 3000MW Wyoming: MAR 02 Hour 21 (Post-Trans Improvements)

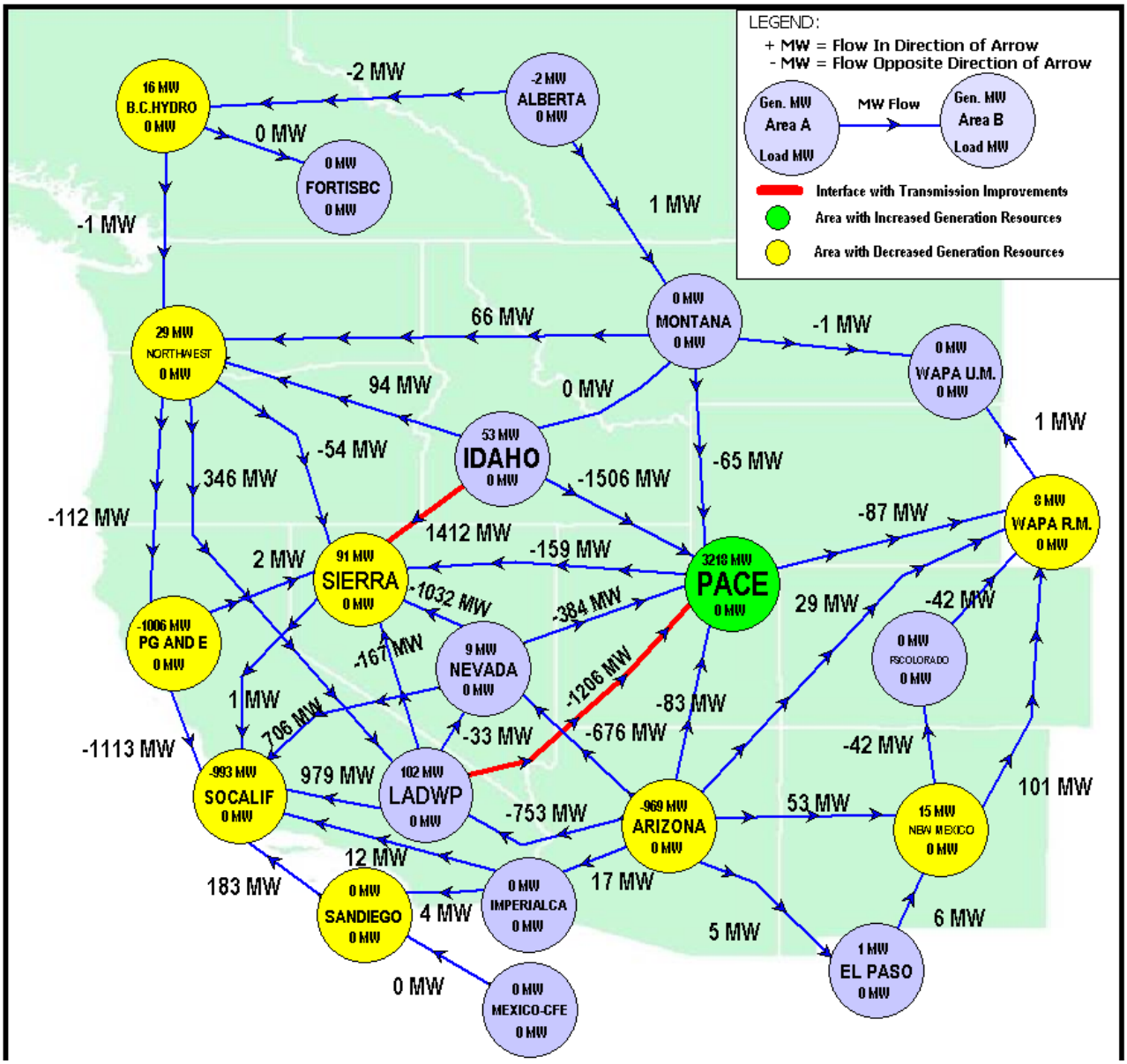

Figure 65 – Difference Flow 3000MW Wyoming: MAR 02 Hour 21 (Core Case vs. Post-Imp AC Solution)

Bubble Diagrams
for
3000MW in Wyoming
OCT04H21

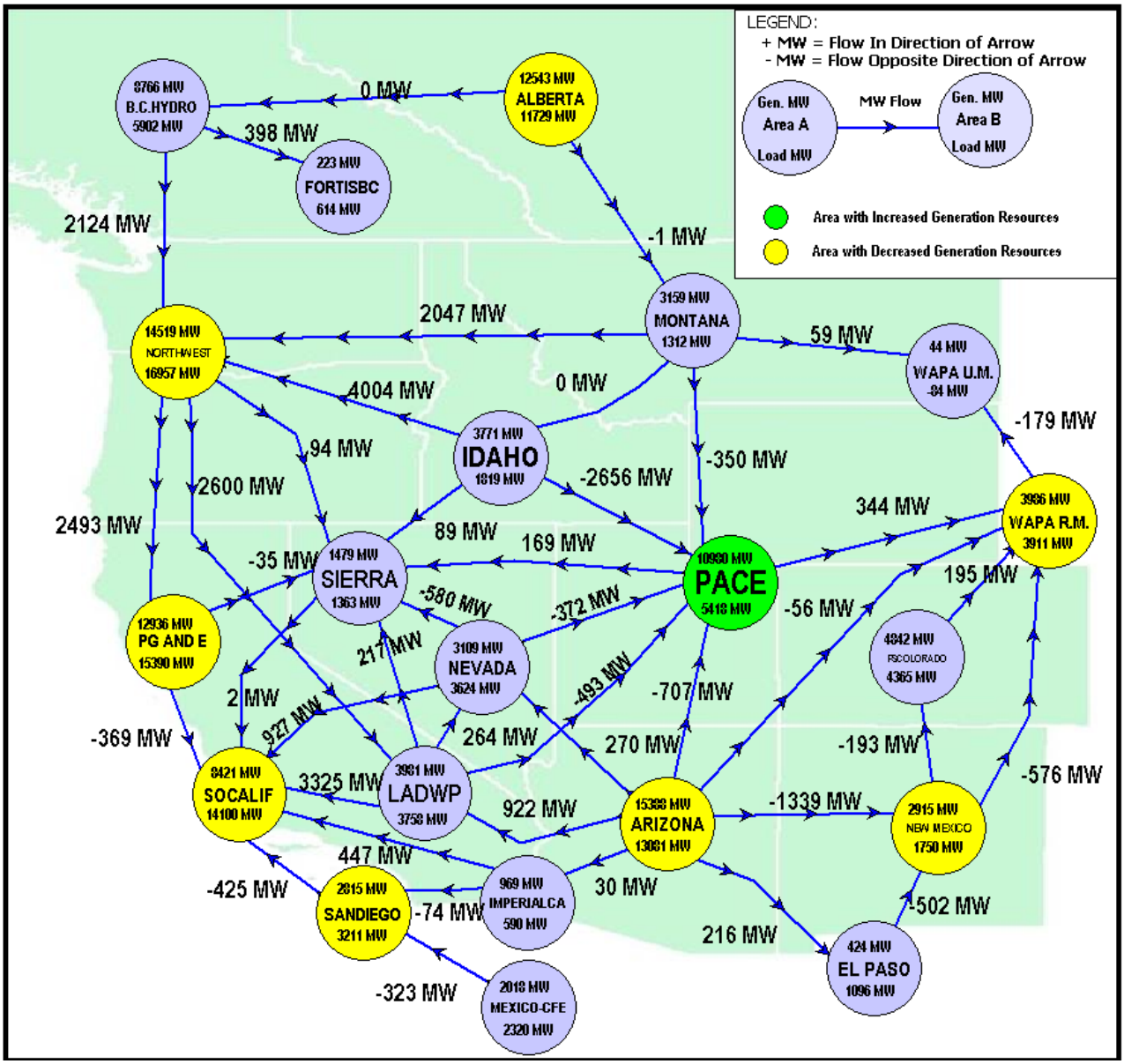

Figure 66 – 3000MW Wyoming: OCT 04 Hour 21 (Pre-Transmission Improvements)

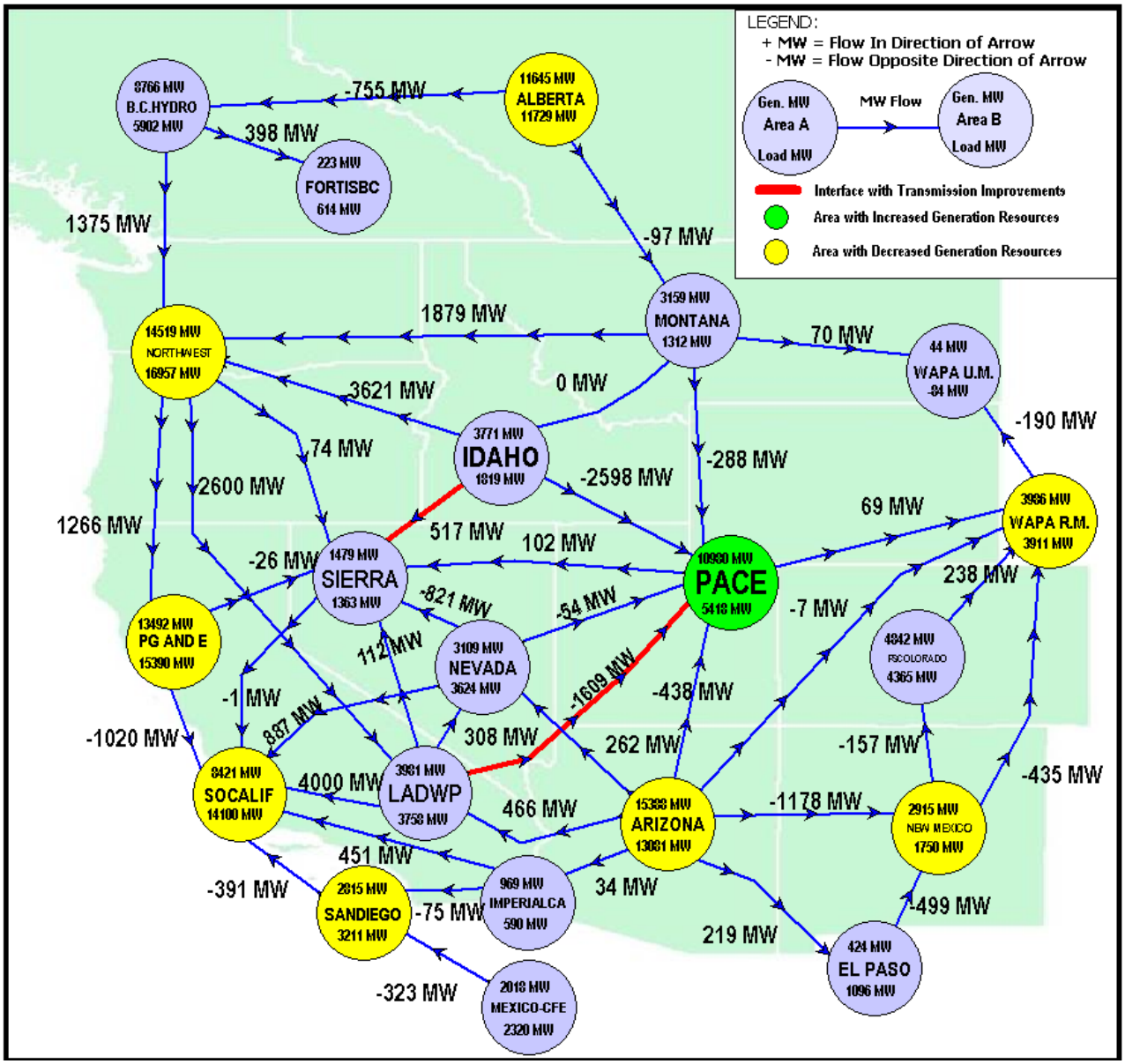

Figure 67 – 3000MW Wyoming: OCT 04 Hour 21 (Post-Transmission Improvements)

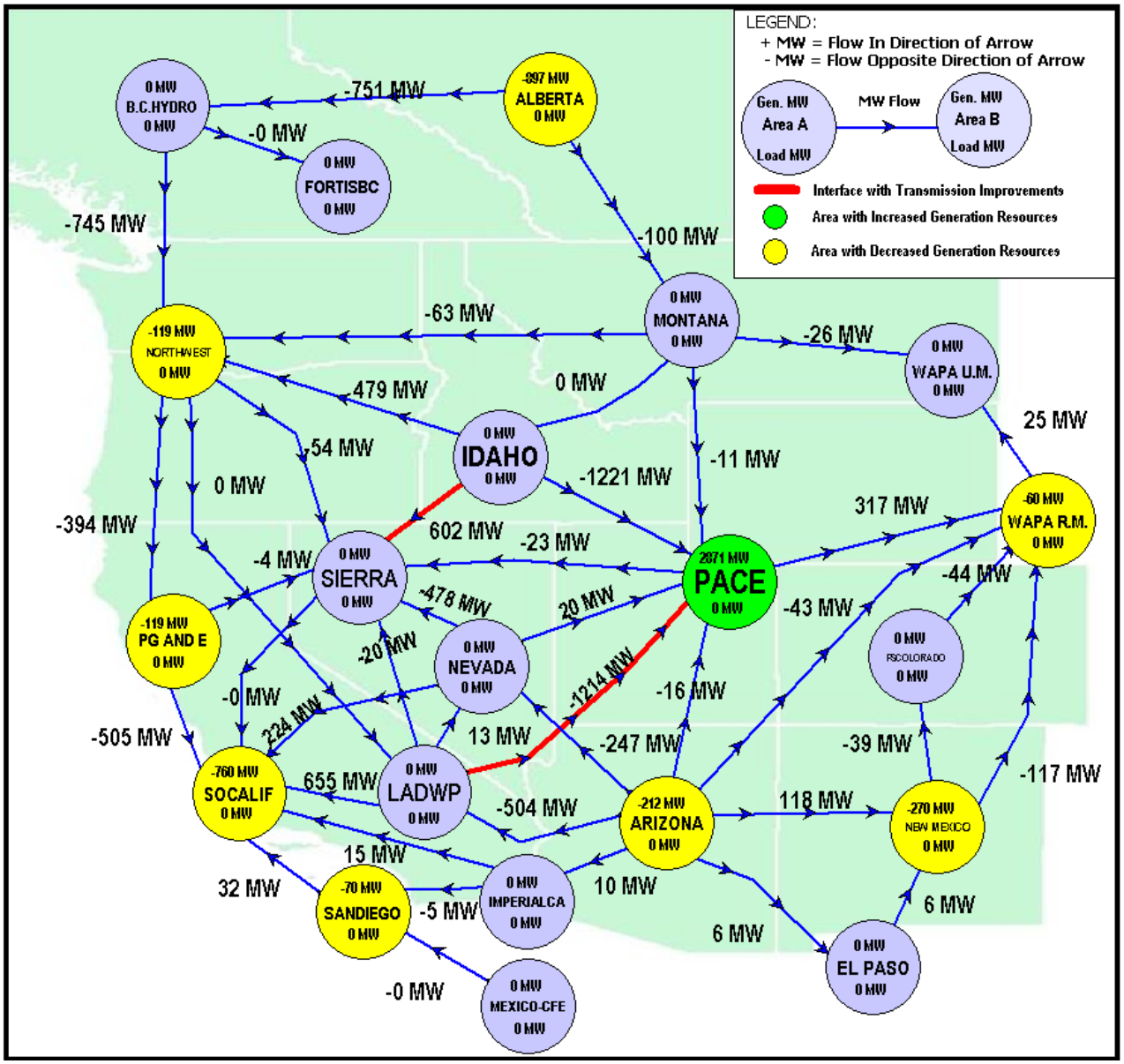

Figure 68 – Difference Flow 3000MW Wyoming: OCT 04 Hour 21 (Core Case vs. Post-Imp)

Bubble Diagrams
for
3000MW in Wyoming
AUG10H13

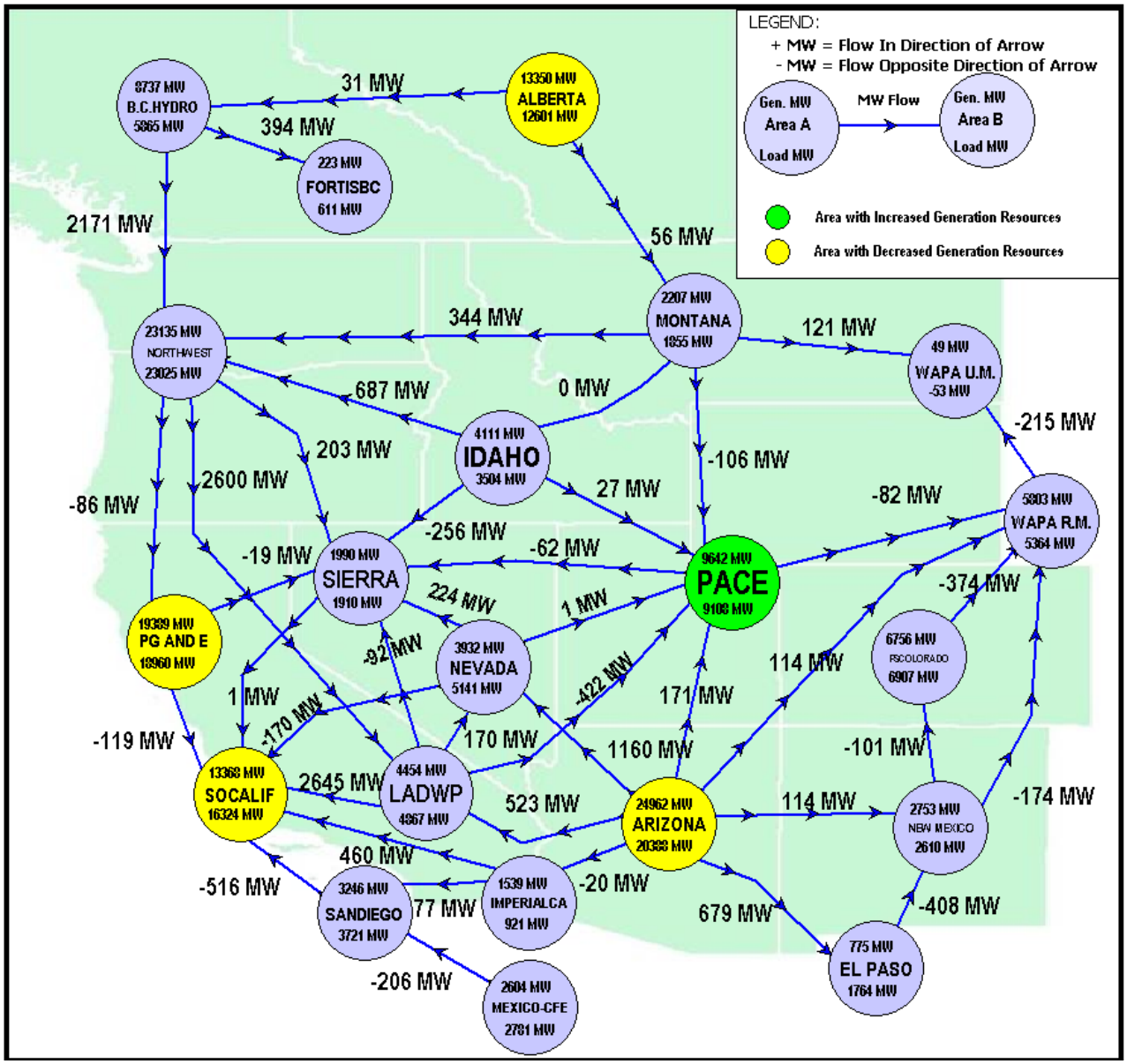

Figure 69 – 3000MW Wyoming: AUG 10 Hour 13 (Pre-Transmission Improvements)

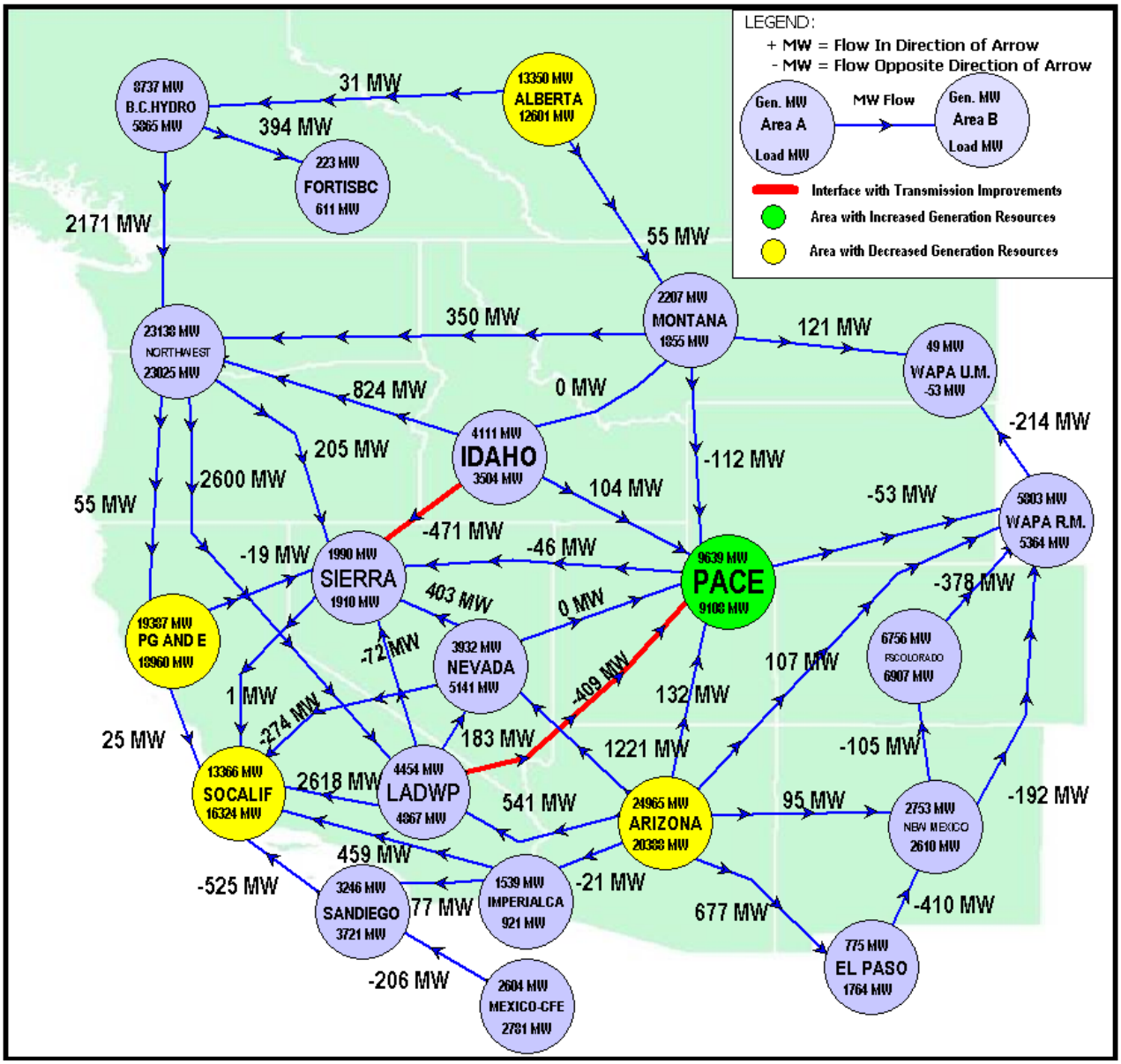

Figure 70 – 3000MW Wyoming: AUG 10 Hour 13 (Post-Transmission Improvements)

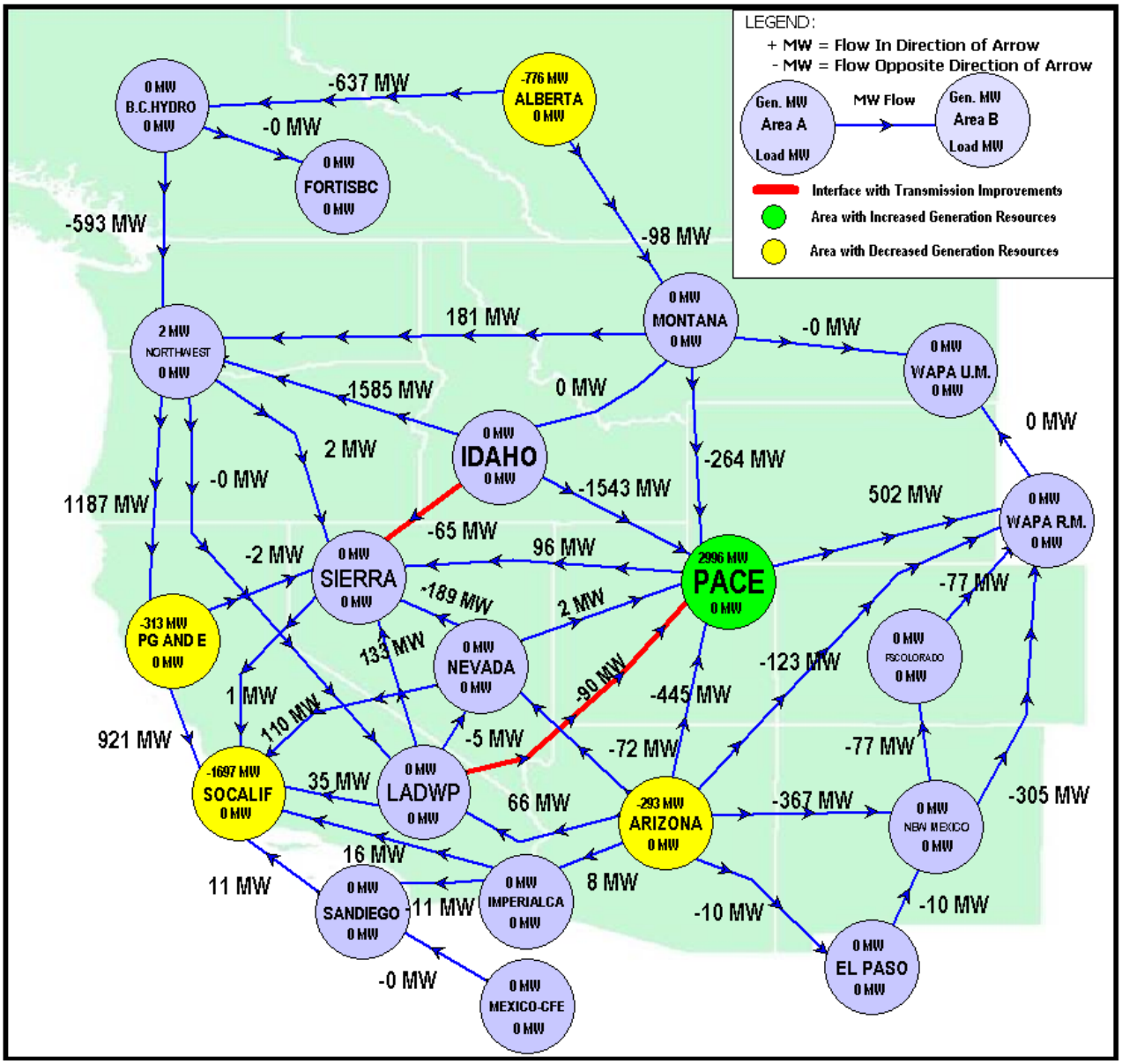

Figure 71 – Difference Flow 3000MW Wyoming: AUG 10 Hour 13 (Core Case vs. Post-Imp)

Appendix 6

Core Cases: Violation Tables

Core Cases: N-0 Violation Tables

Core Case – July 27 H16 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	CS_____1 (64346) -> CS__2309 (64379) CKT 1 at CS_____1	198.95	198.95	120	165.79	SIERRA-SIERRA	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	28.12	28.12	20	140.59	PACE-PACE	230
Branch MVA	BEAVER (43017) -> BEAVER (43021) CKT 1 at BEAVER	485.39	485.39	348	139.48	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	54.85	54.85	40	137.12	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	34.22	34.22	25	136.9	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	40.73	40.73	33	123.42	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	40.73	40.73	33	123.42	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	27.02	27.02	22.4	120.64	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	117.17	117.17	100	117.17	PACE-PACE	230
Branch MVA	CC_CT C1 (60268) -> LANGLEY (60266) CKT 1 at CC_CT C1	274.27	274.27	240	114.28	IDAHO-IDAHO	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	24.12	24.12	22.4	107.68	PACE-PACE	230
Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	306.58	306.58	287	106.82	PACE-PACE	345
Branch MVA	BOYLE 2 (45064) -> BOYLE (45025) CKT 1 at BOYLE	43.73	43.73	42.3	103.38	NORTHWEST-NORTHWEST	230
Branch MVA	MNTFRM G (47675) -> MINTFARM (47677) CKT 1 at MINTFARM	222.01	222.01	215	103.26	NORTHWEST-NORTHWEST	230

Core Case – July 27 H16 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.31	1.31	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.18	1.18	1.1		MONTANA	230
Bus High Volts	TOWN2 (62012)	1.16	1.16	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.16	1.16	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.14	1.14	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.14	1.14	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GARRISON (40459)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	GARTAF11 (41066)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GARTAF12 (41068)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GARTAF21 (41070)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	HOT SPR (40553)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	PONSUM11 (41048)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	TAFT (41057)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.11	1.11	1.1		MONTANA	500
Bus High Volts	GRIMAL21 (40700)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.1	1.1	1.1		NORTHWEST	500

Core Case – December 22 H18 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	29	29	20	145	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	35.27	35.27	25	141.07	PACE-PACE	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	56.36	56.36	40	140.91	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	41.93	41.93	33	127.05	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	41.93	41.93	33	127.05	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	27.83	27.83	22.4	124.26	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	121.15	121.15	100	121.15	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	24.84	24.84	22.4	110.91	PACE-PACE	230

Core Case – December 22 H18 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.29	1.29	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.18	1.18	1.1		MONTANA	230
Bus High Volts	TOWN2 (62012)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	GARRISON (40459)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL23 (40704)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL24 (40706)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL26 (40710)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	PONSUM11 (41048)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI11 (45039)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIZZ R3 (40488)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIZZLY (40489)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	HOT SPR (40553)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIJOH12 (40591)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIJOH22 (40594)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL22 (40702)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL25 (40708)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	PONDROSA (40837)	1.11	1.11	1.1		NORTHWEST	500
Bus High	SUMMER L (41043)	1.11	1.11	1.1		NORTHWEST	500

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MALSUM11 (41044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MALSUM12 (41046)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	PONSUM12 (41050)	1.11	1.11	1.1		NORTHWEST	500
Bus High	PONSUM13 (41052)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	PONSUM14 (41054)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GARTAF12 (41068)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI12 (45040)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI13 (45041)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI14 (45042)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI15 (45043)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BIG EDDY (40111)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BUCKLEY (40155)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BUCGRI11 (40498)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BUCMAR11 (40722)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JOHMAR11 (40724)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	TAFT (41057)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GARTAF11 (41066)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GARTAF21 (41070)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CELILO1 (41311)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CELILO2 (41312)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	KNIGHT (41450)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ROUND BU (43485)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPTJACK (45035)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	MERIDINP (45197)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	KFALLS (45262)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.1	1.1	1.1		MONTANA	500
Bus High Volts	MATL AB (62365)	1.1	1.1	1.1		MONTANA	230

Core Case – March 2 H21 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPOFWLD	191.36	191.36	110	173.97	PACE-PACE	230
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.5	204.5	125	163.6	NORTHWEST-NORTHWEST	230
Branch MVA	LEANJ 1 (44887) -> JONESCYN (47814) CKT 1 at JONESCYN	203.68	203.68	125	162.94	NORTHWEST-NORTHWEST	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLOND EA	194.18	194.18	120	161.82	NORTHWEST-NORTHWEST	230
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	231.55	231.55	167	138.65	NORTHWEST-NORTHWEST	230
Branch MVA	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	330.3	330.3	255	129.53	NORTHWEST-NORTHWEST	230
Interface MW	PAVANT, INTRMTN - GONDER 230 KV	297.88	297.88	245	121.59	N/A	230
Branch MVA	WHTCK 1 (47902) -> WHITE CK (47827) CKT 1 at WHITE CK	146.09	146.09	125	116.87	NORTHWEST-NORTHWEST	230
Branch MVA	JOHN DAY (40584) -> JOHN DAY (40585) CKT 1 at JOHN DAY	1318.23	1318.23	1218	108.23	NORTHWEST-NORTHWEST	500
Branch MVA	MALIN (40687) -> MALROU21 (40697) CKT 2 at MALROU21	1682.57	1682.57	1558.8	107.94	NORTHWEST-PG AND E	500
Branch MVA	KLONDTAP (47830) -> JOHN DAY (40584) CKT 1 at JOHN DAY	736.44	736.44	694.8	105.99	NORTHWEST-NORTHWEST	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	105.89	105.89	100	105.89	PACE-PACE	230
Branch MVA	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	330.22	330.22	317	104.17	NORTHWEST-NORTHWEST	230

March 2 H21 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	TOWN2 (62012)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	GARRISON (40459)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ROBH A12 (64897)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	ASHMAR22 (40719)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.1	1.1	1.1		MONTANA	500
Bus Low Volts	HEMGRA11 (60157)	0.9	0.9	0.9		IDAHO	500

Core Case – October 04 H21 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	LEANJ 1 (44887) -> JONESCYN (47814) CKT 1 at JONESCYN	158.7	158.7	125	126.96	NORTHWEST-NORTHWEST	230
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	156.65	156.65	125	125.32	NORTHWEST-NORTHWEST	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLON 31	144.14	144.14	120	120.12	NORTHWEST-NORTHWEST	230
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPOFWLD	131.97	131.97	110	119.97	PACE-PACE	230
Interface MW	MIDPOINT - SUMMER LAKE	1600.63	1600.63	1500	106.71	N/A	500
Interface MW	PAVANT, INTRMTN - GONDER 230 KV	257.18	257.18	245	104.97	N/A	230
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	174.01	174.01	167	104.2	NORTHWEST-NORTHWEST	230
Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	1765.98	1765.98	1732.05	101.96	NORTHWEST-NORTHWEST	500
Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	650.76	650.76	640.11	101.67	NORTHWEST-NORTHWEST	230
Interface MW	PATH C	1408.33	1408.33	1400	100.6	N/A	N/A
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	100.3	100.3	100	100.3	PACE-PACE	230

Core Case – October 04 H21 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.31	1.31	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.18	1.18	1.1		MONTANA	230
Bus High Volts	GRIMAL21 (40700)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL26 (40710)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	PONSUM12 (41050)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI11 (45039)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	TOWN2 (62012)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIZZ R3 (40488)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIZZLY (40489)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIJOH12 (40591)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIJOH22 (40594)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL22 (40702)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL23 (40704)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL24 (40706)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL25 (40708)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BUCMAR11 (40722)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	PONSUM13 (41052)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	PONSUM14 (41054)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BURNS (45029)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI12 (45040)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI13 (45041)	1.11	1.11	1.1		NORTHWEST	500
Bus High	CAPGRI14 (45042)	1.11	1.11	1.1		NORTHWEST	500

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	CAPGRI15 (45043)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	DIXONVLE (45095)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MERIDINP (45197)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.11	1.11	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.11	1.11	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.11	1.11	1.1		MONTANA	500
Bus High Volts	ALVEY (40051)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BUCKLEY (40155)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BUCGRI11 (40498)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	MALIN R1 (40684)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	MALIN (40687)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	MALIN R3 (40688)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	MARION (40699)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR21 (40718)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JOHMAR11 (40724)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	PONDROSA (40837)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	SUMMER L (41043)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	MALSUM12 (41046)	1.1	1.1	1.1		NORTHWEST	500
Bus High	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	KNIWAU11 (41453)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ROUND BU (43485)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPTJACK (45035)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ALVDIX11 (45096)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	KFALLS (45262)	1.1	1.1	1.1		NORTHWEST	500

Core Case – August 10 H13 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	29.91	29.91	20	149.53	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	36.34	36.34	25	145.36	PACE-PACE	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	58.04	58.04	40	145.1	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	43.14	43.14	33	130.71	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	43.14	43.14	33	130.71	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	28.66	28.66	22.4	127.95	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	125.23	125.23	100	125.23	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	25.58	25.58	22.4	114.2	PACE-PACE	230
Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	304.03	304.03	287	105.93	PACE-PACE	345
Branch MVA	MIDWEST (65955) -> MIDWEST (65956) CKT 2 at MIDWEST	25.31	25.31	25	101.23	PACE-PACE	230

Core Case – August 10 H13 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.2	1.2	1.1		MONTANA	230
Bus High Volts	TOWN2 (62012)	1.17	1.17	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.17	1.17	1.1		MONTANA	500
Bus High Volts	GARRISON (40459)	1.15	1.15	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GARTAF12 (41068)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GRIMAL26 (40710)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	MALSUM11 (41044)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	PONSUM11 (41048)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GARTAF11 (41066)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GARTAF21 (41070)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	CAPGRI11 (45039)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	MARIAS (62362)	1.13	1.13	1.1		MONTANA	230
Bus High Volts	GRIZZ R3 (40488)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIZZLY (40489)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	HOT SPR (40553)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIJOH12 (40591)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIJOH22 (40594)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL22 (40702)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL23 (40704)	1.12	1.12	1.1		NORTHWEST	500
Bus High	GRIMAL24 (40706)	1.12	1.12	1.1		NORTHWEST	500

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	GRIMAL25 (40708)	1.12	1.12	1.1		NORTHWEST	500
Bus High	PONDROSA (40837)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	SUMMER L (41043)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	MALSUM12 (41046)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	PONSUM12 (41050)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	PONSUM13 (41052)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	PONSUM14 (41054)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI12 (45040)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI13 (45041)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI14 (45042)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI15 (45043)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	BUCKLEY (40155)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BUCGRI11 (40498)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MALIN R1 (40684)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MALIN (40687)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MALIN R3 (40688)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BUCMAR11 (40722)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	JOHMAR11 (40724)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	TAFT (41057)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ROUND BU (43485)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPTJACK (45035)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	DIXONVLE (45095)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MERIDINP (45197)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	KFALLS (45262)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.11	1.11	1.1		MONTANA	500
Bus High Volts	ALVEY (40051)	1.1	1.1	1.1		NORTHWEST	500

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	BIG EDDY (40111)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	MARION (40699)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR21 (40718)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BELTAF11 (41060)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CELILO1 (41311)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CELILO2 (41312)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	KNIGHT (41450)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	KNIWAU11 (41453)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNCDR11 (43952)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ALVDIX11 (45096)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	DIXMER11 (45199)	1.1	1.1	1.1		NORTHWEST	500

Core Cases: N-1 Violation Tables

Core Case – July 27 H16 – N-1 Overloads

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	306.58	459.36	321	143.1	PACE-PACE	345
L-065420DAVEJOHN-067814WINDSTARC2	Branch Amp	DAVEJOHN (65420) -> WINDSTAR (67814) CKT 1 at DAVEJOHN	564.24	1314.06	953.88	137.76	PACE-PACE	230
T-065140BENLOMND-065145BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	306.58	381.2	321	118.75	PACE-PACE	345
T-065140BENLOMND-065145BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	306.58	359.75	321	112.07	PACE-PACE	345
T-0600843MIKNOLL-0652913MIKNOLLC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	306.58	339.4	321	105.73	PACE-PACE	345
T-066050NAUGHTON-066065NAUGT_G3C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	306.58	336.09	321	104.7	PACE-PACE	345
T-065135BENLOMND-065140BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	306.58	328.59	321	102.36	PACE-PACE	345
T-065135BENLOMND-065140BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	306.58	328.54	321	102.35	PACE-PACE	345
L-060085BRIDGER-0600843MIKNOLLC1-MS	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	306.58	326.74	321	101.79	PACE-PACE	345
T-066050NAUGHTON-066060NAUGT_G2C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	306.58	324.85	321	101.2	PACE-PACE	345

Core Case – July 27 H16 – N-1 Voltage Violations

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.16	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.16	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.14	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.14	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.13	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.12	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.12	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.12	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.12	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.11	1.13	1.1		MONTANA	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.05	1.11	1.1		PACE	230
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.13	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.1	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.97	0.88	0.9		NORTHWEST	230
N-1: Colstrip-Broadview 500 #1	Bus High Volts	BROADV&2 (62053)	1.14	1.15	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.16	1.18	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.16	1.18	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High	GAR1EAST (40451)	1.13	1.15	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.13	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.13	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.12	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF12 (41068)	1.12	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.12	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF22 (41072)	1.12	1.14	1.1		NORTHWEST	500
T-1: Great Falls 230-100	Bus High Volts	MATL AB (62365)	1.1	1.11	1.1		MONTANA	230

Core Case – December 22 H18 – N-1 Overloads

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	243.28	372.96	321	116.19	PACE-PACE	345
L-1:040826PEARLW230-043527SHERWOOD230C1-MS	Branch Amp	PEARL # (43773) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1404.82	2399.35	2299.36	104.35	NORTHWEST-NORTHWEST	230
L-1:043773PEARL#230-043527SHERWOOD230C1	Branch Amp	PEASHE12 (43530) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1195.49	2313.16	2299.36	100.6	NORTHWEST-NORTHWEST	230

Core Case – December 22 H18 – N-1 Voltage Violations

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.12	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.11	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.11	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.1	1.13	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TAFT (41057)	1.1	1.11	1.1		NORTHWEST	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.07	1.11	1.1		IDAHO	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.05	1.14	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.07	1.12	1.1		SIERRA	230
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.13	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.1	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.99	0.88	0.9		NORTHWEST	230

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
N-1: Broadview-Garison 500 #1	Bus High	GAR2EAST (40453)	1.13	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.15	1.16	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.15	1.16	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.13	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.13	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.12	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.1	1.12	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.1	1.12	1.1		NORTHWEST	500

Core Case – March 2 H21 – N-1 Overloads

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	814.26	1430.55	640.11	223.49	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.5	207.06	125	165.65	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR E TP (45160) -> BOARD T2 (40123) CKT 1 at DR E TP	789.29	1403.58	870.04	161.32	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DALREED (45075) -> DR E TP (45160) CKT 1 at DALREED	789.3	1403.59	873.56	160.68	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	813.2	1429.85	1006.6	142.05	NORTHWEST-NORTHWEST	230
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	814.26	829.56	640.11	129.6	NORTHWEST-NORTHWEST	230
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	814.26	829.15	640.11	129.53	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	BOARD T2 (40123) -> MCNRY S2 (41352) CKT 1 at BOARD T2	786.04	1400.46	1320.12	106.09	NORTHWEST-NORTHWEST	230
G-1: Colstrip #4	Branch MVA	JGAPCLCT (62214) -> JUDITHSO (62083) CKT 1 at JUDITHSO	162.09	174.7	166.6	104.86	MONTANA-MONTANA	230
G-1: Colstrip #1	Branch MVA	JGAPCLCT (62214) -> JUDITHSO (62083) CKT 1 at JUDITHSO	162.09	166.92	166.6	100.19	MONTANA-MONTANA	230

Core Case – March 2 H21 – N-1 Voltage Violations

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #1	Bus High Volts	TOWN2 (62012)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	TOWN1 (62013)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADVU (62046)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&2 (62053)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&1 (62054)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	GARRISON (40459)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF12 (41068)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF22 (41072)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF11 (41066)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF21 (41070)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.11	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High	GARTAF11 (41066)	1.09	1.12	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.09	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.1	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	HOT SPR (40553)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL21 (40700)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TAFT (41057)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI16 (45044)	1.09	1.11	1.1		NORTHWEST	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	ALVDIX11 (45096)	1.08	1.1	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	MERIDINP (45197)	1.08	1.1	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	DIXMER11 (45199)	1.08	1.1	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	KFALLS (45262)	1.08	1.1	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.98	0.89	0.9		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.12	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.13	1.14	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.13	1.14	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-1: Garrison 500-230	Bus High	GARRISON (40459)	1.11	1.12	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.09	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF12 (41068)	1.1	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.09	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF22 (41072)	1.1	1.11	1.1		NORTHWEST	500

Core Case – October 04 H21 – N-1 Overloads

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	650.76	1058.01	640.11	165.29	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	156.65	195.06	125	156.05	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	JONTMB11 (47815) -> TMBLCR T (41079) CKT 1 at TMBLCR T	397.29	986.27	640.11	154.08	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	TMBLCR T (41079) -> SANTIAM (40939) CKT 1 at TMBLCR T	391.58	984.63	640.11	153.82	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	JONESCYN (47814) -> JONTMB11 (47815) CKT 1 at JONTMB11	398.92	975.98	640.11	152.47	NORTHWEST-NORTHWEST	230
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	1765.98	2415.52	1732.05	139.46	NORTHWEST-NORTHWEST	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	1765.98	2415.52	1732.05	139.46	NORTHWEST-NORTHWEST	500
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR E TP (45160) -> BOARD T2 (40123) CKT 1 at DR E TP	628.46	1034.85	870.04	118.94	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DALREED (45075) -> DR E TP (45160) CKT 1 at DALREED	628.47	1034.85	873.56	118.46	NORTHWEST-NORTHWEST	230
L-1:060150HELLSCYN230-045327WALAWALA230C1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1765.98	1837.08	1732.05	106.06	NORTHWEST-NORTHWEST	500
L-060150HELLSCYN-045103HURICANEC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1765.98	1836.55	1732.05	106.03	NORTHWEST-NORTHWEST	500
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	650.42	1057.81	1006.6	105.09	NORTHWEST-NORTHWEST	230
robinson-h allen 500kV #1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1765.98	1817.83	1732.05	104.95	NORTHWEST-NORTHWEST	500
L-040621LAGRANDE-060312NPOWDERC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1765.98	1814.87	1732.05	104.78	NORTHWEST-NORTHWEST	500
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1765.98	1810.36	1732.05	104.52	NORTHWEST-NORTHWEST	500
L-048197LOLO-060275OXBOW	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1765.98	1806.83	1732.05	104.32	NORTHWEST-NORTHWEST	500
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1765.98	1806.43	1732.05	104.29	NORTHWEST-NORTHWEST	500
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1765.98	1806.38	1732.05	104.29	NORTHWEST-NORTHWEST	500
L-065545EXXONWY-066010MONUMENTC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	1765.98	1802.97	1732.05	104.09	NORTHWEST-NORTHWEST	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	MIDPOINT (60240) -> MIDHEM11 (60242) CKT 1 at MIDHEM11	1547.9	2431.32	2338.27	103.98	IDAHO-IDAHO	500

Core Case – October 04 H21 – N-1 Voltage Violations

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #1	Bus High Volts	TOWN2 (62012)	1.12	1.14	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	TOWN1 (62013)	1.12	1.14	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&2 (62053)	1.11	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&1 (62054)	1.11	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADVU (62046)	1.11	1.12	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	GARRISON (40459)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF12 (41068)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF22 (41072)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.12	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.12	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.11	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.11	1.14	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.11	1.14	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.11	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.11	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.08	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.09	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.08	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.09	1.12	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High	COLSTRP (62057)	1.1	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	HOT SPR (40553)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TAFT (41057)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	BELTAF11 (41060)	1.09	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.1	1.14	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL21 (40700)	1.12	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL23 (40704)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL24 (40706)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL25 (40708)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI13 (45041)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI14 (45042)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI16 (45044)	1.12	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIZZ R3 (40488)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIZZLY (40489)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIJOH12 (40591)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIJOH22 (40594)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONDROSA (40837)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	SUMMER L (41043)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM11 (41044)	1.09	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM12 (41046)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM13 (41052)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM14 (41054)	1.11	1.12	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI12 (45040)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI15 (45043)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN R1 (40684)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN (40687)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN R3 (40688)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPTJACK (45035)	1.1	1.11	1.1		NORTHWEST	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.07	1.16	1.1		IDAHO	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.03	1.12	1.1		PACE	230
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.13	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.1	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	1	0.89	0.9		NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Bus High Volts	JONESCYN (47814)	1.04	1.31	1.1		NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Bus High Volts	JONTMB11 (47815)	1.04	1.16	1.1		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.11	1.17	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.12	1.13	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.12	1.13	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.11	1.12	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.11	1.12	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.1	1.11	1.1		NORTHWEST	500

Core Case – August 10 H13 – N-1 Overloads

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	304.03	451.1	321	140.53	PACE-PACE	345
L-065420DAVEJOHN-067814WINDSTARC2	Branch Amp	DAVEJOHN (65420) -> WINDSTAR (67814) CKT 1 at DAVEJOHN	551.65	1284.41	953.88	134.65	PACE-PACE	230
T-065140BENLOMND-065145BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	304.03	377.25	321	117.52	PACE-PACE	345
L-065220BRIDGER-066315ROCKSPGSC2	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	608.14	920.7	800.76	114.98	PACE-PACE	230
T-065140BENLOMND-065145BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	304.03	356.17	321	110.96	PACE-PACE	345
T-0600843MIKNOLL-0652913MIKNOLLC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	304.03	341.52	321	106.39	PACE-PACE	345
T-066050NAUGHTON-066065NAUGT_G3C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	304.03	333.42	321	103.87	PACE-PACE	345
L-060085BRIDGER-0600843MIKNOLLC1-MS	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	304.03	326.92	321	101.85	PACE-PACE	345
T-065135BENLOMND-065140BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	304.03	326.87	321	101.83	PACE-PACE	345
T-065135BENLOMND-065140BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	304.03	326.83	321	101.81	PACE-PACE	345
L-065135BENLOMND-066476SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	304.03	324.03	321	100.94	PACE-PACE	345
T-066050NAUGHTON-066060NAUGT_G2C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	304.03	322.21	321	100.38	PACE-PACE	345

Core Case – August 10 H13 – N-1 Voltage Violations

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.17	1.19	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.17	1.19	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.15	1.16	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.13	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.14	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.13	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.14	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.11	1.14	1.1		MONTANA	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	BURSUM11 (45030)	1.1	1.11	1.1		NORTHWEST	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	HEMINWAY (60155)	1.09	1.1	1.1		IDAHO	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.11	1.13	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.1	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	1	0.88	0.9		NORTHWEST	230
N-1: Colstrip-Broadview 500 #1	Bus High Volts	BROADV&2 (62053)	1.15	1.16	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.17	1.19	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High	TOWN1 (62013)	1.17	1.19	1.1		MONTANA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.14	1.16	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.14	1.16	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.15	1.16	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.13	1.16	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.13	1.16	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF12 (41068)	1.14	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF22 (41072)	1.14	1.15	1.1		NORTHWEST	500

Appendix 7

Scenario Cases: Resource Removal Tables

Table 1 – 6000 MW Wyoming (Scenario 1) Generation Resource Reductions

Area Name	Bus Name	Generation Reduction (MW) July 27 Hour 16	Generation Reduction (MW) December 22 Hour 18	Generation Reduction (MW) March 2 Hour 21	Generation Reduction (MW) October 4 Hour 21	Generation Reduction (MW) August 10 Hour 13
SOCALIF	COLRIVER	741	436		646	979
	ANTELOPE	427				715
	PISGAH	739				1260
	CIMA	158				
	ETIWANDA		114		114	
	ALMITOSW		450			
	S.ONOFR2			1122		
	S.ONOFR1			1124		
SANDEIGO	MIGUEL		108			
	N. GILA		70		70	272
NORTHWEST	KLONTAP	8	12		107	
NEWMEXICO	GUADLUPE				270	
ARIZONA	CHOLLA				63	
	PALOVRD1		845	455	600	65
	PALOVRD2	590		455	600	65
	PALOVRD3	590		455		70
	HARQUAHA					295
	TORTOLIT					165
	NAVAJO 1			582		
PG&E	TESLA E				155	
	NEWARK F				65	
	GATES	260				436
	RDGCT_6				29	
	DVRAST3				28	
	GATEWAY3				86	
	DIABLO1	1122	1122	1122	1052	
	DIABLO2	1118	1118	1118	1048	
SIERRA	TRACY		47			
ALBERTA	MATLB1	129	1019		898	776
NEVADA	AMARGOSA VLY	118				120
WAPA RM	STERLING				60	
PACE	W CEDAR		102		102	
	ANTICLIN				27	
	Total	**6000 MW**	**5443 MW**	**6433 MW**	**6020 MW**	**5218 MW**

Table 2 – 3000 MW Wyoming, 3000 MW Montana (Scenario 2) Generation Resource Reductions

Area Name	Bus Name	Generation Reduction (MW) July 27 Hour 16	Generation Reduction (MW) December 22 Hour 18	Generation Reduction (MW) March 2 Hour 21	Generation Reduction (MW) October 4 Hour 21	Generation Reduction (MW) August 10 Hour 13
SOCALIF	COLRIVER	741	436		646	979
	ANTELOPE	427				715
	PISGAH	739				1260
	CIMA	158				
	ETIWANDA		114		114	
	ALMITOSW		450			
	S.ONOFR2			1122		
	S.ONOFR1			1124		
SANDEIGO	MIGUEL		108			
	N. GILA		70		70	272
NORTHWEST	KLONTAP	8	12		107	
NEWMEXICO	GUADLUPE				270	
ARIZONA	CHOLLA				63	
	PALOVRD1		942	455	600	110
	PALOVRD2	590		455	600	130
	PALOVRD3	590		455		130
	HARQUAHA					295
	TORTOLIT					165
	NAVAJO 1			582		
PG&E	TESLA E				155	
	NEWARK F				65	
	GATES	260				436
	RDGCT_6				29	
	DVRAST3				28	
	GATEWAY3				86	
	DIABLO1	1122	1122	1122	1052	
	DIABLO2	1118	1118	1118	1048	
SIERRA	TRACY		47			
ALBERTA	MATLB1	129	1019		898	776
NEVADA	AMARGOSA VLY	118				120
WAPA RM	STERLING				60	
PACE	W CEDAR		102		102	
	ANTICLIN				27	
	Total	**6000 MW**	**5540 MW**	**6433 MW**	**6020 MW**	**5388 MW**

Table 3 – 3000 MW Montana (Scenario 3) Generation Resource Reductions

Area Name	Bus Name	Generation Reduction (MW) July 27 Hour 16	Generation Reduction (MW) December 22 Hour 18	Generation Reduction (MW) March 2 Hour 21	Generation Reduction (MW) October 4 Hour 21	Generation Reduction (MW) August 10 Hour 13
SOCALIF	COLRIVER	741	436	564	646	979
	ANTELOPE	427				716
	DEVERS			104		
	ETIWANDA		114		114	
	S.ONOFR2			122		
	S.ONOFR1			124		
SANDEIGO	MIGUEL		108	381		
	N. GILA		70	70	70	
NORTHWEST	KLONTAP	8	12		107	
	MALIN			274		
NEWMEXICO	GUADLUPE			250	270	
	BELEN_PG			39		
ARIZONA	CHOLLA			41	63	
	PALOVRD1	260		245	150	
	PALOVRD2	260		245		
	PALOVRD3			245		
	HARQUAHA					295
PG&E	TESLA E			183	155	
	NEWARK F			65	65	
	GATES	260				436
	DIABLO1	522	864		275	
	DIABLO2	518				
SIERRA	TRACY		47	47		
ALBERTA	MATLB1		1019		898	776
WAPA RM	STERLING			45	60	
PACE	W CEDAR		102	102	102	
	ANTICLIN			80	27	
BC HYDRO	NIC 500			539		
	Total	**2996 MW**	**2772 MW**	**3765 MW**	**3002 MW**	**3202 MW**

Table 4 – 3000 MW Wyoming (Scenario 4) Generation Resource Reductions

Area Name	Bus Name	Generation Reduction (MW) July 27 Hour 16	Generation Reduction (MW) December 22 Hour 18	Generation Reduction (MW) March 2 Hour 21	Generation Reduction (MW) October 4 Hour 21	Generation Reduction (MW) August 10 Hour 13
SOCALIF	COLRIVER	741	436	564	646	979
	ANTELOPE	427				716
	DEVERS			104		
	ETIWANDA		114		114	
	S.ONOFR2			122		
	S.ONOFR1			124		
SANDEIGO	MIGUEL		108	381		
	N. GILA		70	70	70	
NORTHWEST	KLONTAP	8			107	
	MALIN			274		
NEWMEXICO	GUADLUPE			250	270	
	BELEN_PG			39		
ARIZONA	CHOLLA			41	63	
	PALOVRD1	260		245	150	
	PALOVRD2	260		245		
	PALOVRD3			245		
	HARQUAHA					295
PG&E	TESLA E			183	155	
	NEWARK F			65	65	
	GATES	260				436
	DIABLO1	522	1122		275	
	DIABLO2	518				
SIERRA	TRACY		47	47		
ALBERTA	MATLB1		1019		898	776
WAPA RM	STERLING			45	60	
PACE	W CEDAR			102	102	
	ANTICLIN			80	27	
BC HYDRO	NIC 500			539		
	Total	**2996 MW**	**2916 MW**	**3765 MW**	**3002 MW**	**3202 MW**

Appendix 8

Scenario Cases – Violation Tables

Scenario 1: N-0 Contingency Results (Post-Transmission Improvements)

Scenario 1: JUL27H16 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	CS_____1 (64346) -> CS__2309 (64379) CKT 1 at CS_____1	192.44	192.44	120	160.37	SIERRA-SIERRA	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	28.1	28.1	20	140.52	PACE-PACE	230
Branch MVA	BEAVER (43017) -> BEAVER (43021) CKT 1 at BEAVER	485.35	485.35	348	139.47	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	54.83	54.83	40	137.07	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	34.21	34.21	25	136.85	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	40.72	40.72	33	123.4	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	40.72	40.72	33	123.4	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	26.99	26.99	22.4	120.49	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	117.11	117.11	100	117.11	PACE-PACE	230
Branch MVA	CC_CT C1 (60268) -> LANGLEY (60266) CKT 1 at CC_CT C1	273.79	273.79	240	114.08	IDAHO-IDAHO	230
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1084.76	1084.76	1000	108.48	PACE-PACE	500
Branch MVA	WY_CLCT6 (193) -> AEOLUS (67795) CKT 1 at AEOLUS	1084.76	1084.76	1000	108.48	PACE-PACE	500
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	24.09	24.09	22.4	107.54	PACE-PACE	230
Branch MVA	BOYLE 2 (45064) -> BOYLE (45025) CKT 1 at BOYLE	43.96	43.96	42.3	103.93	NORTHWEST-NORTHWEST	230
Branch MVA	MNTFRM G (47675) -> MINTFARM (47677) CKT 1 at MINTFARM	223.17	223.17	215	103.8	NORTHWEST-NORTHWEST	230
Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	295.25	295.25	287	102.87	PACE-PACE	345
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1028.07	1028.07	1000	102.81	PACE-PACE	500
Branch MVA	WY_CLCT7 (194) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1028.07	1028.07	1000	102.81	PACE-PACE	500
Branch MVA	WY_CLCT5 (192) -> DAVEJOHN (65420) CKT 1 at DAVEJOHN	503.71	503.71	500	100.74	PACE-PACE	230
Branch MVA	WY_CLCT4 (191) -> WINDSTAR (67814) CKT 1 at WINDSTAR	501.92	501.92	500	100.38	PACE-PACE	230
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1003.48	1003.48	1000	100.35	PACE-PACE	230

Scenario 1: JUL27H16 – N-0 Voltage Violations

Category	Element	Reference	Value	Limit	Percent	Area Name	Nom

		Value				Assoc.	kV Assoc.
Bus High Volts	MARIAS S (62361)	1.31	1.31	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.18	1.18	1.1		MONTANA	230
Bus High Volts	ANPOPC&1 (67811)	1.18	1.18	1.1		PACE	500
Bus High Volts	TOWN2 (62012)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.14	1.14	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GARRISON (40459)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	MIDROB11 (64902)	1.13	1.13	1.1		SIERRA	500
Bus High Volts	GARTAF12 (41068)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	PONSUM11 (41048)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GARTAF11 (41066)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GARTAF21 (41070)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.11	1.11	1.1		MONTANA	500
Bus High Volts	MIDROB12 (64903)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	HOT SPR (40553)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIJOH12 (40591)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIJOH22 (40594)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	TAFT (41057)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ELY ENGY (64890)	1.1	1.1	1.1		SIERRA	500

Scenario 1: DEC22H18 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	28.98	28.98	20	144.88	PACE-PACE	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	56.43	56.43	40	141.06	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	35.24	35.24	25	140.95	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	41.93	41.93	33	127.06	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	41.93	41.93	33	127.06	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	27.78	27.78	22.4	124.02	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	121.08	121.08	100	121.08	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	24.8	24.8	22.4	110.69	PACE-PACE	230
Branch Amp	ANPOPC&1 (67811) -> POPULUS (67794) CKT 1 at POPULUS	2530.41	2530.41	2309.4	109.57	PACE-PACE	500
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1080.54	1080.54	1000	108.05	PACE-PACE	500
Branch MVA	WY_CLCT6 (193) -> AEOLUS (67795) CKT 1 at AEOLUS	1080.54	1080.54	1000	108.05	PACE-PACE	500
Interface MW	BRIDGER WEST	3932.2	3932.2	3700	106.28	N/A	N/A
Interface MW	MIDPOINT - SUMMER LAKE	1557.69	1557.69	1500	103.85	N/A	500
Branch MVA	WY_CLCT5 (192) -> DAVEJOHN (65420) CKT 1 at DAVEJOHN	506.98	506.98	500	101.4	PACE-PACE	230
Branch MVA	WY_CLCT4 (191) -> WINDSTAR (67814) CKT 1 at WINDSTAR	505.37	505.37	500	101.07	PACE-PACE	230
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1009.14	1009.14	1000	100.91	PACE-PACE	500
Branch MVA	WY_CLCT7 (194) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1009.14	1009.14	1000	100.91	PACE-PACE	500
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1007.68	1007.68	1000	100.77	PACE-PACE	230
Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1740.73	1740.73	1732.05	100.5	NORTHWEST-NORTHWEST	500

Scenario 1: DEC22H18 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.28	1.28	1.1		MONTANA	230
Bus High Volts	ANPOPC&1 (67811)	1.17	1.17	1.1		PACE	500
Bus High Volts	MARIAS (62362)	1.16	1.16	1.1		MONTANA	230
Bus High Volts	TOWN2 (62012)	1.14	1.14	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.14	1.14	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	BROADV&2 (62053)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	GARRISON (40459)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GARTAF12 (41068)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MIDROB11 (64902)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	HOT SPR (40553)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIJOH12 (40591)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIJOH22 (40594)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL26 (40710)	1.1	1.1	1.1		NORTHWEST	500

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	ASHMAR23 (40720)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	PONSUM12 (41050)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI11 (45039)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.1	1.1	1.1		MONTANA	500
Bus Low Volts	HEMGRA11 (60157)	0.9	0.9	0.9		IDAHO	500

Scenario 1: MAR02H21 N-0 Overloads (AC Solution)

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	911.88	911.88	502.04	181.63	PACE-NEVADA	345
Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	903.46	903.46	502.04	179.96	PACE-PACE	345
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPW_CL	189.03	189.03	110	171.85	PACE-PACE	230
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.5	204.5	125	163.6	NORTHWEST-NORTHWEST	230
Branch MVA	LEANJ 1 (44887) -> JONESCYN (47814) CKT 1 at JONESCYN	203.69	203.69	125	162.95	NORTHWEST-NORTHWEST	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLOND EA	194.18	194.18	120	161.82	NORTHWEST-NORTHWEST	230
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	231.5	231.5	167	138.62	NORTHWEST-NORTHWEST	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	25.6	25.6	20	127.98	PACE-PACE	230
Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	814.92	814.92	640.11	127.31	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	50.23	50.23	40	125.57	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	31.2	31.2	25	124.82	PACE-PACE	230
Branch MVA	WHTCK 1 (47902) -> WHITE CK (47827) CKT 1 at WHITE CK	146.08	146.08	125	116.87	NORTHWEST-NORTHWEST	230
Branch MVA	DIABLO31 (46419) -> DIABLO (46421) CKT 1 at DIABLO	88.59	88.59	78	113.57	NORTHWEST-NORTHWEST	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	37.28	37.28	33	112.98	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	37.28	37.28	33	112.98	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	24.7	24.7	22.4	110.26	PACE-PACE	230
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1096.37	1096.37	1000	109.64	PACE-PACE	500
Branch MVA	WY_CLCT7 (194) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1096.37	1096.37	1000	109.64	PACE-PACE	500
Branch MVA	JOHN DAY (40584) -> JOHN DAY (40585) CKT 1 at JOHN DAY	1318.23	1318.23	1218	108.23	NORTHWEST-NORTHWEST	500
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	105.88	105.88	100	105.88	PACE-PACE	230
Branch MVA	WY_CLCT6 (193) -> AEOLUS (67795) CKT 1 at AEOLUS	1033.02	1033.02	1000	103.3	PACE-PACE	500
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1033.02	1033.02	1000	103.3	PACE-PACE	500
Branch Amp	KLONDTAP (47830) -> JOHN DAY (40584) CKT 1 at KLONDTAP	1799.58	1799.58	1744.1	103.18	NORTHWEST-NORTHWEST	230
Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	813.87	813.87	795.74	102.28	NORTHWEST-NORTHWEST	230

Scenario 1: MAR02H21 N-0 Voltage Violations (AC Solution)

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	ROBH A12 (64897)	1.17	1.17	1.1		SIERRA	500
Bus High Volts	TOWN1 (62013)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	TOWN2 (62012)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	GRIMAL21 (40700)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GAR1EAST (40451)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	BROADV&2 (62053)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	BROADVU (62046)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	CAPGRI16 (45044)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	BROADV&1 (62054)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	GARRISON (40459)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MIDROB11 (64902)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	GRIJOH22 (40594)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIJOH12 (40591)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL25 (40708)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.1	1.1	1.1		MONTANA	500
Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GARTAF12 (41068)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.1	1.1	1.1		NORTHWEST	500

Scenario 1: MAR02H21 N-0 Overloads (DC Solution)

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	NAUGT G1 (66055) -> NAUGHTON (66050) CKT 1 at NAUGHTON	411.71	411.71	190	216.69	PACE-PACE	230
Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1015.94	502.04	202.36	PACE-NEVADA	345
Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1006.55	502.04	200.49	PACE-PACE	345
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPW_CL	188.84	188.84	110	171.68	PACE-PACE	230
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.58	204.58	125	163.66	NORTHWEST-NORTHWEST	230
Branch MVA	LEANJ 1 (44887) -> JONESCYN (47814) CKT 1 at JONESCYN	203.55	203.55	125	162.84	NORTHWEST-NORTHWEST	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLOND EA	194.18	194.18	120	161.82	NORTHWEST-NORTHWEST	230
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	231.53	231.53	167	138.64	NORTHWEST-NORTHWEST	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	25.6	25.6	20	127.98	PACE-PACE	230
Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	815.7	815.7	640.11	127.43	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	50.18	50.18	40	125.44	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	31.19	31.19	25	124.74	PACE-PACE	230
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1195.32	1195.32	1000	119.53	PACE-PACE	500
Branch MVA	WY_CLCT7 (194) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1195.32	1195.32	1000	119.53	PACE-PACE	500
Branch MVA	WHTCK 1 (47902) -> WHITE CK (47827) CKT 1 at WHITE CK	146.08	146.08	125	116.87	NORTHWEST-NORTHWEST	230
Branch MVA	DIABLO31 (46419) -> DIABLO (46421) CKT 1 at DIABLO	88.58	88.58	78	113.56	NORTHWEST-NORTHWEST	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	37.28	37.28	33	112.98	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	37.28	37.28	33	112.98	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	24.68	24.68	22.4	110.19	PACE-PACE	230
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1100.38	1100.38	1000	110.04	PACE-PACE	500
Branch MVA	WY_CLCT6 (193) -> AEOLUS (67795) CKT 1 at AEOLUS	1100.38	1100.38	1000	110.04	PACE-PACE	500
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WY_CLCT1	1099.35	1099.35	1000	109.94	PACE-PACE	230
Branch MVA	JOHN DAY (40584) -> JOHN DAY (40585) CKT 1 at JOHN DAY	1318.23	1318.23	1218	108.23	NORTHWEST-NORTHWEST	500
Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1589.98	1500	106	N/A	500
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	105.96	105.96	100	105.96	PACE-PACE	230
Branch Amp	KLONDTAP (47830) -> JOHN DAY (40584) CKT 1 at KLONDTAP	1799.58	1799.58	1744.1	103.18	NORTHWEST-NORTHWEST	230
Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	814.61	814.61	795.74	102.37	NORTHWEST-NORTHWEST	230
Branch Amp	SHIRLYBS (69028) -> AEOLUS (67796) CKT 1 at SHIRLYBS	2250.54	2250.54	2229.07	100.96	PACE-PACE	230

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch Amp	MALIN (40687) -> MALROU21 (40697) CKT 2 at MALROU21	1814.2	1814.2	1799.95	100.79	NORTHWEST-PG AND E	500
Branch MVA	WY_CLCT4 (191) -> WINDSTAR (67814) CKT 1 at WY_CLCT4	501.83	501.83	500	100.37	PACE-PACE	230
Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	303.71	303.71	303	100.23	PACE-PACE	230
Interface MW	TOT 2C	601.36	601.36	600	100.23	N/A	500
Branch MVA	WY_CLCT5 (192) -> DAVEJOHN (65420) CKT 1 at WY_CLCT5	500.05	500.05	500	100.01	PACE-PACE	230

Scenario 1: MAR02H21 N-0 Voltage Violations (DC Solution)

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	TOWN2 (62012)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	GARRISON (40459)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GARTAF12 (41068)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.1	1.1	1.1		MONTANA	500

Scenario 1: OCT04H21 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	LEANJ 1 (44887) -> JONESCYN (47814) CKT 1 at JONESCYN	158.71	158.71	125	126.97	NORTHWEST-NORTHWEST	230
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	156.64	156.64	125	125.31	NORTHWEST-NORTHWEST	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	24.33	24.33	20	121.67	PACE-PACE	230
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPW_CL	132.54	132.54	110	120.49	PACE-PACE	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLON 31	144.35	144.35	120	120.29	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	47.89	47.89	40	119.74	PACE-PACE	230
Interface MW	BRIDGER WEST	4420.03	4420.03	3700	119.46	N/A	N/A
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	29.67	29.67	25	118.68	PACE-PACE	230
Interface MW	MIDPOINT - SUMMER LAKE	1664.55	1664.55	1500	110.97	N/A	500
Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1884.37	1884.37	1732.05	108.79	NORTHWEST-NORTHWEST	500
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	35.56	35.56	33	107.76	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	35.56	35.56	33	107.76	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	23.51	23.51	22.4	104.97	PACE-PACE	230
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	174.04	174.04	167	104.22	NORTHWEST-NORTHWEST	230
Branch Amp	ANPOPC&1 (67811) -> POPULUS (67794) CKT 1 at POPULUS	2380.65	2380.65	2309.4	103.09	PACE-PACE	500
Branch MVA	WY_CLCT6 (193) -> AEOLUS (67795) CKT 1 at AEOLUS	1029.75	1029.75	1000	102.97	PACE-PACE	500
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1029.75	1029.75	1000	102.97	PACE-PACE	500
Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	656.72	656.72	640.11	102.6	NORTHWEST-NORTHWEST	230
Branch Amp	MIDPOINT (60240) -> MIDHEM11 (60242) CKT 1 at MIDHEM11	1766.08	1766.08	1732.05	101.96	IDAHO-IDAHO	500
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	100.35	100.35	100	100.35	PACE-PACE	230
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1001.24	1001.24	1000	100.12	PACE-PACE	500
Branch MVA	WY_CLCT7 (194) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1001.24	1001.24	1000	100.12	PACE-PACE	500

Scenario 1: OCT04H21 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	ANPOPC&1 (67811)	1.13	1.13	1.1		PACE	500
Bus High Volts	MIDROB11 (64902)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR21 (40718)	1.1	1.1	1.1		NORTHWEST	500

Scenario 1: AUG10H13 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	29.88	29.88	20	149.42	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	36.33	36.33	25	145.31	PACE-PACE	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	58.1	58.1	40	145.25	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	43.14	43.14	33	130.74	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	43.14	43.14	33	130.74	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	28.62	28.62	22.4	127.77	PACE-PACE	230
Interface MW	BRIDGER WEST	4674.24	4674.24	3700	126.33	N/A	N/A
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	125.2	125.2	100	125.2	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	25.55	25.55	22.4	114.04	PACE-PACE	230
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1050.67	1050.67	1000	105.07	PACE-PACE	500
Branch MVA	WY_CLCT6 (193) -> AEOLUS (67795) CKT 1 at AEOLUS	1050.67	1050.67	1000	105.07	PACE-PACE	500
Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	301.48	301.48	287	105.04	PACE-PACE	345
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1026	1026	1000	102.6	PACE-PACE	500
Branch MVA	WY_CLCT7 (194) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1026	1026	1000	102.6	PACE-PACE	500
Branch MVA	MIDWEST (65955) -> MIDWEST (65956) CKT 2 at MIDWEST	25.29	25.29	25	101.16	PACE-PACE	230
Branch MVA	WY_CLCT5 (192) -> DAVEJOHN (65420) CKT 1 at DAVEJOHN	504.11	504.11	500	100.82	PACE-PACE	230
Branch MVA	WY_CLCT4 (191) -> WINDSTAR (67814) CKT 1 at WINDSTAR	502.38	502.38	500	100.48	PACE-PACE	230
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1004.06	1004.06	1000	100.41	PACE-PACE	230

Scenario 1: AUG10H13 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.29	1.29	1.1		MONTANA	230
Bus High Volts	TOWN2 (62012)	1.17	1.17	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.17	1.17	1.1		MONTANA	500
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	GARRISON (40459)	1.15	1.15	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GARTAF12 (41068)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GARTAF11 (41066)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GARTAF21 (41070)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	HOT SPR (40553)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	TAFT (41057)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	MIDROB11 (64902)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BELTAF11 (41060)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.11	1.11	1.1		MONTANA	500
Bus High Volts	GRIMAL21 (40700)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL26 (40710)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI11 (45039)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.1	1.1	1.1		NORTHWEST	500

Scenario 2: N-0 Contingency Results (Post-Transmission Improvements)

Scenario 2: JUL27H16 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	CS_____1 (64346) -> CS__2309 (64379) CKT 1 at CS_____1	192.26	192.26	120	160.21	SIERRA-SIERRA	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	28.12	28.12	20	140.61	PACE-PACE	230
Branch MVA	BEAVER (43017) -> BEAVER (43021) CKT 1 at BEAVER	485.39	485.39	348	139.48	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	54.89	54.89	40	137.21	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	34.23	34.23	25	136.92	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	40.72	40.72	33	123.39	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	40.72	40.72	33	123.39	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	26.98	26.98	22.4	120.44	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	117.19	117.19	100	117.19	PACE-PACE	230
Branch MVA	CC_CT C1 (60268) -> LANGLEY (60266) CKT 1 at CC_CT C1	274.47	274.47	240	114.36	IDAHO-IDAHO	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	24.08	24.08	22.4	107.5	PACE-PACE	230
Branch MVA	TOWNWNDC (195) -> Town2 (62012) CKT 1 at Town2	906.73	906.73	850	106.67	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (196) -> Town2 (62012) CKT 1 at Town2	906.73	906.73	850	106.67	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (197) -> Town2 (62012) CKT 1 at Town2	906.73	906.73	850	106.67	MONTANA-MONTANA	500
Branch MVA	BRWNL 5 (60100) -> BROWNLEE (60095) CKT 1 at BROWNLEE	306.13	306.13	287.5	106.48	IDAHO-IDAHO	230
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1055.24	1055.24	1000	105.52	PACE-PACE	500
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1049.25	1049.25	1000	104.92	PACE-PACE	500
Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	296.62	296.62	287	103.35	PACE-PACE	345
Branch MVA	BOYLE 2 (45064) -> BOYLE (45025) CKT 1 at BOYLE	43.69	43.69	42.3	103.29	NORTHWEST-NORTHWEST	230
Branch MVA	MNTFRM G (47675) -> MINTFARM (47677) CKT 1 at MINTFARM	221.18	221.18	215	102.88	NORTHWEST-NORTHWEST	230
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1022.73	1022.73	1000	102.27	PACE-PACE	230

Scenario 2: JUL27H16 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.31	1.31	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.18	1.18	1.1		MONTANA	230
Bus High Volts	MIDROB11 (64902)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	MIDROB21 (64908)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	GAR2EAST (40453)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ELY ENGY (64890)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	ROBINSON (64895)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	MIDROB13 (64907)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	MIDROB23 (64910)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	GAR1EAST (40451)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.1	1.1	1.1		NORTHWEST	500

Scenario 2: DEC22H18 – N-0 Overloads

Category	Element	Nom kV Assoc.	Reference Value	Value	Limit	Percent	Area Name Assoc.
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	230	28.99	28.99	20	144.97	PACE-PACE
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	230	56.5	56.5	40	141.26	PACE-PACE
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	230	35.29	35.29	25	141.14	PACE-PACE
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	230	41.91	41.91	33	127	PACE-PACE
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	230	41.91	41.91	33	127	PACE-PACE
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	230	27.82	27.82	22.4	124.21	PACE-PACE
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	230	120.7	120.7	100	120.7	PACE-PACE
Branch MVA	BRWNL 5 (60100) -> BROWNLEE (60095) CKT 1 at BROWNLEE	230	345.2	345.2	287.5	120.07	IDAHO-IDAHO
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	230	24.83	24.83	22.4	110.86	PACE-PACE
Interface MW	MIDPOINT - SUMMER LAKE	500	1654.34	1654.34	1500	110.29	N/A
Branch MVA	WY_CLCT6 (193) -> AEOLUS (67795) CKT 1 at AEOLUS	500	1087.91	1087.91	1000	108.79	PACE-PACE
Branch MVA	WY_CLCT7 (194) -> ANTICLIN (67826) CKT 1 at ANTICLIN	500	1057.74	1057.74	1000	105.77	PACE-PACE
Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	500	1831.39	1831.39	1732.05	105.74	NORTHWEST-NORTHWEST
Branch MVA	TOWNWNDC (195) -> TOWN2 (62012) CKT 1 at TOWN2	500	896.89	896.89	850	105.52	MONTANA-MONTANA
Branch MVA	TOWNWNDC (196) -> TOWN2 (62012) CKT 1 at TOWN2	500	896.89	896.89	850	105.52	MONTANA-MONTANA
Branch MVA	TOWNWNDC (197) -> TOWN2 (62012) CKT 1 at TOWN2	500	896.89	896.89	850	105.52	MONTANA-MONTANA
Branch MVA	WY_CLCT5 (192) -> DAVEJOHN (65420) CKT 1 at DAVEJOHN	230	524.7	524.7	500	104.94	PACE-PACE
Branch MVA	WY_CLCT4 (191) -> WINDSTAR (67814) CKT 1 at WINDSTAR	230	522.9	522.9	500	104.58	PACE-PACE
Interface MW	MONTANA - NORTHWEST	500	2222.71	2222.71	2200	101.03	N/A

Scenario 2: DEC22H18 – N-0 Voltage Violations

Category	Element	Nom kV Assoc.	Reference Value	Value	Limit	Percent	Area Name Assoc.
Bus High Volts	MARIAS S (62361)	230	1.27	1.27	1.1		MONTANA
Bus High Volts	MIDROB11 (64902)	500	1.16	1.16	1.1		SIERRA
Bus High Volts	MIDROB21 (64908)	500	1.16	1.16	1.1		SIERRA
Bus High Volts	MARIAS (62362)	230	1.15	1.15	1.1		MONTANA
Bus High Volts	ELY ENGY (64890)	500	1.13	1.13	1.1		SIERRA
Bus High Volts	ROBINSON (64895)	500	1.13	1.13	1.1		SIERRA
Bus High Volts	MIDROB13 (64907)	500	1.12	1.12	1.1		SIERRA
Bus High Volts	MIDROB23 (64910)	500	1.12	1.12	1.1		SIERRA
Bus High Volts	GRIMAL21 (40700)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	CAPGRI16 (45044)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	GRIJOH12 (40591)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	GRIJOH22 (40594)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	ASHMAR22 (40719)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	ASHMAR23 (40720)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	ROBH A11 (64896)	500	1.1	1.1	1.1		SIERRA
Bus High Volts	ROBH A21 (64898)	500	1.1	1.1	1.1		SIERRA
Bus High Volts	MIDROB12 (64903)	500	1.1	1.1	1.1		SIERRA
Bus High Volts	MIDROB22 (64909)	500	1.1	1.1	1.1		SIERRA

Scenario 2: MAR02H21 – N-0 Overloads (AC Solution Option)

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	932.34	932.34	502.04	185.71	PACE-NEVADA	345
Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	923.73	923.73	502.04	183.99	PACE-PACE	345
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPOFWLD	190.07	190.07	110	172.79	PACE-PACE	230
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.5	204.5	125	163.6	NORTHWEST-NORTHWEST	230
Branch MVA	LEANJ 1 (44887) -> JONESCYN (47814) CKT 1 at JONESCYN	203.68	203.68	125	162.95	NORTHWEST-NORTHWEST	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLOND EA	194.18	194.18	120	161.82	NORTHWEST-NORTHWEST	230
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	231.52	231.52	167	138.64	NORTHWEST-NORTHWEST	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	25.59	25.59	20	127.97	PACE-PACE	230
Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	813.34	813.34	640.11	127.06	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	50.17	50.17	40	125.42	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	31.19	31.19	25	124.76	PACE-PACE	230
Branch MVA	WHTCK 1 (47902) -> WHITE CK (47827) CKT 1 at WHITE CK	146.08	146.08	125	116.87	NORTHWEST-NORTHWEST	230
Branch MVA	DIABLO31 (46419) -> DIABLO (46421) CKT 1 at DIABLO	88.63	88.63	78	113.62	NORTHWEST-NORTHWEST	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	37.29	37.29	33	113.01	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	37.29	37.29	33	113.01	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	24.69	24.69	22.4	110.2	PACE-PACE	230
Branch MVA	JOHN DAY (40584) -> JOHN DAY (40585) CKT 1 at JOHN DAY	1318.23	1318.23	1218	108.23	NORTHWEST-NORTHWEST	500
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	105.91	105.91	100	105.91	PACE-PACE	230
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1047.57	1047.57	1000	104.76	PACE-PACE	500
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1046.93	1046.93	1000	104.69	PACE-PACE	500
Branch MVA	TOWNWNDC (197) -> TOWN2 (62012) CKT 1 at TOWN2	884.02	884.02	850	104	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (196) -> TOWN2 (62012) CKT 1 at TOWN2	884.02	884.02	850	104	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (195) -> TOWN2 (62012) CKT 1 at TOWN2	884.02	884.02	850	104	MONTANA-MONTANA	500
Branch Amp	KLONDTAP (47830) -> JOHN DAY (40584) CKT 1 at KLONDTAP	1799.58	1799.58	1744.1	103.18	NORTHWEST-NORTHWEST	230
Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	812.28	812.28	795.74	102.08	NORTHWEST-NORTHWEST	230
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1012.57	1012.57	1000	101.26	PACE-PACE	230

Scenario 2: MAR02H21 – N-0 Voltage Violations (AC Solution Option)

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.29	1.29	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	MIDROB21 (64908)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	MIDROB11 (64902)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	ROBH A22 (64899)	1.14	1.14	1.1		SIERRA	500
Bus High Volts	ROBH A12 (64897)	1.14	1.14	1.1		SIERRA	500
Bus High Volts	MIDROB23 (64910)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	MIDROB13 (64907)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500

Scenario 2: MAR02H21 – N-0 Overloads (DC Solution Option)

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	961.76	502.04	191.57	PACE-NEVADA	345
Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	952.89	502.04	189.8	PACE-PACE	345
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPOFWLD	189.03	189.03	110	171.85	PACE-PACE	230
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.55	204.55	125	163.64	NORTHWEST-NORTHWEST	230
Branch MVA	LEANJ 1 (44887) -> JONESCYN (47814) CKT 1 at JONESCYN	203.6	203.6	125	162.88	NORTHWEST-NORTHWEST	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLOND EA	194.18	194.18	120	161.82	NORTHWEST-NORTHWEST	230
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	231.53	231.53	167	138.64	NORTHWEST-NORTHWEST	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	25.6	25.6	20	127.98	PACE-PACE	230
Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	814.29	814.29	640.11	127.21	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	50.2	50.2	40	125.5	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	31.19	31.19	25	124.77	PACE-PACE	230
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1240.32	1240.32	1000	124.03	PACE-PACE	500
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1202.14	1202.14	1000	120.21	PACE-PACE	230
Branch MVA	WHTCK 1 (47902) -> WHITE CK (47827) CKT 1 at WHITE CK	146.08	146.08	125	116.86	NORTHWEST-NORTHWEST	230
Branch MVA	DIABLO31 (46419) -> DIABLO (46421) CKT 1 at DIABLO	88.61	88.61	78	113.61	NORTHWEST-NORTHWEST	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	37.3	37.3	33	113.02	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	37.3	37.3	33	113.02	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	24.69	24.69	22.4	110.22	PACE-PACE	230
Branch MVA	JOHN DAY (40584) -> JOHN DAY (40585) CKT 1 at JOHN DAY	1318.23	1318.23	1218	108.23	NORTHWEST-NORTHWEST	500
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	106.42	106.42	100	106.42	PACE-PACE	230
Branch Amp	KLONDTAP (47830) -> JOHN DAY (40584) CKT 1 at KLONDTAP	1799.58	1799.58	1744.1	103.18	NORTHWEST-NORTHWEST	230
Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	813.21	813.21	795.74	102.2	NORTHWEST-NORTHWEST	230
Branch MVA	TOWNWNDC (197) -> TOWN2 (62012) CKT 1 at TOWN2	855.88	855.88	850	100.69	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (196) -> TOWN2 (62012) CKT 1 at TOWN2	855.88	855.88	850	100.69	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (195) -> TOWN2 (62012) CKT 1 at TOWN2	855.88	855.88	850	100.69	MONTANA-MONTANA	500
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1002.87	1002.87	1000	100.29	PACE-PACE	500
Branch MVA	TOWNWNDC (198) -> TOWN2 (62012) CKT 1 at TOWN2	850.43	850.43	850	100.05	MONTANA-MONTANA	500

Scenario 2: MAR02H21 – N-0 Voltage Violations (DC Solution Option)

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.29	1.29	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	ROBH A11 (64896)	1.16	1.16	1.1		SIERRA	500
Bus High Volts	ROBINSON (64895)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	ELY ENGY (64890)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GONDER1 (64205)	1.11	1.11	1.1		SIERRA	230
Bus High Volts	GONDER (64056)	1.11	1.11	1.1		SIERRA	230
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500

Scenario 2: OCT04H21 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	LEANJ 1 (44887) -> JONESCYN (47814) CKT 1 at JONESCYN	158.72	158.72	125	126.98	NORTHWEST-NORTHWEST	230
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	156.64	156.64	125	125.31	NORTHWEST-NORTHWEST	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	24.33	24.33	20	121.63	PACE-PACE	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLON 31	144.32	144.32	120	120.27	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	47.89	47.89	40	119.71	PACE-PACE	230
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPW_CL	131.6	131.6	110	119.64	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	29.7	29.7	25	118.8	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	35.55	35.55	33	107.74	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	35.55	35.55	33	107.74	PACE-PACE	230
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1062.23	1062.23	1000	106.22	PACE-PACE	500
Branch Amp	MIDPOINT (60240) -> MIDHEM11 (60242) CKT 1 at MIDHEM11	1824.25	1824.25	1732.05	105.32	IDAHO-IDAHO	500
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	23.52	23.52	22.4	104.99	PACE-PACE	230
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	174.04	174.04	167	104.22	NORTHWEST-NORTHWEST	230
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1039.22	1039.22	1000	103.92	PACE-PACE	500
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1016.53	1016.53	1000	101.65	PACE-PACE	230
Branch MVA	TOWNWNDC (197) -> TOWN2 (62012) CKT 1 at TOWN2	859.77	859.77	850	101.15	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (196) -> TOWN2 (62012) CKT 1 at TOWN2	859.77	859.77	850	101.15	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (195) -> TOWN2 (62012) CKT 1 at TOWN2	859.77	859.77	850	101.15	MONTANA-MONTANA	500
Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	646.1	646.1	640.11	100.94	NORTHWEST-NORTHWEST	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	100.35	100.35	100	100.35	PACE-PACE	230

Scenario 2: OCT04H21 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.29	1.29	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	MIDROB11 (64902)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	MIDROB21 (64908)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	ASHMAR23 (40720)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MIDROB13 (64907)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ELY ENGY (64890)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MIDROB23 (64910)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR21 (40718)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL26 (40710)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL25 (40708)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL24 (40706)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL23 (40704)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI11 (45039)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BELL SC (40096)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ROBINSON (64895)	1.1	1.1	1.1		SIERRA	500
Bus High Volts	MERIDINP (45197)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	DIXONVLE (45095)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI14 (45042)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ROBH A22 (64899)	1.1	1.1	1.1		SIERRA	500
Bus High Volts	CAPGRI13 (45041)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500

Scenario 2: AUG10H13 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	29.91	29.91	20	149.53	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	36.33	36.33	25	145.34	PACE-PACE	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	58.09	58.09	40	145.22	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	43.14	43.14	33	130.72	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	43.14	43.14	33	130.72	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	28.63	28.63	22.4	127.81	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	125.16	125.16	100	125.16	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	25.55	25.55	22.4	114.07	PACE-PACE	230
Branch MVA	TOWNWNDC (195) -> Town2 (62012) CKT 1 at Town2	955.44	955.44	850	112.41	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (196) -> Town2 (62012) CKT 1 at Town2	955.44	955.44	850	112.41	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (197) -> Town2 (62012) CKT 1 at Town2	955.44	955.44	850	112.41	MONTANA-MONTANA	500
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1100.83	1100.83	1000	110.08	PACE-PACE	500
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1065.31	1065.31	1000	106.53	PACE-PACE	500
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1026.87	1026.87	1000	102.69	PACE-PACE	230
Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	294.25	294.25	287	102.53	PACE-PACE	345
Branch MVA	MIDWEST (65955) -> MIDWEST (65956) CKT 2 at MIDWEST	25.31	25.31	25	101.25	PACE-PACE	230

Scenario 2: AUG10H13 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.18	1.18	1.1		MONTANA	230
Bus High Volts	MIDROB11 (64902)	1.16	1.16	1.1		SIERRA	500
Bus High Volts	MIDROB21 (64908)	1.16	1.16	1.1		SIERRA	500
Bus High Volts	GAR2EAST (40453)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	ELY ENGY (64890)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	ROBINSON (64895)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	GAR1EAST (40451)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MIDROB12 (64903)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	MIDROB13 (64907)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	MIDROB22 (64909)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	MIDROB23 (64910)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	GRIMAL21 (40700)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.1	1.1	1.1		NORTHWEST	500

Scenario 3: N-0 Contingency Results (Post-Transmission Improvements)

Scenario 3: JUL27H16 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	CS_____1 (64346) -> CS__2309 (64379) CKT 1 at CS_____1	198.85	198.85	120	165.71	SIERRA-SIERRA	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	28.12	28.12	20	140.59	PACE-PACE	230
Branch MVA	BEAVER (43017) -> BEAVER (43021) CKT 1 at BEAVER	485.32	485.32	348	139.46	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	54.87	54.87	40	137.18	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	34.22	34.22	25	136.89	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	40.71	40.71	33	123.38	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	40.71	40.71	33	123.38	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	27.02	27.02	22.4	120.64	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	117.17	117.17	100	117.17	PACE-PACE	230
Branch MVA	CC_CT C1 (60268) -> LANGLEY (60266) CKT 1 at CC_CT C1	274.24	274.24	240	114.27	IDAHO-IDAHO	230
Branch MVA	BRWNL 5 (60100) -> BROWNLEE (60095) CKT 1 at BROWNLEE	316.98	316.98	287.5	110.25	IDAHO-IDAHO	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	24.12	24.12	22.4	107.68	PACE-PACE	230
Branch MVA	TOWNWNDC (195) -> Town2 (62012) CKT 1 at Town2	914.91	914.91	850	107.64	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (196) -> Town2 (62012) CKT 1 at Town2	914.91	914.91	850	107.64	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (197) -> Town2 (62012) CKT 1 at Town2	914.91	914.91	850	107.64	MONTANA-MONTANA	500
Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	307.13	307.13	287	107.01	PACE-PACE	345
Branch MVA	MNTFRM G (47675) -> MINTFARM (47677) CKT 1 at MINTFARM	224.37	224.37	215	104.36	NORTHWEST-NORTHWEST	230
Branch MVA	BOYLE 2 (45064) -> BOYLE (45025) CKT 1 at BOYLE	43.99	43.99	42.3	104	NORTHWEST-NORTHWEST	230

Scenario 3: JUL27H16 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.31	1.31	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.18	1.18	1.1		MONTANA	230
Bus High Volts	MIDROB11 (64902)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	MIDROB21 (64908)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	ELY ENGY (64890)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	GAR2EAST (40453)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ROBINSON (64895)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	MIDROB13 (64907)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	MIDROB23 (64910)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	GAR1EAST (40451)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIJOH12 (40591)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIJOH22 (40594)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500

Scenario 3: DEC22H18 – N-0 Overloads

Category	Element	Nom kV Assoc.	Reference Value	Value	Limit	Percent	Area Name Assoc.
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	230	29	29	20	145.02	PACE-PACE
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	230	56.47	56.47	40	141.18	PACE-PACE
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	230	35.27	35.27	25	141.08	PACE-PACE
Branch MVA	BRWNL 5 (60100) -> BROWNLEE (60095) CKT 1 at BROWNLEE	230	382.72	382.72	287.5	133.12	IDAHO-IDAHO
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	230	41.92	41.92	33	127.04	PACE-PACE
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	230	41.92	41.92	33	127.04	PACE-PACE
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	230	27.84	27.84	22.4	124.28	PACE-PACE
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	230	121.15	121.15	100	121.15	PACE-PACE
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	230	24.85	24.85	22.4	110.93	PACE-PACE
Branch MVA	BRIDGER (60085) -> BRIDGER (65220) CKT 2 at BRIDGER	345	217.68	217.68	200	108.84	PACE-IDAHO
Branch MVA	TOWNWNDC (195) -> TOWN2 (62012) CKT 1 at TOWN2	500	916.07	916.07	850	107.77	MONTANA-MONTANA
Branch MVA	TOWNWNDC (196) -> TOWN2 (62012) CKT 1 at TOWN2	500	916.07	916.07	850	107.77	MONTANA-MONTANA
Branch MVA	TOWNWNDC (197) -> TOWN2 (62012) CKT 1 at TOWN2	500	916.07	916.07	850	107.77	MONTANA-MONTANA
Branch MVA	BRIDGER (60085) -> BRIDGER (65220) CKT 1 at BRIDGER	345	214.16	214.16	200	107.08	PACE-IDAHO
Branch MVA	BRIDGER (60085) -> BRIDGER (65220) CKT 3 at BRIDGER	345	214.16	214.16	200	107.08	PACE-IDAHO

Scenario 3: DEC22H18 – N-0 Voltage Violations

Category	Element	Nom kV Assoc.	Reference Value	Value	Limit	Percent	Area Name Assoc.
Bus High Volts	MARIAS S (62361)	230	1.27	1.27	1.1		MONTANA
Bus High Volts	MARIAS (62362)	230	1.16	1.16	1.1		MONTANA
Bus High Volts	MIDROB11 (64902)	500	1.15	1.15	1.1		SIERRA
Bus High Volts	MIDROB21 (64908)	500	1.15	1.15	1.1		SIERRA
Bus High Volts	ELY ENGY (64890)	500	1.12	1.12	1.1		SIERRA
Bus High Volts	ROBINSON (64895)	500	1.12	1.12	1.1		SIERRA
Bus High Volts	MIDROB12 (64903)	500	1.12	1.12	1.1		SIERRA
Bus High Volts	MIDROB22 (64909)	500	1.12	1.12	1.1		SIERRA
Bus High Volts	GAR2EAST (40453)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	GRIJOH12 (40591)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	GRIJOH22 (40594)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	GRIMAL21 (40700)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	GRIMAL22 (40702)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	GRIMAL23 (40704)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	GRIMAL24 (40706)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	GRIMAL26 (40710)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	ASHMAR22 (40719)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	ASHMAR23 (40720)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	PONSUM12 (41050)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	CAPGRI11 (45039)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	CAPGRI13 (45041)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	CAPGRI14 (45042)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	CAPGRI15 (45043)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	CAPGRI16 (45044)	500	1.11	1.11	1.1		NORTHWEST
Bus High Volts	ROBH A11 (64896)	500	1.11	1.11	1.1		SIERRA
Bus High Volts	BIG EDDY (40111)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	GRIZZ R3 (40488)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	GRIZZLY (40489)	500	1.1	1.1	1.1		NORTHWEST

Category	Element	Nom kV Assoc.	Reference Value	Value	Limit	Percent	Area Name Assoc.
Bus High Volts	GRIMAL25 (40708)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	BUCMAR11 (40722)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	PONDROSA (40837)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	PONSUM11 (41048)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	PONSUM13 (41052)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	PONSUM14 (41054)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	CELILO1 (41311)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	CELILO2 (41312)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	KNIGHT (41450)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	KNIWAU11 (41453)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	CAPGRI12 (45040)	500	1.1	1.1	1.1		NORTHWEST
Bus High Volts	MIDROB13 (64907)	500	1.1	1.1	1.1		SIERRA
Bus High Volts	MIDROB23 (64910)	500	1.1	1.1	1.1		SIERRA

Scenario 3: MAR02H21 - Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPOFWLD	191.34	191.34	110	173.95	PACE-PACE	230
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.57	204.57	125	163.65	NORTHWEST-NORTHWEST	230
Branch MVA	LEANJ 1 (44887) -> JONESCYN (47814) CKT 1 at JONESCYN	203.57	203.57	125	162.86	NORTHWEST-NORTHWEST	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLOND EA	194.18	194.18	120	161.82	NORTHWEST-NORTHWEST	230
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	231.53	231.53	167	138.64	NORTHWEST-NORTHWEST	230
Branch MVA	BRWNL 5 (60100) -> BROWNLEE (60095) CKT 1 at BROWNLEE	369.95	369.95	287.5	128.68	IDAHO-IDAHO	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	25.59	25.59	20	127.95	PACE-PACE	230
Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	809.86	809.86	640.11	126.52	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	50.26	50.26	40	125.65	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	31.21	31.21	25	124.84	PACE-PACE	230
Branch Amp	ROBINSON (64895) -> ROBH A21 (64898) CKT 2 at ROBINSON	1964.97	1964.97	1629.98	120.55	SIERRA-SIERRA	500
Branch MVA	WHTCK 1 (47902) -> WHITE CK (47827) CKT 1 at WHITE CK	146.08	146.08	125	116.86	NORTHWEST-NORTHWEST	230
Branch MVA	DIABLO31 (46419) -> DIABLO (46421) CKT 1 at DIABLO	88.51	88.51	78	113.48	NORTHWEST-NORTHWEST	230
Branch Amp	ROBH A22 (64899) -> H ALLEN (18450) CKT 2 at H ALLEN	1841.13	1841.13	1629.98	112.95	SIERRA-NEVADA	500
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	37.27	37.27	33	112.95	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	37.27	37.27	33	112.95	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	24.68	24.68	22.4	110.18	PACE-PACE	230
Branch MVA	JOHN DAY (40584) -> JOHN DAY (40585) CKT 1 at JOHN DAY	1318.23	1318.23	1218	108.23	NORTHWEST-NORTHWEST	500
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	105.89	105.89	100	105.89	PACE-PACE	230
Branch MVA	TOWNWNDC (195) -> TOWN2 (62012) CKT 1 at TOWN2	887.47	887.47	850	104.41	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (196) -> TOWN2 (62012) CKT 1 at TOWN2	887.47	887.47	850	104.41	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (197) -> TOWN2 (62012) CKT 1 at TOWN2	887.47	887.47	850	104.41	MONTANA-MONTANA	500
Branch Amp	KLONDTAP (47830) -> JOHN DAY (40584) CKT 1 at KLONDTAP	1799.58	1799.58	1744.1	103.18	NORTHWEST-NORTHWEST	230
Branch Amp	MALIN (40687) -> MALROU21 (40697) CKT 2 at MALIN	1836.84	1836.84	1799.95	102.05	NORTHWEST-PG AND E	500
Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	808.76	808.76	795.74	101.64	NORTHWEST-NORTHWEST	230

Scenario 3: MAR02H21 – Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
Bus High Volts	ROBH A12 (64897)	1.2	1.2	1.1		SIERRA	500
Bus High Volts	ROBH A22 (64899)	1.2	1.2	1.1		SIERRA	500
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	MIDROB11 (64902)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	MIDROB21 (64908)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	GAR2EAST (40453)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GAR1EAST (40451)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500

Scenario 3: OCT04H21 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	LEANJ 1 (44887) -> JONESCYN (47814) CKT 1 at JONESCYN	158.64	158.64	125	126.91	NORTHWEST-NORTHWEST	230
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	156.67	156.67	125	125.34	NORTHWEST-NORTHWEST	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	24.32	24.32	20	121.59	PACE-PACE	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLON 31	144.24	144.24	120	120.2	NORTHWEST-NORTHWEST	230
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPOFWLD	131.98	131.98	110	119.98	PACE-PACE	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	47.89	47.89	40	119.72	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	29.69	29.69	25	118.74	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	35.56	35.56	33	107.76	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	35.56	35.56	33	107.76	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	23.5	23.5	22.4	104.93	PACE-PACE	230
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	174.03	174.03	167	104.21	NORTHWEST-NORTHWEST	230
Branch MVA	TOWNWNDC (195) -> TOWN2 (62012) CKT 1 at TOWN2	864.91	864.91	850	101.75	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (196) -> TOWN2 (62012) CKT 1 at TOWN2	864.91	864.91	850	101.75	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (197) -> TOWN2 (62012) CKT 1 at TOWN2	864.91	864.91	850	101.75	MONTANA-MONTANA	500
Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	644.95	644.95	640.11	100.76	NORTHWEST-NORTHWEST	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	100.3	100.3	100	100.3	PACE-PACE	230

Scenario 3: OCT04H21 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.29	1.29	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	MIDROB11 (64902)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	MIDROB21 (64908)	1.15	1.15	1.1		SIERRA	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MERIDINP (45197)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ELY ENGY (64890)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	ROBINSON (64895)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	ROBH A12 (64897)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	ROBH A22 (64899)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	MIDROB13 (64907)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	MIDROB23 (64910)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	BELL SC (40096)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL23 (40704)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL24 (40706)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL25 (40708)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL26 (40710)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR21 (40718)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI11 (45039)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI13 (45041)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI14 (45042)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	DIXONVLE (45095)	1.1	1.1	1.1		NORTHWEST	500

Scenario 3: AUG10H13 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	29.91	29.91	20	149.54	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	36.34	36.34	25	145.35	PACE-PACE	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	58.1	58.1	40	145.24	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	43.14	43.14	33	130.74	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	43.14	43.14	33	130.74	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	28.66	28.66	22.4	127.96	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	125.23	125.23	100	125.23	PACE-PACE	230
Branch MVA	BRIDGER (60085) -> BRIDGER (65220) CKT 2 at BRIDGER	228.78	228.78	200	114.39	PACE-IDAHO	345
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	25.58	25.58	22.4	114.21	PACE-PACE	230
Branch MVA	TOWNWNDC (195) -> Town2 (62012) CKT 1 at Town2	958.58	958.58	850	112.77	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (196) -> Town2 (62012) CKT 1 at Town2	958.58	958.58	850	112.77	MONTANA-MONTANA	500
Branch MVA	TOWNWNDC (197) -> Town2 (62012) CKT 1 at Town2	958.58	958.58	850	112.77	MONTANA-MONTANA	500
Branch MVA	BRIDGER (60085) -> BRIDGER (65220) CKT 1 at BRIDGER	225.08	225.08	200	112.54	PACE-IDAHO	345
Branch MVA	BRIDGER (60085) -> BRIDGER (65220) CKT 3 at BRIDGER	225.08	225.08	200	112.54	PACE-IDAHO	345
Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	297.15	297.15	287	103.54	PACE-PACE	345
Branch MVA	MIDWEST (65955) -> MIDWEST (65956) CKT 2 at MIDWEST	25.29	25.29	25	101.14	PACE-PACE	230
Branch MVA	BRWNL 5 (60100) -> BROWNLEE (60095) CKT 1 at BROWNLEE	290.65	290.65	287.5	101.1	IDAHO-IDAHO	230

Scenario 3: AUG10H13 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.29	1.29	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	MIDROB11 (64902)	1.16	1.16	1.1		SIERRA	500
Bus High Volts	MIDROB21 (64908)	1.16	1.16	1.1		SIERRA	500
Bus High Volts	GRIMAL21 (40700)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	PONSUM11 (41048)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	ELY ENGY (64890)	1.14	1.14	1.1		SIERRA	500
Bus High Volts	GAR2EAST (40453)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GRIMAL22 (40702)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GRIMAL23 (40704)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GRIMAL24 (40706)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GRIMAL25 (40708)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GRIMAL26 (40710)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	PONDROSA (40837)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	SUMMER L (41043)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	MALSUM11 (41044)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	MALSUM12 (41046)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	PONSUM13 (41052)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	PONSUM14 (41054)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	CAPGRI11 (45039)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	CAPGRI12 (45040)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	CAPGRI13 (45041)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	CAPGRI14 (45042)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	CAPGRI15 (45043)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	ROBINSON (64895)	1.13	1.13	1.1		SIERRA	500
Bus High Volts	ROBH A21 (64898)	1.13	1.13	1.1		SIERRA	500
Bus High Volts	MIDROB12 (64903)	1.13	1.13	1.1		SIERRA	500

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MIDROB22 (64909)	1.13	1.13	1.1		SIERRA	500
Bus High Volts	GAR1EAST (40451)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIZZ R3 (40488)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIZZLY (40489)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIJOH12 (40591)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIJOH22 (40594)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	PONSUM12 (41050)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	MERIDINP (45197)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	ROBH A11 (64896)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	MIDROB13 (64907)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	MIDROB23 (64910)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	ALVEY (40051)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BIG EDDY (40111)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BUCKLEY (40155)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BUCGRI11 (40498)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MALIN R1 (40684)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MALIN (40687)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MALIN R3 (40688)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BUCMAR11 (40722)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	JOHMAR11 (40724)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CELILO1 (41311)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CELILO2 (41312)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ROUND BU (43485)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPTJACK (45035)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	DIXONVLE (45095)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ALVDIX11 (45096)	1.11	1.11	1.1		NORTHWEST	500

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	DIXMER11 (45199)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	KFALLS (45262)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MARION (40699)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ALVMAR11 (40716)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR21 (40718)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	SANTIAM (40941)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	KNIGHT (41450)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	KNIWAU11 (41453)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNCDR11 (43952)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BURNS (45029)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BURSUM11 (45030)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	HEMINWAY (60155)	1.1	1.1	1.1		IDAHO	500
Bus High Volts	BROADVU (62046)	1.1	1.1	1.1		MONTANA	500

Scenario 4: N-0 Contingency Results (Post-Transmission Improvements)

Scenario 4: JUL27H16 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	CS_____1 (64346) -> CS__2309 (64379) CKT 1 at CS_____1	199.98	199.98	120	166.65	SIERRA-SIERRA	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	28.13	28.13	20	140.66	PACE-PACE	230
Branch MVA	BEAVER (43017) -> BEAVER (43021) CKT 1 at BEAVER	485.46	485.46	348	139.5	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	54.83	54.83	40	137.08	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	34.24	34.24	25	136.96	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	40.73	40.73	33	123.43	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	40.73	40.73	33	123.43	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	26.99	26.99	22.4	120.48	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	117.52	117.52	100	117.52	PACE-PACE	230
Branch MVA	CC_CT C1 (60268) -> LANGLEY (60266) CKT 1 at CC_CT C1	274.51	274.51	240	114.38	IDAHO-IDAHO	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	24.09	24.09	22.4	107.54	PACE-PACE	230
Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	301.95	301.95	287	105.21	PACE-PACE	345
Branch MVA	BOYLE 2 (45064) -> BOYLE (45025) CKT 1 at BOYLE 2	43.63	43.63	42.3	103.13	NORTHWEST-NORTHWEST	230
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1029.31	1029.31	1000	102.93	PACE-PACE	500
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1021.83	1021.83	1000	102.18	PACE-PACE	500
Branch MVA	MNTFRM G (47675) -> MINTFARM (47677) CKT 1 at MINTFARM	219.39	219.39	215	102.04	NORTHWEST-NORTHWEST	230
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1019.64	1019.64	1000	101.96	PACE-PACE	230

Scenario 4: JUL27H16 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.31	1.31	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.18	1.18	1.1		MONTANA	230
Bus High Volts	TOWN2 (62012)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.14	1.14	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.14	1.14	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GARRISON (40459)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	GARTAF12 (41068)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	MIDROB11 (64902)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
Bus High Volts	HOT SPR (40553)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GARTAF11 (41066)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GARTAF21 (41070)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.11	1.11	1.1		MONTANA	500
Bus High Volts	TAFT (41057)	1.1	1.1	1.1		NORTHWEST	500

Scenario 4: DEC22H18 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	29	29	20	144.99	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	35.26	35.26	25	141.06	PACE-PACE	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	56.37	56.37	40	140.92	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	41.92	41.92	33	127.03	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	41.92	41.92	33	127.03	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	27.83	27.83	22.4	124.25	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	121.2	121.2	100	121.2	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	24.84	24.84	22.4	110.9	PACE-PACE	230
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1023.95	1023.95	1000	102.4	PACE-PACE	230
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1023.7	1023.7	1000	102.37	PACE-PACE	500
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1020.06	1020.06	1000	102.01	PACE-PACE	500

Scenario 4: DEC22H18 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.28	1.28	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.16	1.16	1.1		MONTANA	230
Bus High Volts	TOWN2 (62012)	1.14	1.14	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.14	1.14	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	BROADV&2 (62053)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	GARRISON (40459)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	GRIJOH12 (40591)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIJOH22 (40594)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL26 (40710)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	PONSUM12 (41050)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GARTAF12 (41068)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI11 (45039)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MIDROB11 (64902)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	GRIZZLY (40489)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	HOT SPR (40553)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL22 (40702)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL23 (40704)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL24 (40706)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIMAL25 (40708)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.1	1.1	1.1		NORTHWEST	500

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	GARTAF11 (41066)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GARTAF21 (41070)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI13 (45041)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI14 (45042)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CAPGRI15 (45043)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.1	1.1	1.1		MONTANA	500
Bus High Volts	ANPOPC&1 (67811)	1.1	1.1	1.1		PACE	500

Scenario 4: MAR02H21 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	926.94	502.04	184.63	PACE-NEVADA	345
Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	918.37	502.04	182.93	PACE-PACE	345
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPOFWLD	190.05	190.05	110	172.77	PACE-PACE	230
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.53	204.53	125	163.62	NORTHWEST-NORTHWEST	230
Branch MVA	LEANJ 1 (44887) -> JONESCYN (47814) CKT 1 at JONESCYN	203.63	203.63	125	162.91	NORTHWEST-NORTHWEST	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLOND EA	194.18	194.18	120	161.82	NORTHWEST-NORTHWEST	230
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	231.51	231.51	167	138.63	NORTHWEST-NORTHWEST	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	25.61	25.61	20	128.07	PACE-PACE	230
Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	812.74	812.74	640.11	126.97	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	50.22	50.22	40	125.55	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	31.22	31.22	25	124.87	PACE-PACE	230
Branch MVA	WHTCK 1 (47902) -> WHITE CK (47827) CKT 1 at WHITE CK	146.08	146.08	125	116.86	NORTHWEST-NORTHWEST	230
Branch MVA	DIABLO31 (46419) -> DIABLO (46421) CKT 1 at DIABLO	88.53	88.53	78	113.5	NORTHWEST-NORTHWEST	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	37.29	37.29	33	113.01	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	37.29	37.29	33	113.01	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	24.71	24.71	22.4	110.3	PACE-PACE	230
Branch MVA	JOHN DAY (40584) -> JOHN DAY (40585) CKT 1 at JOHN DAY	1318.23	1318.23	1218	108.23	NORTHWEST-NORTHWEST	500
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	105.91	105.91	100	105.91	PACE-PACE	230
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1036.57	1036.57	1000	103.66	PACE-PACE	500
Branch Amp	KLONDTAP (47830) -> JOHN DAY (40584) CKT 1 at KLONDTAP	1799.58	1799.58	1744.1	103.18	NORTHWEST-NORTHWEST	230
Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	811.67	811.67	795.74	102	NORTHWEST-NORTHWEST	230
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1017.71	1017.71	1000	101.77	PACE-PACE	500
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1012.33	1012.33	1000	101.23	PACE-PACE	230

Scenario 4: MAR02H21 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	ROBH A12 (64897)	1.17	1.17	1.1		SIERRA	500
Bus High Volts	MIDROB11 (64902)	1.14	1.14	1.1		SIERRA	500
Bus High Volts	TOWN2 (62012)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
Bus High Volts	GARRISON (40459)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MIDROB13 (64907)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	ASHMAR22 (40719)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GARTAF12 (41068)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.1	1.1	1.1		MONTANA	500
Bus Low Volts	HEMGRA11 (60157)	0.9	0.9	0.9		IDAHO	500

Scenario 4: OCT04H21 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	156.62	156.62	125	125.29	NORTHWEST-NORTHWEST	230
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	24.33	24.33	20	121.67	PACE-PACE	230
Branch MVA	KLON 31 (47833) -> KLOND EA (47832) CKT 1 at KLON 31	144.17	144.17	120	120.14	NORTHWEST-NORTHWEST	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	47.92	47.92	40	119.79	PACE-PACE	230
Branch MVA	TOPW_CL (69509) -> TOPOFWLD (69508) CKT 1 at TOPW_CL	131.66	131.66	110	119.69	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	29.71	29.71	25	118.84	PACE-PACE	230
Interface MW	MIDPOINT - SUMMER LAKE	1761.95	1761.95	1500	117.46	N/A	500
Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	2015.63	2015.63	1732.05	116.37	NORTHWEST-NORTHWEST	500
Interface MW	BRIDGER WEST	4179.32	4179.32	3700	112.95	N/A	N/A
Branch Amp	ANPOPC&1 (67811) -> POPULUS (67794) CKT 1 at POPULUS	2530.91	2530.91	2309.4	109.59	PACE-PACE	500
Interface MW	PATH C	1512.36	1512.36	1400	108.03	N/A	N/A
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	35.55	35.55	33	107.74	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	35.55	35.55	33	107.74	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	23.53	23.53	22.4	105.04	PACE-PACE	230
Branch Amp	MIDPOINT (60240) -> MIDHEM11 (60242) CKT 1 at MIDHEM11	1813.68	1813.68	1732.05	104.71	IDAHO-IDAHO	500
Branch MVA	SHPDF 5 (47462) -> SHPD FLT (47849) CKT 1 at SHPD FLT	174.02	174.02	167	104.2	NORTHWEST-NORTHWEST	230
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1013.16	1013.16	1000	101.32	PACE-PACE	230
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1012.61	1012.61	1000	101.26	PACE-PACE	500
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	100.53	100.53	100	100.53	PACE-PACE	230

Scenario 4: OCT04H21 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	TOWN2 (62012)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.13	1.13	1.1		MONTANA	500
Bus High Volts	ANPOPC&1 (67811)	1.13	1.13	1.1		PACE	500
Bus High Volts	GAR1EAST (40451)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.12	1.12	1.1		MONTANA	500
Bus High Volts	ROBH A12 (64897)	1.12	1.12	1.1		SIERRA	500
Bus High Volts	GARRISON (40459)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL22 (40702)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL23 (40704)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL24 (40706)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL25 (40708)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	GRIMAL26 (40710)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	PONSUM12 (41050)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI11 (45039)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI12 (45040)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI13 (45041)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI14 (45042)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPGRI15 (45043)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MERIDINP (45197)	1.11	1.11	1.1		NORTHWEST	500

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	GRIZZLY (40489)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BUCGRI11 (40498)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIJOH12 (40591)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	GRIJOH22 (40594)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR21 (40718)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BUCMAR11 (40722)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JOHMAR11 (40724)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BURNS (45029)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	DIXONVLE (45095)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ALVDIX11 (45096)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	KFALLS (45262)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	MIDROB11 (64902)	1.1	1.1	1.1		SIERRA	500

Scenario 4: AUG10H13 – N-0 Overloads

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Branch MVA	BRIDGER (65220) -> BRIDGER (65221) CKT 1 at BRIDGER	29.91	29.91	20	149.55	PACE-PACE	230
Branch MVA	FIREHOLE (65555) -> FIREHOL2 (65556) CKT 2 at FIREHOLE	36.34	36.34	25	145.37	PACE-PACE	230
Branch MVA	OREBASIN (66145) -> OREBASIN (66147) CKT 1 at OREBASIN	58.03	58.03	40	145.08	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 1 at SHERIDAN	43.15	43.15	33	130.76	PACE-PACE	230
Branch MVA	SHERIDAN (66335) -> SHERIDAN (66336) CKT 2 at SHERIDAN	43.15	43.15	33	130.76	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 1 at ROCKSPGS	28.6	28.6	22.4	127.7	PACE-PACE	230
Branch MVA	PLATTE (66240) -> PLATTE (66245) CKT 1 at PLATTE	125.72	125.72	100	125.72	PACE-PACE	230
Branch MVA	ROCKSPGS (66315) -> ROCKSPGS (66316) CKT 2 at ROCKSPGS	25.53	25.53	22.4	113.98	PACE-PACE	230
Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	299.9	299.9	287	104.5	PACE-PACE	345
Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	1023.91	1023.91	1000	102.39	PACE-PACE	500
Branch MVA	WY_CLCT1 (188) -> WINDSTAR (67814) CKT 1 at WINDSTAR	1021.33	1021.33	1000	102.13	PACE-PACE	230
Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1019.51	1019.51	1000	101.95	PACE-PACE	500
Branch MVA	MIDWEST (65955) -> MIDWEST (65956) CKT 2 at MIDWEST	25.3	25.3	25	101.19	PACE-PACE	230

Scenario 4: AUG10H13 – N-0 Voltage Violations

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MARIAS S (62361)	1.29	1.29	1.1		MONTANA	230
Bus High Volts	TOWN2 (62012)	1.17	1.17	1.1		MONTANA	500
Bus High Volts	TOWN1 (62013)	1.17	1.17	1.1		MONTANA	500
Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
Bus High Volts	GARRISON (40459)	1.15	1.15	1.1		NORTHWEST	500
Bus High Volts	BROADVU (62046)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	BROADV&2 (62053)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	BROADV&1 (62054)	1.15	1.15	1.1		MONTANA	500
Bus High Volts	GAR1EAST (40451)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GAR2EAST (40453)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GARTAF12 (41068)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GARTAF22 (41072)	1.14	1.14	1.1		NORTHWEST	500
Bus High Volts	GRIMAL21 (40700)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GRIMAL26 (40710)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	PONSUM11 (41048)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GARTAF11 (41066)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GARTAF21 (41070)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	CAPGRI11 (45039)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	CAPGRI16 (45044)	1.13	1.13	1.1		NORTHWEST	500
Bus High Volts	GRIZZ R3 (40488)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIZZLY (40489)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	HOT SPR (40553)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIJOH12 (40591)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIJOH22 (40594)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL22 (40702)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL23 (40704)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL24 (40706)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	GRIMAL25 (40708)	1.12	1.12	1.1		NORTHWEST	500

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	PONDROSA (40837)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	SUMMER L (41043)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	MALSUM11 (41044)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	MALSUM12 (41046)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	PONSUM12 (41050)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	PONSUM13 (41052)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	PONSUM14 (41054)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	TAFT (41057)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI12 (45040)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI13 (45041)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI14 (45042)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	CAPGRI15 (45043)	1.12	1.12	1.1		NORTHWEST	500
Bus High Volts	BUCKLEY (40155)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BUCGRI11 (40498)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MALIN R1 (40684)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MALIN (40687)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MALIN R3 (40688)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR22 (40719)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ASHMAR23 (40720)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BUCMAR11 (40722)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	JOHMAR11 (40724)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	BELTAF11 (41060)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ROUND BU (43485)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	CAPTJACK (45035)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	DIXONVLE (45095)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	ALVDIX11 (45096)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	MERIDINP (45197)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	KFALLS (45262)	1.11	1.11	1.1		NORTHWEST	500
Bus High Volts	COLSTRP (62057)	1.11	1.11	1.1		MONTANA	500

Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
Bus High Volts	MIDROB11 (64902)	1.11	1.11	1.1		SIERRA	500
Bus High Volts	ANPOPC&1 (67811)	1.11	1.11	1.1		PACE	500
Bus High Volts	ALVEY (40051)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BIG EDDY (40111)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	MARION (40699)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	ASHMAR21 (40718)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CELILO1 (41311)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	CELILO2 (41312)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	KNIGHT (41450)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	KNIWAU11 (41453)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNCDR11 (43952)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	JUNMIK21 (43956)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	BURNS (45029)	1.1	1.1	1.1		NORTHWEST	500
Bus High Volts	DIXMER11 (45199)	1.1	1.1	1.1		NORTHWEST	500

Scenario 1: N-1 Contingency Results (Post-Transmission Improvements)

N-1 Contingency Results for Scenario 1: JUL27H16

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	295.25	439.97	321	137.06	PACE-PACE	345
T-065140BENLOMND-065145BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	295.25	367.61	321	114.52	PACE-PACE	345
L-067794POPULUS-067826ANTICLINC1	Branch Amp	ANTICLIN (67827) -> BRIDGER (60085) CKT 1 at ANTICLIN	1069.07	2653.79	2396.4	110.74	PACE-IDAHO	345
L-067829CLOVER-067795AEOLUSC1	Interface MW	BRIDGER WEST	3620.7	4005.87	3700	108.27	N/A	N/A
T-065140BENLOMND-065145BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	295.25	346.81	321	108.04	PACE-PACE	345
T-0600843MIKNOLL-0652913MIKNOLLC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	295.25	335.32	321	104.46	PACE-PACE	345
L-065220BRIDGER-066315ROCKSPGSC2	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	536.22	834.65	800.76	104.23	PACE-PACE	230
T-066050NAUGHTON-066065NAUGT_G3C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	295.25	325.8	321	101.5	PACE-PACE	345
L-060085BRIDGER-0600843MIKNOLLC1-MS	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	295.25	322.88	321	100.59	PACE-PACE	345
L-065193BONANZA-065995MONAC1	Interface MW	BRIDGER WEST	3620.7	3707.64	3700	100.21	N/A	N/A
L-066266RAVEN-066010MONUMENTC1	Interface MW	BRIDGER WEST	3620.7	3701.02	3700	100.03	N/A	N/A
G-1: Colstrip #1	Bus High Volts	GARTAF11 (41066)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF21 (41070)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.14	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.13	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High	GARTAF12 (41068)	1.12	1.14	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.12	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.11	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.11	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.11	1.13	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TAFT (41057)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	BELTAF11 (41060)	1.09	1.1	1.1		NORTHWEST	500
L-060085BRIDGER-0600843MIKNOLLC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.18	1.19	1.1		PACE	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.05	1.12	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.07	1.1	1.1		SIERRA	230
L-067790POPULUS-060085BRIDGERC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.18	1.19	1.1		PACE	500
L-067790POPULUS-060085BRIDGERC2-MS	Bus High Volts	ANPOPC&1 (67811)	1.18	1.19	1.1		PACE	500
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	MIDROB12 (64903)	1.11	1.13	1.1		SIERRA	500
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	POPBRI11 (67793)	1.04	1.13	1.1		PACE	345
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	POPBRI21 (67800)	1.04	1.13	1.1		PACE	345
L-067827ANTICLIN-060085BRIDGERC1	Bus High Volts	ANPOPC&1 (67811)	1.18	1.22	1.1		PACE	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ANPOPC&1 (67811)	1.18	1.2	1.1		PACE	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.1	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-	Bus Low	NICKLMTN (44995)	0.97	0.88	0.9		NORTHWEST	230

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
045123DGRANTPS230C1	Volts							
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.13	1.14	1.1		NORTHWEST	500
T-067794POPULUS-067790POPULUSC1	Bus High Volts	ANPOPC&1 (67811)	1.18	1.21	1.1		PACE	500
T-067826ANTICLIN-067801ANTPSTC1	Bus High Volts	ANPOPC&1 (67811)	1.18	1.22	1.1		PACE	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.15	1.17	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.15	1.17	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.13	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.13	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.13	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.11	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF12 (41068)	1.12	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.11	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF22 (41072)	1.12	1.13	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 1: DEC22H18

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	1740.73	2232.69	1732.05	128.9	NORTHWEST-NORTHWEST	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	1740.73	2232.69	1732.05	128.9	NORTHWEST-NORTHWEST	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1557.69	1932.37	1500	128.82	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1557.69	1932.37	1500	128.82	N/A	500
L-067829CLOVER-067795AEOLUSC1	Interface MW	BRIDGER WEST	3932.2	4161.9	3700	112.48	N/A	N/A
L-067795AEOLUS-067826ANTICLINC1	Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1080.54	1116.49	1000	111.65	PACE-PACE	500
L-067795AEOLUS-067826ANTICLINC1	Branch MVA	WY_CLCT6 (193) -> AEOLUS (67795) CKT 1 at AEOLUS	1080.54	1116.49	1000	111.65	PACE-PACE	500
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	225.48	348.96	321	108.71	PACE-PACE	345
L-1:060150HELLSCYN230-045327WALAWALA230C1	Interface MW	MIDPOINT - SUMMER LAKE	1557.69	1601.87	1500	106.79	N/A	500
L-060150HELLSCYN-045103HURICANEC1	Interface MW	MIDPOINT - SUMMER LAKE	1557.69	1601.76	1500	106.78	N/A	500
L-1:040826PEARLW230-043527SHERWOOD230C1-MS	Branch Amp	PEARL # (43773) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1410.27	2406.46	2299.36	104.66	NORTHWEST-NORTHWEST	230
L-060150HELLSCYN-045103HURICANEC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1740.73	1793.69	1732.05	103.56	NORTHWEST-NORTHWEST	500
L-1:060150HELLSCYN230-045327WALAWALA230C1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1740.73	1793.74	1732.05	103.56	NORTHWEST-NORTHWEST	500
L-065545EXXONWY-066010MONUMENTC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1740.73	1776.09	1732.05	102.54	NORTHWEST-NORTHWEST	500
L-1:043773PEARL#230-043527SHERWOOD230C1	Branch Amp	PEASHE12 (43530) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1197.51	2341.88	2299.36	101.85	NORTHWEST-NORTHWEST	230
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	MIDPOINT (60240) -> MIDHEM11 (60242) CKT 1 at MIDHEM11	1521.02	2374.97	2338.27	101.57	IDAHO-IDAHO	500
L-1:043313MCLOUGLN230-040824PEARL E230-043527SHERWOOD230C1	Branch Amp	PEASHE12 (43530) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1197.51	2315.8	2299.36	100.71	NORTHWEST-NORTHWEST	230
L-067794POPULUS-060159CEDARHILC1-MS	Interface MW	BORAH WEST	3997.13	4480.89	4450	100.69	N/A	N/A
G-1: Colstrip #1	Bus High Volts	TOWN2 (62012)	1.14	1.15	1.1		MONTANA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #1	Bus High Volts	TOWN1 (62013)	1.14	1.15	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&2 (62053)	1.13	1.14	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&1 (62054)	1.13	1.14	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	GARRISON (40459)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	BROADVU (62046)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	GARTAF12 (41068)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF22 (41072)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF11 (41066)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF21 (41070)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.14	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.14	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.13	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.13	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.12	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.11	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.11	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High	COLSTRP (62057)	1.1	1.13	1.1		MONTANA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
	Volts							
G-1: Colstrip #4	Bus High Volts	HOT SPR (40553)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TAFT (41057)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	BELTAF11 (41060)	1.09	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL21 (40700)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.09	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI16 (45044)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIZZ R3 (40488)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL23 (40704)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL24 (40706)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL25 (40708)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONDROSA (40837)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	SUMMER L (41043)	1.08	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM11 (41044)	1.07	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM12 (41046)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM13 (41052)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM14 (41054)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI12 (45040)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI13 (45041)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI14 (45042)	1.1	1.11	1.1		NORTHWEST	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.9	0.88	0.9		IDAHO	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.06	1.15	1.1		IDAHO	500
L-060240MIDPOINT-060159CEDARHILC1	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-065975MINERS-066240PLATTEC1	Bus High Volts	ANPOPC&1 (67811)	1.17	1.18	1.1		PACE	500
L-065975MINERS-067946FREEZOUTC1	Bus High Volts	ANPOPC&1 (67811)	1.17	1.18	1.1		PACE	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.06	1.15	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.08	1.12	1.1		SIERRA	230
L-067796AEOLUS-067946FREEZOUTC1	Bus High Volts	ANPOPC&1 (67811)	1.17	1.18	1.1		PACE	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ANPOPC&1 (67811)	1.17	1.2	1.1		PACE	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.98	0.88	0.9		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.13	1.15	1.1		NORTHWEST	500
T-067829CLOVER-065996CLOVERC1	Bus High Volts	AEMNC&1A (67798)	1.1	1.11	1.1		PACE	500
T-067829CLOVER-065996CLOVERC1	Bus High Volts	AEMNC&1C (67804)	1.1	1.11	1.1		PACE	500
T-067829CLOVER-065996CLOVERC2	Bus High Volts	AEMNC&1A (67798)	1.1	1.11	1.1		PACE	500
T-067829CLOVER-065996CLOVERC2	Bus High Volts	AEMNC&1C (67804)	1.1	1.11	1.1		PACE	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.14	1.15	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.14	1.15	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High	GAR1EAST (40451)	1.13	1.14	1.1		NORTHWEST	500

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
	Volts							
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.13	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.12	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.1	1.12	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.1	1.12	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 1: MAR04H21 (AC Solution)

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	814.37	1430.54	640.11	223.49	NORTHWEST-NORTHWEST	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	1051.71	552.25	190.44	PACE-NEVADA	345
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	1041.99	552.25	188.68	PACE-PACE	345
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	1025.37	552.25	185.67	PACE-NEVADA	345
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	1019.82	552.25	184.67	PACE-NEVADA	345
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	1019.78	552.25	184.66	PACE-NEVADA	345
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	1015.9	552.25	183.96	PACE-PACE	345
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	1010.41	552.25	182.96	PACE-PACE	345
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	1010.37	552.25	182.96	PACE-PACE	345
L-066355SIGURDPS-079031GLENCANYC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	1003.63	552.25	181.73	PACE-NEVADA	345
T-066345SIGURD-066355SIGURDPSC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	1003.57	552.25	181.72	PACE-NEVADA	345
L-066355SIGURDPS-079031GLENCANYC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	994.36	552.25	180.06	PACE-PACE	345
T-066345SIGURD-066355SIGURDPSC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	994.3	552.25	180.05	PACE-PACE	345
L-060155HEMINWAY-045029BURNSC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	974.85	552.25	176.52	PACE-NEVADA	345
L-060155HEMINWAY-045029BURNSC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	965.85	552.25	174.89	PACE-PACE	345
L-060061BORAH-060240MIDPOINTC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	957.42	552.25	173.37	PACE-NEVADA	345
L-067794POPULUS-060159CEDARHILC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	951.95	552.25	172.38	PACE-NEVADA	345
L-060061BORAH-060240MIDPOINTC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	948.58	552.25	171.77	PACE-PACE	345
L-065510EMERY-065805HUNTNGTNC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	946.77	552.25	171.44	PACE-NEVADA	345
L-065805HUNTNGTN-065995MONAC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	943.48	552.25	170.84	PACE-NEVADA	345
L-067794POPULUS-060159CEDARHILC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	943.17	552.25	170.79	PACE-PACE	345

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-065510EMERY-066400SPANFRKC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	942.23	552.25	170.62	PACE-NEVADA	345
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	930.45	941.63	552.25	170.51	PACE-NEVADA	345
L-065510EMERY-065805HUNTNGTNC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	938.03	552.25	169.86	PACE-PACE	345
L-065805HUNTNGTN-065995MONAC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	934.77	552.25	169.27	PACE-PACE	345
L-065510EMERY-066400SPANFRKC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	933.53	552.25	169.04	PACE-PACE	345
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	921.86	932.93	552.25	168.93	PACE-PACE	345
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.5	207.06	125	165.64	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR E TP (45160) -> BOARD T2 (40123) CKT 1 at DR E TP	789.38	1403.57	870.04	161.32	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DALREED (45075) -> DR E TP (45160) CKT 1 at DALREED	789.39	1403.57	873.56	160.67	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	813.31	1429.84	1006.6	142.05	NORTHWEST-NORTHWEST	230
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	814.37	830.71	640.11	129.78	NORTHWEST-NORTHWEST	230
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	814.37	830.36	640.11	129.72	NORTHWEST-NORTHWEST	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1351.77	1643.27	1500	109.55	N/A	500
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	BOARD T2 (40123) -> MCNRY S2 (41352) CKT 1 at BOARD T2	786.14	1400.45	1320.12	106.08	NORTHWEST-NORTHWEST	230
G-1: Colstrip #4	Branch MVA	JGAPCLCT (62214) -> JUDITHSO (62083) CKT 1 at JUDITHSO	162.24	173.95	166.6	104.41	MONTANA-MONTANA	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	1456.75	1780.49	1732.05	102.8	NORTHWEST-NORTHWEST	500
L-067796AEOLUS-067814WINDSTARC1	Branch Amp	SHIRLYBS (69028) -> AEOLUS (67796) CKT 1 at SHIRLYBS	1917.11	2507.01	2475.08	101.29	PACE-PACE	230
L-066280REDBUTTE-018002HAPSC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	265.33	305.7	303	100.89	PACE-PACE	230
G-1: Colstrip #1	Branch MVA	JGAPCLCT (62214) -> JUDITHSO (62083) CKT 1 at JUDITHSO	162.24	167.16	166.6	100.34	MONTANA-MONTANA	230
G-1: Colstrip #1	Bus High Volts	TOWN2 (62012)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #1	Bus High	TOWN1 (62013)	1.13	1.15	1.1		MONTANA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
	Volts							
G-1: Colstrip #1	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	BROADVU (62046)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&2 (62053)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&1 (62054)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	GARRISON (40459)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	HOT SPR (40553)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF11 (41066)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF12 (41068)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF21 (41070)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF22 (41072)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	COLSTRP (62057)	1.1	1.11	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	TAFT (41057)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	MARIAS S (62361)	1.3	1.31	1.1		MONTANA	230
G-1: Colstrip #4	Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.11	1.14	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.09	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.09	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.1	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	HOT SPR (40553)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TAFT (41057)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	BELL BPA (40091)	1.09	1.1	1.1		NORTHWEST	500
L-060061BORAH-060240MIDPOINTC1-MS	Bus High Volts	CEDHEM11 (60166)	1.09	1.1	1.1		IDAHO	500
L-060150HELLSCYN-060095BROWNLEEC1	Bus High Volts	HURWAL11 (45334)	1.02	1.12	1.1		NORTHWEST	230
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	ROBH A12 (64897)	1.18	1.2	1.1		SIERRA	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	ROBH A12 (64897)	1.18	1.19	1.1		SIERRA	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.09	1.15	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	PONSUM11 (41048)	1.11	1.11	1.1		NORTHWEST	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	BURSUM11 (45030)	1.08	1.11	1.1		NORTHWEST	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	HEMINWAY (60155)	1.09	1.11	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	MALSUM12 (41046)	1.1	1.1	1.1		NORTHWEST	500
L-060240MIDPOINT-060159CEDARHILC1	Bus High Volts	CEDHEM11 (60166)	1.09	1.11	1.1		IDAHO	500
L-065805HUNTNGTN-	Bus High	ROBH A12 (64897)	1.18	1.19	1.1		SIERRA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
066225PINTOC1	Volts							
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.04	1.13	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.07	1.11	1.1		SIERRA	230
L-066235PINTOPS-014101FOURCORNC1	Bus High Volts	ROBH A12 (64897)	1.18	1.19	1.1		SIERRA	500
L-066280REDBUTTE-018002HAPSC1	Bus High Volts	ROBH A12 (64897)	1.18	1.19	1.1		SIERRA	500
L-067794POPULUS-060061BORAHC1-MS	Bus High Volts	CEDHEM11 (60166)	1.09	1.1	1.1		IDAHO	500
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	ANPOPC&2 (67812)	1.07	1.13	1.1		PACE	500
L-067794POPULUS-067826ANTICLINC2	Bus High Volts	ANPOPC&1 (67811)	1.07	1.13	1.1		PACE	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ROBH A12 (64897)	1.18	1.19	1.1		SIERRA	500
L-1:043496JUNPRFT500-043950CDRSPRG500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.11	1.1		NORTHWEST	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.99	0.89	0.9		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.12	1.15	1.1		NORTHWEST	500
N-1: Mill Crk-Garrison #1 230	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
N-1: Mill Crk-Garrison #1 230	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
T-060155HEMINWAY-060156HEMINWAYC1	Bus High Volts	CEDHEM11 (60166)	1.09	1.1	1.1		IDAHO	500
T-066225PINTO-066235PINTOPSC1_2	Bus High Volts	ROBH A12 (64897)	1.18	1.19	1.1		SIERRA	500
T-067829CLOVER-065996CLOVERC1	Bus High Volts	AEMNC&1C (67804)	1.08	1.1	1.1		PACE	500
T-067829CLOVER-065996CLOVERC1	Bus High Volts	CLOVER (67829)	1.08	1.1	1.1		PACE	500

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-067829CLOVER-065996CLOVERC2	Bus High Volts	AEMNC&1C (67804)	1.08	1.1	1.1		PACE	500
T-067829CLOVER-065996CLOVERC2	Bus High Volts	CLOVER (67829)	1.08	1.1	1.1		PACE	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.13	1.15	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.13	1.15	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	BROADV&2 (62053)	1.12	1.13	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	BROADV&1 (62054)	1.12	1.13	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.11	1.12	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	BROADVU (62046)	1.12	1.12	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.09	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF12 (41068)	1.1	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.09	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF22 (41072)	1.1	1.11	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 1: MAR04H21 (DC Solution)

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	815.7	1430.55	640.11	223.49	NORTHWEST-NORTHWEST	230
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1216.26	552.25	220.24	PACE-NEVADA	345
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1205.87	552.25	218.36	PACE-NEVADA	345
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1205.82	552.25	218.35	PACE-NEVADA	345
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1205	552.25	218.2	PACE-PACE	345
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1194.71	552.25	216.34	PACE-PACE	345
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1194.66	552.25	216.33	PACE-PACE	345
L-060155HEMINWAY-045029BURNSC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1165.18	552.25	210.99	PACE-NEVADA	345
L-060155HEMINWAY-045029BURNSC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1154.44	552.25	209.04	PACE-PACE	345
L-066355SIGURDPS-079031GLENCANYC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1134.75	552.25	205.48	PACE-NEVADA	345
T-066345SIGURD-066355SIGURDPSC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1134.69	552.25	205.47	PACE-NEVADA	345
L-066355SIGURDPS-079031GLENCANYC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1124.26	552.25	203.58	PACE-PACE	345
T-066345SIGURD-066355SIGURDPSC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1124.2	552.25	203.57	PACE-PACE	345
L-060240MIDPOINT-060155HEMINWAYC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1053.44	552.25	190.76	PACE-NEVADA	345
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1048.45	552.25	189.85	PACE-NEVADA	345
L-060240MIDPOINT-060155HEMINWAYC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1043.71	552.25	188.99	PACE-PACE	345
L-066210PAVANT-066345SIGURDC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1043.2	552.25	188.9	PACE-NEVADA	345
L-067794POPULUS-060159CEDARHILC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1040.35	552.25	188.38	PACE-NEVADA	345
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1039.39	552.25	188.21	PACE-NEVADA	345
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1039.39	552.25	188.21	PACE-NEVADA	345
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1038.77	552.25	188.1	PACE-PACE	345

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-065545EXXONWY-066010MONUMENTC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1037.75	552.25	187.91	PACE-NEVADA	345
L-060061BORAH-060240MIDPOINTC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1037.57	552.25	187.88	PACE-NEVADA	345
L-066210PAVANT-064056GONDERC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1033.59	552.25	187.16	PACE-NEVADA	345
L-066210PAVANT-066345SIGURDC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1033.57	552.25	187.16	PACE-PACE	345
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1031.56	552.25	186.79	PACE-NEVADA	345
L-065510EMERY-065805HUNTNGTNC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1031.49	552.25	186.78	PACE-NEVADA	345
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1031.51	552.25	186.78	PACE-NEVADA	345
L-065293CARRDRA-076400PUMPKIN_C1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1030.72	552.25	186.64	PACE-NEVADA	345
L-067794POPULUS-060159CEDARHILC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1030.74	552.25	186.64	PACE-PACE	345
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1029.79	552.25	186.47	PACE-PACE	345
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1029.79	552.25	186.47	PACE-PACE	345
L-060235MIDPOINT-064059HUMBOLDTC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1029.44	552.25	186.41	PACE-NEVADA	345
L-065545EXXONWY-066010MONUMENTC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1028.16	552.25	186.18	PACE-PACE	345
L-060061BORAH-060240MIDPOINTC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1027.98	552.25	186.14	PACE-PACE	345
L-066266RAVEN-066010MONUMENTC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	1015.94	1027.79	552.25	186.11	PACE-NEVADA	345
L-066210PAVANT-064056GONDERC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1024.05	552.25	185.43	PACE-PACE	345
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1022.03	552.25	185.07	PACE-PACE	345
L-065510EMERY-065805HUNTNGTNC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1021.96	552.25	185.06	PACE-PACE	345
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1021.98	552.25	185.06	PACE-PACE	345
L-065293CARRDRA-076400PUMPKIN_C1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1021.19	552.25	184.92	PACE-PACE	345
L-060235MIDPOINT-	Branch	REDBUTTE (66280) -> UTAH-NEV (67657)	1006.55	1019.93	552.25	184.69	PACE-PACE	345

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
064059HUMBOLDTC1	Amp	CKT 1 at UTAH-NEV						
L-066266RAVEN-066010MONUMENTC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	1006.55	1018.29	552.25	184.39	PACE-PACE	345
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR E TP (45160) -> BOARD T2 (40123) CKT 1 at DR E TP	790.91	1403.58	870.04	161.32	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DALREED (45075) -> DR E TP (45160) CKT 1 at DALREED	790.92	1403.59	873.56	160.68	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	814.61	1429.85	1006.6	142.05	NORTHWEST-NORTHWEST	230
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	815.7	830.87	640.11	129.8	NORTHWEST-NORTHWEST	230
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	815.7	830.38	640.11	129.73	NORTHWEST-NORTHWEST	230
L-066280REDBUTTE-018002HAPSC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	303.71	368.74	303	121.7	PACE-PACE	230
L-067796AEOLUS-067814WINDSTARC1	Branch Amp	SHIRLYBS (69028) -> AEOLUS (67796) CKT 1 at SHIRLYBS	2250.54	2981.64	2475.08	120.47	PACE-PACE	230
L-065805HUNTNGTN-066225PINTOC1	Interface MW	TOT 2C	601.36	709.85	600	118.31	N/A	500
L-066235PINTOPS-014101FOURCORNC1	Interface MW	TOT 2C	601.36	705.47	600	117.58	N/A	500
T-066225PINTO-066235PINTOPSC1_2	Interface MW	TOT 2C	601.36	705.45	600	117.57	N/A	500
L-067796AEOLUS-069028SHIRLYBSC1	Branch Amp	WINDSTAR (67814) -> AEOLUS (67796) CKT 1 at AEOLUS	2019.67	2874.56	2475.08	116.14	PACE-PACE	230
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1727.44	1500	115.16	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1727.44	1500	115.16	N/A	500
L-067796AEOLUS-067814WINDSTARC2	Branch Amp	SHIRLYBS (69028) -> AEOLUS (67796) CKT 1 at SHIRLYBS	2250.54	2824.19	2475.08	114.11	PACE-PACE	230
L-065805HUNTNGTN-066225PINTOC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	303.71	344.68	303	113.76	PACE-PACE	230
L-066280REDBUTTE-018002HAPSC1	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1701.3	1500	113.42	N/A	500
L-066235PINTOPS-014101FOURCORNC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	303.71	342.62	303	113.08	PACE-PACE	230
T-066225PINTO-066235PINTOPSC1_2	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	303.71	342.63	303	113.08	PACE-PACE	230
L-060155HEMINWAY-045029BURNSC1	Interface MW	TOT 2C	601.36	675.15	600	112.52	N/A	500
L-065420DAVEJOHN-065460DIFICULTC1	Branch Amp	WINDSTAR (67814) -> AEOLUS (67796) CKT 1 at AEOLUS	2019.67	2770.7	2475.08	111.94	PACE-PACE	230

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-065805HUNTNGTN-066225PINTOC1	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1678.42	1500	111.89	N/A	500
L-067796AEOLUS-067814WINDSTARC1	Branch Amp	DAVEJOHN (65420) -> DIFICULT (65460) CKT 1 at DIFICULT	2029.16	2767.8	2475.08	111.83	PACE-PACE	230
L-065460DIFICULT-069028SHIRLYBSC1	Branch Amp	WINDSTAR (67814) -> AEOLUS (67796) CKT 1 at AEOLUS	2019.67	2763.49	2475.08	111.65	PACE-PACE	230
L-066235PINTOPS-014101FOURCORNC1	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1673.72	1500	111.58	N/A	500
T-066225PINTO-066235PINTOPSC1_2	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1673.68	1500	111.58	N/A	500
L-067796AEOLUS-067814WINDSTARC1	Branch Amp	DIFICULT (65460) -> SHIRLYBS (69028) CKT 1 at DIFICULT	2015.92	2753.91	2475.08	111.27	PACE-PACE	230
L-066280REDBUTTE-018002HAPSC1	Interface MW	TOT 2B	766.48	865.08	780	110.91	N/A	345
L-066355SIGURDPS-079031GLENCANYC1	Interface MW	TOT 2C	601.36	664.72	600	110.79	N/A	500
T-066345SIGURD-066355SIGURDPSC1	Interface MW	TOT 2C	601.36	664.69	600	110.78	N/A	500
L-066280REDBUTTE-018002HAPSC1	Interface MW	TOT 2B2	258.24	288.84	265	109	N/A	230
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1710.57	1886.31	1732.05	108.91	NORTHWEST-NORTHWEST	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1710.57	1886.31	1732.05	108.91	NORTHWEST-NORTHWEST	500
L-1:060150HELLSCYN230-045327WALAWALA230C1	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1632.77	1500	108.85	N/A	500
L-060150HELLSCYN-045103HURICANEC1	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1632.42	1500	108.83	N/A	500
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1631.49	1500	108.77	N/A	500
L-066355SIGURDPS-079031GLENCANYC1	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1628.57	1500	108.57	N/A	500
T-066345SIGURD-066355SIGURDPSC1	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1628.49	1500	108.57	N/A	500
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1628.26	1500	108.55	N/A	500
L-060155HEMINWAY-045029BURNSC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	303.71	328.05	303	108.27	PACE-PACE	230
L-065545EXXONWY-066010MONUMENTC1	Interface MW	MIDPOINT - SUMMER LAKE	1589.98	1622.4	1500	108.16	N/A	500
L-066280REDBUTTE-	Branch	BURNS (45029) -> BURSUM11 (45030) CKT 1	1710.57	1846.12	1732.05	106.59	NORTHWEST-	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
018002HAPSC1	Amp	at BURNS					NORTHWEST	
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	BOARD T2 (40123) -> MCNRY S2 (41352) CKT 1 at BOARD T2	787.61	1400.46	1320.12	106.09	NORTHWEST-NORTHWEST	230
L-060155HEMINWAY-045029BURNSC1	Interface MW	TOT 2B	766.48	824.35	780	105.69	N/A	345
L-067796AEOLUS-067814WINDSTARC2	Branch Amp	DAVEJOHN (65420) -> DIFICULT (65460) CKT 1 at DIFICULT	2029.16	2608.7	2475.08	105.4	PACE-PACE	230
L-065805HUNTNGTN-066225PINTOC1	Interface MW	TOT 2B2	258.24	278.38	265	105.05	N/A	230
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1710.57	1817.79	1732.05	104.95	NORTHWEST-NORTHWEST	500
L-067796AEOLUS-067814WINDSTARC2	Branch Amp	WINDSTAR (67814) -> AEOLUS (67796) CKT 1 at AEOLUS	2019.67	2597.19	2475.08	104.93	PACE-PACE	230
L-067796AEOLUS-067814WINDSTARC2	Branch Amp	DIFICULT (65460) -> SHIRLYBS (69028) CKT 1 at DIFICULT	2015.92	2594.98	2475.08	104.84	PACE-PACE	230
T-066225PINTO-066235PINTOPSC1_2	Interface MW	TOT 2B2	258.24	277.61	265	104.76	N/A	230
L-066235PINTOPS-014101FOURCORNC1	Interface MW	TOT 2B2	258.24	277.6	265	104.75	N/A	230
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1710.57	1812	1732.05	104.62	NORTHWEST-NORTHWEST	500
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1710.57	1811.95	1732.05	104.61	NORTHWEST-NORTHWEST	500
G-1: Colstrip #4	Branch MVA	JGAPCLCT (62214) -> JUDITHSO (62083) CKT 1 at JUDITHSO	162.24	173.68	166.6	104.25	MONTANA-MONTANA	230
L-060240MIDPOINT-060155HEMINWAYC1-MS	Interface MW	TOT 2C	601.36	620.86	600	103.48	N/A	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Interface MW	TOT 2C	601.36	618.29	600	103.05	N/A	500
L-065420DAVEJOHN-065460DIFICULTC1	Branch MVA	WY_CLCT4 (191) -> WINDSTAR (67814) CKT 1 at WY_CLCT4	501.83	514.68	500	102.94	PACE-PACE	230
L-065460DIFICULT-069028SHIRLYBSC1	Branch MVA	WY_CLCT4 (191) -> WINDSTAR (67814) CKT 1 at WY_CLCT4	501.83	514.71	500	102.94	PACE-PACE	230
L-067796AEOLUS-069028SHIRLYBSC1	Branch MVA	WY_CLCT4 (191) -> WINDSTAR (67814) CKT 1 at WY_CLCT4	501.83	514.59	500	102.92	PACE-PACE	230
L-066280REDBUTTE-018002HAPSC1	Interface MW	TOT 2B1	508.25	576.24	560	102.9	N/A	345
L-066210PAVANT-066345SIGURDC1	Interface MW	TOT 2C	601.36	615.44	600	102.57	N/A	500
L-067796AEOLUS-069028SHIRLYBSC1	Branch MVA	WY_CLCT5 (192) -> DAVEJOHN (65420) CKT 1 at WY_CLCT5	500.05	512.67	500	102.53	PACE-PACE	230
L-067794POPULUS-060159CEDARHILC1-MS	Interface MW	TOT 2C	601.36	614.07	600	102.35	N/A	500

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-060240MIDPOINT-060155HEMINWAYC1-MS	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	303.71	310	303	102.31	PACE-PACE	230
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	TOT 2C	601.36	613.56	600	102.26	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	TOT 2C	601.36	613.56	600	102.26	N/A	500
L-067796AEOLUS-067814WINDSTARC1	Branch MVA	WY_CLCT5 (192) -> DAVEJOHN (65420) CKT 1 at WY_CLCT5	500.05	510.76	500	102.15	PACE-PACE	230
L-060155HEMINWAY-045029BURNSC1	Interface MW	TOT 2B2	258.24	270.22	265	101.97	N/A	230
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	1710.57	1764.16	1732.05	101.85	NORTHWEST-NORTHWEST	500
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1710.57	1761.71	1732.05	101.71	NORTHWEST-NORTHWEST	500
L-1:060150HELLSCYN230-045327WALAWALA230C1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	1710.57	1759.21	1732.05	101.57	NORTHWEST-NORTHWEST	500
L-060150HELLSCYN-045103HURICANEC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	1710.57	1758.63	1732.05	101.53	NORTHWEST-NORTHWEST	500
L-066355SIGURDPS-079031GLENCANYC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1710.57	1756.74	1732.05	101.43	NORTHWEST-NORTHWEST	500
T-066345SIGURD-066355SIGURDPSC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1710.57	1756.64	1732.05	101.42	NORTHWEST-NORTHWEST	500
L-065545EXXONWY-066010MONUMENTC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1710.57	1749.72	1732.05	101.02	NORTHWEST-NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	TOWN2 (62012)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	TOWN1 (62013)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	BROADVU (62046)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&2 (62053)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&1 (62054)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	GARRISON (40459)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
	Volts							
G-1: Colstrip #1	Bus High Volts	GARTAF12 (41068)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF22 (41072)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	COLSTRP (62057)	1.1	1.11	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	HOT SPR (40553)	1.1	1.1	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GRIMAL25 (40708)	1.1	1.1	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	TAFT (41057)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF11 (41066)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF21 (41070)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
G-1: Colstrip #4	Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.11	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL21 (40700)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.09	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.09	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI16 (45044)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.1	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	HOT SPR (40553)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL25 (40708)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	PONSUM11 (41048)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TAFT (41057)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI12 (45040)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIJOH22 (40594)	1.1	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL23 (40704)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL24 (40706)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI13 (45041)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI14 (45042)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	HEMINWAY (60155)	1.1	1.1	1.1		IDAHO	500
L-060150HELLSCYN-060095BROWNLEEC1	Bus High Volts	HURWAL11 (45334)	1.02	1.12	1.1		NORTHWEST	230
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-	Bus High	HEMINWAY (60155)	1.1	1.11	1.1		IDAHO	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
045029BURNSC1	Volts							
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL25 (40708)	1.1	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CEDHEM11 (60166)	1.09	1.1	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.09	1.15	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	HEMINWAY (60155)	1.1	1.11	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
L-060240MIDPOINT-060159CEDARHILC1	Bus High Volts	CEDHEM11 (60166)	1.09	1.1	1.1		IDAHO	500
L-065394CURRANTC-065995MONAC1	Bus High Volts	AEMNC&1C (67804)	1.1	1.11	1.1		PACE	500
L-065394CURRANTC-065995MONAC1	Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
L-065580FTCREEK-065975MINERSC1	Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
L-065975MINERS-066240PLATTEC1	Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.04	1.14	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.06	1.12	1.1		SIERRA	230
L-067794POPULUS-060159CEDARHILC1-MS	Bus High Volts	BORMID11 (60241)	1.09	1.1	1.1		IDAHO	500
L-067796AEOLUS-067814WINDSTARC1	Bus Low Volts	DIFICULT (65460)	0.93	0.87	0.9		PACE	230
L-067796AEOLUS-067814WINDSTARC2	Bus Low Volts	DIFICULT (65460)	0.93	0.88	0.9		PACE	230
L-1:043496JUNPRFT500-043950CDRSPRG500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.11	1.1		NORTHWEST	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.98	0.89	0.9		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.12	1.15	1.1		NORTHWEST	500
T-060155HEMINWAY-060156HEMINWAYC1	Bus High Volts	CEDHEM11 (60166)	1.09	1.1	1.1		IDAHO	500
T-066050NAUGHTON-066055NAUGT_G1C1	Bus High Volts	CAPGRI16 (45044)	1.11	1.12	1.1		NORTHWEST	500
T-066050NAUGHTON-066055NAUGT_G1C1	Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
T-066050NAUGHTON-066055NAUGT_G1C1	Bus High Volts	PONSUM11 (41048)	1.1	1.11	1.1		NORTHWEST	500
T-066050NAUGHTON-066055NAUGT_G1C1	Bus High Volts	HEMINWAY (60155)	1.1	1.11	1.1		IDAHO	500
T-066050NAUGHTON-066055NAUGT_G1C1	Bus High Volts	GRIMAL25 (40708)	1.1	1.1	1.1		NORTHWEST	500
T-066050NAUGHTON-066055NAUGT_G1C1	Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500
T-066050NAUGHTON-066065NAUGT_G3C1	Bus High Volts	HEMINWAY (60155)	1.1	1.11	1.1		IDAHO	500
T-066050NAUGHTON-066065NAUGT_G3C1	Bus High Volts	GRIMAL25 (40708)	1.1	1.1	1.1		NORTHWEST	500
T-066050NAUGHTON-066065NAUGT_G3C1	Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
T-066050NAUGHTON-066065NAUGT_G3C1	Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500
T-067829CLOVER-065996CLOVERC1	Bus High Volts	AEMNC&1C (67804)	1.1	1.12	1.1		PACE	500
T-067829CLOVER-065996CLOVERC1	Bus High Volts	CLOVER (67829)	1.09	1.11	1.1		PACE	500
T-067829CLOVER-065996CLOVERC1	Bus High Volts	AEMNC&1A (67798)	1.09	1.1	1.1		PACE	500
T-067829CLOVER-065996CLOVERC2	Bus High Volts	AEMNC&1C (67804)	1.1	1.12	1.1		PACE	500
T-067829CLOVER-065996CLOVERC2	Bus High Volts	CLOVER (67829)	1.09	1.11	1.1		PACE	500
T-067829CLOVER-065996CLOVERC2	Bus High Volts	AEMNC&1A (67798)	1.09	1.1	1.1		PACE	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.13	1.15	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High	TOWN1 (62013)	1.13	1.15	1.1		MONTANA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
	Volts							
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	BROADV&2 (62053)	1.12	1.13	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	BROADV&1 (62054)	1.12	1.13	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.11	1.12	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	BROADVU (62046)	1.12	1.12	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.09	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF12 (41068)	1.1	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.09	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF22 (41072)	1.1	1.11	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 1: OCT04H21

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	656.72	1058.01	640.11	165.29	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	156.64	195.12	125	156.1	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	JONTMB11 (47815) -> TMBLCR T (41079) CKT 1 at TMBLCR T	391.14	986.21	640.11	154.07	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	TMBLCR T (41079) -> SANTIAM (40939) CKT 1 at TMBLCR T	385.5	984.57	640.11	153.81	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	JONESCYN (47814) -> JONTMB11 (47815) CKT 1 at JONTMB11	392.88	975.87	640.11	152.46	NORTHWEST-NORTHWEST	230
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1884.37	2591.43	1732.1	149.62	NORTHWEST-NORTHWEST	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1884.37	2591.43	1732.1	149.62	NORTHWEST-NORTHWEST	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1664.55	2204.27	1500	146.95	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1664.55	2204.27	1500	146.95	N/A	500
L-067829CLOVER-067795AEOLUSC1	Interface MW	BRIDGER WEST	4420.03	4774.31	3700	129.04	N/A	N/A
L-065193BONANZA-065995MONAC1	Interface MW	BRIDGER WEST	4420.03	4505.47	3700	121.77	N/A	N/A
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR E TP (45160) -> BOARD T2 (40123) CKT 1 at DR E TP	634.36	1034.85	870.04	118.94	NORTHWEST-NORTHWEST	230
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	MIDPOINT (60240) -> MIDHEM11 (60242) CKT 1 at MIDHEM11	1766.08	2772.36	2338.3	118.56	IDAHO-IDAHO	500
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DALREED (45075) -> DR E TP (45160) CKT 1 at DALREED	634.37	1034.85	873.56	118.46	NORTHWEST-NORTHWEST	230
L-1:060150HELLSCYN230-045327WALAWALA230C1	Interface MW	MIDPOINT - SUMMER LAKE	1664.55	1717.12	1500	114.47	N/A	500
L-060150HELLSCYN-045103HURICANEC1	Interface MW	MIDPOINT - SUMMER LAKE	1664.55	1716.84	1500	114.46	N/A	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1664.55	1705.57	1500	113.7	N/A	500
L-040621LAGRANDE-060312NPOWDERC1	Interface MW	MIDPOINT - SUMMER LAKE	1664.55	1700.33	1500	113.36	N/A	500
L-048197LOLO-060275OXBOW	Interface MW	MIDPOINT - SUMMER LAKE	1664.55	1696.94	1500	113.13	N/A	500
L-060240MIDPOINT-	Branch	BURNS (45029) -> BURSUM11 (45030) CKT 1	1884.37	1952.52	1732.1	112.73	NORTHWEST-	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
064895ROBINSONC1-MS	Amp	at BURNS					NORTHWEST	
L-1:060150HELLSCYN230-045327WALAWALA230C1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1884.37	1951.56	1732.1	112.67	NORTHWEST-NORTHWEST	500
L-060150HELLSCYN-045103HURICANEC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1884.37	1951.31	1732.1	112.66	NORTHWEST-NORTHWEST	500
L-040621LAGRANDE-060312NPOWDERC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1884.37	1930.1	1732.1	111.43	NORTHWEST-NORTHWEST	500
L-048197LOLO-060275OXBOW	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1884.37	1925.36	1732.1	111.16	NORTHWEST-NORTHWEST	500
L-067794POPULUS-060061BORAHC1-MS	Interface MW	PATH C	1146.35	1547.71	1400	110.55	N/A	N/A
L-067794POPULUS-067826ANTICLINC1	Branch Amp	BRIDGER (60085) -> BRI3MI11 (60090) CKT 1 at BRIDGER	1415.79	2015.94	1840	109.56	IDAHO-IDAHO	345
L-067794POPULUS-067826ANTICLINC1	Branch Amp	ANTICLIN (67827) -> BRIDGER (60085) CKT 1 at ANTICLIN	926.49	2601.81	2396.4	108.57	PACE-IDAHO	345
L-067794POPULUS-067826ANTICLINC1	Interface MW	PATH C	1146.35	1486.55	1400	106.18	N/A	N/A
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	656.39	1057.81	1006.6	105.09	NORTHWEST-NORTHWEST	230
L-060085BRIDGER-0600843MIKNOLLC1-MS	Interface MW	PATH C	1146.35	1414.26	1400	101.02	N/A	N/A
G-1: Colstrip #1	Bus High Volts	BROADVU (62046)	1.09	1.11	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&1 (62054)	1.09	1.11	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	TOWN2 (62012)	1.09	1.1	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	TOWN1 (62013)	1.09	1.1	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&2 (62053)	1.09	1.1	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.09	1.13	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.09	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.09	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.09	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.09	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.09	1.11	1.1		MONTANA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-060085BRIDGER-0600843MIKNOLLC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.13	1.15	1.1		PACE	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.08	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM12 (41046)	1.09	1.1	1.1		NORTHWEST	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.93	0.9	0.9		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.07	1.18	1.1		IDAHO	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.05	1.14	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.07	1.11	1.1		SIERRA	230
L-067790POPULUS-060085BRIDGERC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.13	1.15	1.1		PACE	500
L-067790POPULUS-060085BRIDGERC2-MS	Bus High Volts	ANPOPC&1 (67811)	1.13	1.15	1.1		PACE	500
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	POPBRI11 (67793)	1.05	1.17	1.1		PACE	345
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	POPBRI21 (67800)	1.05	1.17	1.1		PACE	345
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	BRI3MI11 (60090)	1.04	1.12	1.1		IDAHO	345
L-067827ANTICLIN-060085BRIDGERC1	Bus High Volts	ANPOPC&1 (67811)	1.13	1.18	1.1		PACE	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ANPOPC&1 (67811)	1.13	1.15	1.1		PACE	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.99	0.89	0.9		NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Bus High Volts	JONESCYN (47814)	1.04	1.31	1.1		NORTHWEST	230
L-1:047814JONESCYN230-	Bus High	JONTMB11 (47815)	1.04	1.16	1.1		NORTHWEST	230

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
045075DALREED230C1	Volts							
T-067794POPULUS-067790POPULUSC1	Bus High Volts	ANPOPC&1 (67811)	1.13	1.14	1.1		PACE	500
T-067826ANTICLIN-067801ANTPSTC1	Bus High Volts	ANPOPC&1 (67811)	1.13	1.18	1.1		PACE	500

N-1 Contingency Results for Scenario 1: AUG10H13

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	301.48	444.34	321	138.42	PACE-PACE	345
T-065140BENLOMND-065145BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	301.48	374.7	321	116.73	PACE-PACE	345
L-065220BRIDGER-066315ROCKSPGSC2	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	587.22	918.06	800.76	114.65	PACE-PACE	230
T-065140BENLOMND-065145BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	301.48	353.55	321	110.14	PACE-PACE	345
T-0600843MIKNOLL-0652913MIKNOLLC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	301.48	343.13	321	106.89	PACE-PACE	345
T-066050NAUGHTON-066065NAUGT_G3C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	301.48	332.19	321	103.49	PACE-PACE	345
L-060085BRIDGER-0600843MIKNOLLC1-MS	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	301.48	328.73	321	102.41	PACE-PACE	345
L-065135BENLOMND-066476SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	301.48	327.85	321	102.13	PACE-PACE	345
T-065135BENLOMND-065140BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	301.48	324.01	321	100.94	PACE-PACE	345
T-065135BENLOMND-065140BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	301.48	323.99	321	100.93	PACE-PACE	345
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.17	1.19	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.17	1.19	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.15	1.16	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.13	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.14	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.13	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High	GARTAF22 (41072)	1.14	1.15	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
	Volts							
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.11	1.14	1.1		MONTANA	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.07	1.12	1.1		IDAHO	500
L-060240MIDPOINT-060159CEDARHILC1	Bus Low Volts	HEMGRA11 (60157)	0.9	0.88	0.9		IDAHO	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.06	1.13	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.07	1.11	1.1		SIERRA	230
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	ANPOPC&2 (67812)	1.08	1.18	1.1		PACE	500
L-067794POPULUS-067826ANTICLINC2	Bus High Volts	ANPOPC&1 (67811)	1.08	1.18	1.1		PACE	500
L-067829CLOVER-067795AEOLUSC1	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	KFALLS (45262)	1.09	1.1	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.99	0.88	0.9		NORTHWEST	230
N-1: Colstrip-Broadview 500 #1	Bus High Volts	BROADV&2 (62053)	1.15	1.16	1.1		MONTANA	500
T-067829CLOVER-065996CLOVERC1	Bus High Volts	AEMNC&1C (67804)	1.09	1.1	1.1		PACE	500
T-067829CLOVER-065996CLOVERC1	Bus High Volts	CLOVER (67829)	1.08	1.1	1.1		PACE	500
T-067829CLOVER-065996CLOVERC2	Bus High Volts	AEMNC&1C (67804)	1.09	1.1	1.1		PACE	500
T-067829CLOVER-065996CLOVERC2	Bus High Volts	CLOVER (67829)	1.08	1.1	1.1		PACE	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.17	1.19	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.17	1.19	1.1		MONTANA	500

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.14	1.16	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.14	1.16	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.15	1.16	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.13	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF12 (41068)	1.14	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.13	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF22 (41072)	1.14	1.15	1.1		NORTHWEST	500

Scenario 2: N-1 Contingency Results (Post-Generic Transmission Improvements)

N-1 Contingency Results for Scenario 2: JUL27H16

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	296.62	440.11	321	137.11	PACE-PACE	345
T-065140BENLOMND-065145BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	296.62	370.19	321	115.32	PACE-PACE	345
T-065140BENLOMND-065145BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	296.62	349	321	108.72	PACE-PACE	345
T-0600843MIKNOLL-0652913MIKNOLLC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	296.62	331.84	321	103.38	PACE-PACE	345
T-066050NAUGHTON-066065NAUGT_G3C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	296.62	326.51	321	101.72	PACE-PACE	345
G-1: Colstrip #4	Bus High Volts	PONSUM11 (41048)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.09	1.1	1.1		MONTANA	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.09	1.11	1.1		NORTHWEST	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB21 (64908)	1.15	1.16	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB23 (64910)	1.11	1.13	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.05	1.13	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.07	1.11	1.1		SIERRA	230
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.97	0.88	0.9		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.11	1.18	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 2: DEC22H18

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-060159CEDARHIL-060155HEMINWAYC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1444.24	2139.34	1500	142.62	N/A	N/A
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1831.39	2213.23	1732.05	127.78	NORTHWEST-NORTHWEST	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1831.39	2213.23	1732.05	127.78	NORTHWEST-NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Interface MW	MONTANA - NORTHWEST	2222.71	2576.68	2200	117.12	N/A	500
L-067795AEOLUS-067826ANTICLINC1	Branch MVA	WY_CLCT6 (193) -> AEOLUS (67795) CKT 1 at AEOLUS	1087.91	1124.18	1000	112.42	PACE-PACE	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Interface MW	MONTANA - NORTHWEST	2222.71	2464.06	2200	112	N/A	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MONTANA - NORTHWEST	2222.71	2443.4	2200	111.06	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MONTANA - NORTHWEST	2222.71	2443.4	2200	111.06	N/A	500
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	229.27	349.7	321	108.94	PACE-PACE	345
L-060159CEDARHIL-060155HEMINWAYC1-MS	Interface MW	IDAHO - NORTHWEST	1904.16	2599.83	2400	108.33	N/A	N/A
L-1:060150HELLSCYN230-045327WALAWALA230C1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1831.39	1873.04	1732.05	108.14	NORTHWEST-NORTHWEST	500
L-060150HELLSCYN-045103HURICANEC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1831.39	1872.36	1732.05	108.1	NORTHWEST-NORTHWEST	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Interface MW	MONTANA - NORTHWEST	2222.71	2357.88	2200	107.18	N/A	500
L-060240MIDPOINT-060159CEDARHILC1	Interface MW	MIDPOINT - SUMMER LAKE	1444.24	1565.09	1500	104.34	N/A	N/A
L-1:040826PEARLW230-043527SHERWOOD230C1-MS	Branch Amp	PEARL # (43773) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1398.06	2397.62	2299.36	104.27	NORTHWEST-NORTHWEST	230
L-060150HELLSCYN-045103HURICANEC1	Interface MW	MONTANA - NORTHWEST	2222.71	2268.6	2200	103.12	N/A	500
L-067794POPULUS-060159CEDARHILC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1444.24	1523.45	1500	101.56	N/A	N/A
L-1:043773PEARL#230-043527SHERWOOD230C1	Branch Amp	PEASHE12 (43530) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1186.84	2321.3	2299.36	100.95	NORTHWEST-NORTHWEST	230
N-1: Broadview-Garison 500 #1	Branch Amp	GAR2EAST (40453) -> GARRISON (40459) CKT 1 at GAR2EAST	1459.86	2704.18	2700.04	100.15	NORTHWEST-NORTHWEST	500
G-1: Colstrip #4	Bus High	GAR2EAST (40453)	1.1	1.11	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
	Volts							
G-1: Colstrip #4	Bus High Volts	ROBH A11 (64896)	1.1	1.11	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	ROBH A21 (64898)	1.1	1.11	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	MIDROB12 (64903)	1.1	1.11	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	MIDROB22 (64909)	1.1	1.11	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.09	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONDROSA (40837)	1.09	1.1	1.1		NORTHWEST	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.05	1.13	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.91	0.9	0.9		IDAHO	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB23 (64910)	1.12	1.13	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	ROBH A11 (64896)	1.1	1.11	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	ROBH A21 (64898)	1.1	1.11	1.1		SIERRA	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.07	1.17	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.1	1.15	1.1		SIERRA	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	GONDER (64056)	1.09	1.12	1.1		SIERRA	230
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ANPOPC&1 (67811)	1.08	1.1	1.1		PACE	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.98	0.88	0.9		NORTHWEST	230

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.1	1.18	1.1		NORTHWEST	500
N-1: Great Falls -Judith Gap S 230	Bus High Volts	MARIAS S (62361)	1.27	1.28	1.1		MONTANA	230
T-067829CLOVER-065996CLOVERC1	Bus High Volts	AEMNC&1C (67804)	1.09	1.1	1.1		PACE	500
T-067829CLOVER-065996CLOVERC2	Bus High Volts	AEMNC&1C (67804)	1.09	1.1	1.1		PACE	500
N-1: Great Falls -Judith Gap S 230	Bus High Volts	MARIAS S (62361)	1.27	1.28	1.1		MONTANA	230
T-067829CLOVER-065996CLOVERC1	Bus High Volts	AEMNC&1C (67804)	1.09	1.1	1.1		PACE	500
T-067829CLOVER-065996CLOVERC2	Bus High Volts	AEMNC&1C (67804)	1.09	1.1	1.1		PACE	500

N-1 Contingency Results for Scenario 2: MAR04H21 (AC Solution)

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	813.15	1430.55	640.11	223.49	NORTHWEST-NORTHWEST	230
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	956.04	552.25	173.12	PACE-NEVADA	345
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	950.25	552.25	172.07	PACE-NEVADA	345
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	950.21	552.25	172.06	PACE-NEVADA	345
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	947.22	552.25	171.52	PACE-PACE	345
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	941.48	552.25	170.48	PACE-PACE	345
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	941.44	552.25	170.47	PACE-PACE	345
L-066355SIGURDPS-079031GLENCANYC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	933.89	552.25	169.11	PACE-NEVADA	345
T-066345SIGURD-066355SIGURDPSC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	933.83	552.25	169.1	PACE-NEVADA	345
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	930.11	552.25	168.42	PACE-NEVADA	345
L-066355SIGURDPS-079031GLENCANYC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	925.25	552.25	167.54	PACE-PACE	345
T-066345SIGURD-066355SIGURDPSC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	925.2	552.25	167.53	PACE-PACE	345
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	921.52	552.25	166.87	PACE-PACE	345
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.5	207.06	125	165.64	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR E TP (45160) -> BOARD T2 (40123) CKT 1 at DR E TP	788.18	1403.57	870.04	161.32	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DALREED (45075) -> DR E TP (45160) CKT 1 at DALREED	788.19	1403.58	873.56	160.67	NORTHWEST-NORTHWEST	230
L-060155HEMINWAY-045029BURNSC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	882.99	552.25	159.89	PACE-NEVADA	345
L-060155HEMINWAY-045029BURNSC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	874.83	552.25	158.41	PACE-PACE	345
L-067794POPULUS-067826ANTICLINC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	871.72	552.25	157.85	PACE-NEVADA	345
L-065510EMERY-065805HUNTNGTNC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	871.13	552.25	157.74	PACE-NEVADA	345
L-060061BORAH-060240MIDPOINTC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	869.5	552.25	157.45	PACE-NEVADA	345

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-067794POPULUS-060159CEDARHILC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	867.07	552.25	157.01	PACE-NEVADA	345
L-065510EMERY-066400SPANFRKC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	864.71	552.25	156.58	PACE-NEVADA	345
L-065805HUNTNGTN-065995MONAC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	851.78	863.99	552.25	156.45	PACE-NEVADA	345
L-067794POPULUS-067826ANTICLINC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	863.67	552.25	156.39	PACE-PACE	345
L-065510EMERY-065805HUNTNGTNC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	863.09	552.25	156.29	PACE-PACE	345
L-060061BORAH-060240MIDPOINTC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	861.48	552.25	155.99	PACE-PACE	345
L-067794POPULUS-060159CEDARHILC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	859.06	552.25	155.56	PACE-PACE	345
L-065510EMERY-066400SPANFRKC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	856.72	552.25	155.13	PACE-PACE	345
L-065805HUNTNGTN-065995MONAC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	843.91	856	552.25	155	PACE-PACE	345
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	812.09	1429.84	1006.6	142.05	NORTHWEST-NORTHWEST	230
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	813.15	829.67	640.11	129.61	NORTHWEST-NORTHWEST	230
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	813.15	829.48	640.11	129.59	NORTHWEST-NORTHWEST	230
L-066280REDBUTTE-018002HAPSC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	296.9	332.46	303	109.72	PACE-PACE	230
L-065805HUNTNGTN-066225PINTOC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	296.9	322.66	303	106.49	PACE-PACE	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	BOARD T2 (40123) -> MCNRY S2 (41352) CKT 1 at BOARD T2	784.93	1400.45	1320.12	106.08	NORTHWEST-NORTHWEST	230
L-066235PINTOPS-014101FOURCORNC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	296.9	321.2	303	106.01	PACE-PACE	230
T-066225PINTO-066235PINTOPSC1_2	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	296.9	321.21	303	106.01	PACE-PACE	230
L-065805HUNTNGTN-066225PINTOC1	Interface MW	TOT 2C	1996.51	2209.04	2100	105.19	N/A	500
L-066235PINTOPS-014101FOURCORNC1	Interface MW	TOT 2C	1996.51	2197.08	2100	104.62	N/A	500
T-066225PINTO-066235PINTOPSC1_2	Interface MW	TOT 2C	1996.51	2197.03	2100	104.62	N/A	500
L-060240MIDPOINT-	Interface	TOT 2C	1996.51	2181.69	2100	103.89	N/A	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
064895ROBINSONC1-MS	MW							
L-066280REDBUTTE-018002HAPSC1	Interface MW	TOT 2B2	252.79	271.45	265	102.43	N/A	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	296.9	308.24	303	101.73	PACE-PACE	230
L-066355SIGURDPS-079031GLENCANYC1	Interface MW	TOT 2C	1996.51	2118.5	2100	100.88	N/A	500
T-066345SIGURD-066355SIGURDPSC1	Interface MW	TOT 2C	1996.51	2118.44	2100	100.88	N/A	500
L-066280REDBUTTE-018002HAPSC1	Interface MW	TOT 2B	734.58	784.51	780	100.58	N/A	345
L-065805HUNTNGTN-066225PINTOC1	Interface MW	TOT 2B2	252.79	266.31	265	100.49	N/A	230
L-066235PINTOPS-014101FOURCORNC1	Interface MW	TOT 2B2	252.79	265.62	265	100.24	N/A	230
T-066225PINTO-066235PINTOPSC1_2	Interface MW	TOT 2B2	252.79	265.64	265	100.24	N/A	230
G-1: Colstrip #1	Bus High Volts	GAR2EAST (40453)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GAR1EAST (40451)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	CAPGRI12 (45040)	1.09	1.1	1.1		NORTHWEST	500
L-065805HUNTNGTN-066225PINTOC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	296.9	322.66	303	106.49	PACE-PACE	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	BOARD T2 (40123) -> MCNRY S2 (41352) CKT 1 at BOARD T2	784.93	1400.45	1320.12	106.08	NORTHWEST-NORTHWEST	230
G-1: Colstrip #4	Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
G-1: Colstrip #4	Bus High Volts	MIDROB11 (64902)	1.15	1.15	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	MIDROB21 (64908)	1.15	1.15	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.1	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	MIDROB13 (64907)	1.12	1.12	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	MIDROB23 (64910)	1.12	1.12	1.1		SIERRA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI16 (45044)	1.11	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL25 (40708)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	PONSUM11 (41048)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI12 (45040)	1.09	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	ROBH A12 (64897)	1.15	1.16	1.1		SIERRA	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	ROBH A22 (64899)	1.15	1.16	1.1		SIERRA	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.09	1.11	1.1		NORTHWEST	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	PONSUM11 (41048)	1.09	1.1	1.1		NORTHWEST	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.06	1.1	1.1		IDAHO	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB21 (64908)	1.15	1.17	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB23 (64910)	1.12	1.17	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.91	0.9	0.9		IDAHO	500
L-065805HUNTNGTN-066225PINTOC1	Bus High Volts	ROBH A22 (64899)	1.15	1.16	1.1		SIERRA	500
L-065805HUNTNGTN-066225PINTOC1	Bus High Volts	ROBH A12 (64897)	1.15	1.15	1.1		SIERRA	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.03	1.14	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.06	1.12	1.1		SIERRA	230
L-066235PINTOPS-014101FOURCORNC1	Bus High Volts	ROBH A22 (64899)	1.15	1.16	1.1		SIERRA	500
L-066235PINTOPS-014101FOURCORNC1	Bus High Volts	ROBH A12 (64897)	1.15	1.15	1.1		SIERRA	500
L-066280REDBUTTE-	Bus High	ROBH A22 (64899)	1.15	1.16	1.1		SIERRA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
018002HAPSC1	Volts							
L-066280REDBUTTE-018002HAPSC1	Bus High Volts	ROBH A12 (64897)	1.15	1.15	1.1		SIERRA	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ROBH A22 (64899)	1.15	1.16	1.1		SIERRA	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ROBH A12 (64897)	1.15	1.15	1.1		SIERRA	500
L-1:043496JUNPRFT500-043950CDRSPRG500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.11	1.1		NORTHWEST	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.1	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	DIXMER11 (45199)	1.09	1.1	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.98	0.89	0.9		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.1	1.17	1.1		NORTHWEST	500
N-1: Garrison-Ovando 230	Bus High Volts	GAR2EAST (40453)	1.1	1.11	1.1		NORTHWEST	500
N-1: Great Falls -Judith Gap S 230	Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
T-066225PINTO-066235PINTOPSC1_2	Bus High Volts	ROBH A22 (64899)	1.15	1.16	1.1		SIERRA	500
T-066225PINTO-066235PINTOPSC1_2	Bus High Volts	ROBH A12 (64897)	1.15	1.15	1.1		SIERRA	500
T-1: Mill Crk 230-161 #1	Bus High Volts	GAR2EAST (40453)	1.1	1.11	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 2: MAR04H21 (DC Solution)

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	814.29	1430.56	640.11	223.49	NORTHWEST-NORTHWEST	230
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	1139.14	552.25	206.27	PACE-NEVADA	345
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	1128.83	552.25	204.41	PACE-NEVADA	345
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	1128.77	552.25	204.4	PACE-NEVADA	345
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	1128.65	552.25	204.37	PACE-PACE	345
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	1118.43	552.25	202.52	PACE-PACE	345
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	1118.37	552.25	202.51	PACE-PACE	345
L-060155HEMINWAY-045029BURNSC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	1098.54	552.25	198.92	PACE-NEVADA	345
L-060155HEMINWAY-045029BURNSC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	1088.4	552.25	197.09	PACE-PACE	345
L-066355SIGURDPS-079031GLENCANYC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	1076.26	552.25	194.89	PACE-NEVADA	345
T-066345SIGURD-066355SIGURDPSC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	1076.2	552.25	194.88	PACE-NEVADA	345
L-066355SIGURDPS-079031GLENCANYC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	1066.32	552.25	193.09	PACE-PACE	345
T-066345SIGURD-066355SIGURDPSC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	1066.25	552.25	193.08	PACE-PACE	345
L-060240MIDPOINT-060155HEMINWAYC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	994.51	552.25	180.08	PACE-NEVADA	345
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	989.51	552.25	179.18	PACE-NEVADA	345
L-060240MIDPOINT-060155HEMINWAYC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	985.33	552.25	178.42	PACE-PACE	345
L-065545EXXONWY-066010MONUMENTC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	983.7	552.25	178.13	PACE-NEVADA	345
L-067794POPULUS-067826ANTICLINC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	983.42	552.25	178.08	PACE-NEVADA	345
L-067794POPULUS-060159CEDARHILC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	981.57	552.25	177.74	PACE-NEVADA	345
L-060159CEDARHIL-	Branch	REDBUTTE (66280) -> UTAH-NEV (67657)	952.89	980.37	552.25	177.52	PACE-PACE	345

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
060155HEMINWAYC1-MS	Amp	CKT 1 at UTAH-NEV						
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	979.89	552.25	177.44	PACE-NEVADA	345
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	979.89	552.25	177.44	PACE-NEVADA	345
L-060061BORAH-060240MIDPOINTC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	979.25	552.25	177.32	PACE-NEVADA	345
L-065510EMERY-065805HUNTNGTNC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	978.1	552.25	177.11	PACE-NEVADA	345
L-065293CARRDRA-076400PUMPKIN_C1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	977.94	552.25	177.08	PACE-NEVADA	345
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	976.77	552.25	176.87	PACE-NEVADA	345
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	976.74	552.25	176.87	PACE-NEVADA	345
L-065545EXXONWY-066010MONUMENTC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	974.62	552.25	176.48	PACE-PACE	345
L-067794POPULUS-067826ANTICLINC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	974.35	552.25	176.43	PACE-PACE	345
L-066266RAVEN-066010MONUMENTC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	973.15	552.25	176.22	PACE-NEVADA	345
L-065510EMERY-066400SPANFRKC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	961.76	972.96	552.25	176.18	PACE-NEVADA	345
L-067794POPULUS-060159CEDARHILC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	972.51	552.25	176.1	PACE-PACE	345
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	970.85	552.25	175.8	PACE-PACE	345
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	970.85	552.25	175.8	PACE-PACE	345
L-060061BORAH-060240MIDPOINTC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	970.22	552.25	175.69	PACE-PACE	345
L-065510EMERY-065805HUNTNGTNC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	969.07	552.25	175.48	PACE-PACE	345
L-065293CARRDRA-076400PUMPKIN_C1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	968.92	552.25	175.45	PACE-PACE	345
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	967.76	552.25	175.24	PACE-PACE	345
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	967.72	552.25	175.23	PACE-PACE	345
L-066266RAVEN-066010MONUMENTC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	964.17	552.25	174.59	PACE-PACE	345
L-065510EMERY-066400SPANFRKC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	952.89	963.98	552.25	174.56	PACE-PACE	345

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.55	207.06	125	165.65	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR E TP (45160) -> BOARD T2 (40123) CKT 1 at DR E TP	789.43	1403.58	870.04	161.32	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DALREED (45075) -> DR E TP (45160) CKT 1 at DALREED	789.44	1403.59	873.56	160.68	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	813.21	1429.85	1006.6	142.05	NORTHWEST-NORTHWEST	230
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	814.29	829.76	640.11	129.63	NORTHWEST-NORTHWEST	230
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	814.29	829.45	640.11	129.58	NORTHWEST-NORTHWEST	230
L-066280REDBUTTE-018002HAPSC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	288.55	350.76	303	115.76	PACE-PACE	230
L-065805HUNTNGTN-066225PINTOC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	288.55	326.64	303	107.8	PACE-PACE	230
L-066235PINTOPS-014101FOURCORNC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	288.55	324.48	303	107.09	PACE-PACE	230
T-066225PINTO-066235PINTOPSC1_2	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	288.55	324.49	303	107.09	PACE-PACE	230
L-066280REDBUTTE-018002HAPSC1	Interface MW	TOT 2B2	249.11	281.88	265	106.37	N/A	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	BOARD T2 (40123) -> MCNRY S2 (41352) CKT 1 at BOARD T2	786.15	1400.46	1320.12	106.09	NORTHWEST-NORTHWEST	230
L-066280REDBUTTE-018002HAPSC1	Interface MW	TOT 2B	717.97	822.55	780	105.46	N/A	345
L-065420DAVEJOHN-067814WINDSTARC2	Branch Amp	WINDSTAR (67814) -> DAVEJOHN (65420) CKT 1 at WINDSTAR	434.68	1004.72	953.88	105.33	PACE-PACE	230
L-066280REDBUTTE-018002HAPSC1	Interface MW	MIDPOINT - SUMMER LAKE	1462.2	1563.96	1500	104.26	N/A	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1462.2	1549.12	1500	103.27	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1462.2	1549.12	1500	103.27	N/A	500
L-060155HEMINWAY-045029BURNSC1	Branch MVA	SIGURD (66345) -> SIGURDPS (66355) CKT 1 at SIGURD	288.55	312	303	102.97	PACE-PACE	230
L-065805HUNTNGTN-066225PINTOC1	Interface MW	MIDPOINT - SUMMER LAKE	1462.2	1543.91	1500	102.93	N/A	500
L-066235PINTOPS-014101FOURCORNC1	Interface MW	MIDPOINT - SUMMER LAKE	1462.2	1539.21	1500	102.61	N/A	500
T-066225PINTO-	Interface	MIDPOINT - SUMMER LAKE	1462.2	1539.17	1500	102.61	N/A	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
066235PINTOPSC1_2	MW							
L-065805HUNTNGTN-066225PINTOC1	Interface MW	TOT 2B2	249.11	269.77	265	101.8	N/A	230
T-066225PINTO-066235PINTOPSC1_2	Interface MW	TOT 2B2	249.11	268.8	265	101.44	N/A	230
L-066235PINTOPS-014101FOURCORNC1	Interface MW	TOT 2B2	249.11	268.79	265	101.43	N/A	230
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1462.2	1503.6	1500	100.24	N/A	500
L-1:060150HELLSCYN230-045327WALAWALA230C1	Interface MW	MIDPOINT - SUMMER LAKE	1462.2	1502.01	1500	100.13	N/A	500
L-060150HELLSCYN-045103HURICANEC1	Interface MW	MIDPOINT - SUMMER LAKE	1462.2	1501.65	1500	100.11	N/A	500
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1462.2	1500.32	1500	100.02	N/A	500
G-1: Colstrip #1	Bus High Volts	GRIMAL25 (40708)	1.1	1.1	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	MARIAS S (62361)	1.29	1.3	1.1		MONTANA	230
G-1: Colstrip #4	Bus High Volts	MARIAS (62362)	1.17	1.17	1.1		MONTANA	230
G-1: Colstrip #4	Bus High Volts	GRIMAL21 (40700)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI16 (45044)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL25 (40708)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	PONSUM11 (41048)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI12 (45040)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIJOH12 (40591)	1.1	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIJOH22 (40594)	1.1	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL23 (40704)	1.09	1.1	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	GRIMAL24 (40706)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI13 (45041)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI14 (45042)	1.09	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.1	1.11	1.1		NORTHWEST	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.06	1.11	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.05	1.17	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.1	1.15	1.1		SIERRA	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	GONDER (64056)	1.11	1.12	1.1		SIERRA	230
L-1:043496JUNPRFT500-043950CDRSPRG500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.11	1.1		NORTHWEST	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.98	0.89	0.9		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.1	1.17	1.1		NORTHWEST	500
N-1: Great Falls -Judith Gap S 230	Bus High Volts	MARIAS S (62361)	1.29	1.3	1.1		MONTANA	230
T-066050NAUGHTON-066065NAUGT_G3C1	Bus High Volts	GRIMAL25 (40708)	1.1	1.1	1.1		NORTHWEST	500
T-066050NAUGHTON-066065NAUGT_G3C1	Bus High Volts	PONSUM11 (41048)	1.1	1.1	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 2: OCT04H21

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	646.1	1058.1	640.11	165.3	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	156.64	193.27	125	154.62	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	JONTMB11 (47815) -> TMBLCR T (41079) CKT 1 at TMBLCR T	401.72	988.24	640.11	154.39	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	TMBLCR T (41079) -> SANTIAM (40939) CKT 1 at TMBLCR T	395.69	986.62	640.11	154.13	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	JONESCYN (47814) -> JONTMB11 (47815) CKT 1 at JONTMB11	403.47	979.31	640.11	152.99	NORTHWEST-NORTHWEST	230
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1663.34	2256.17	1732.1	130.26	NORTHWEST-NORTHWEST	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1663.34	2256.17	1732.1	130.26	NORTHWEST-NORTHWEST	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1469.39	1922.1	1500	128.14	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1469.39	1922.1	1500	128.14	N/A	500
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR E TP (45160) -> BOARD T2 (40123) CKT 1 at DR E TP	623.79	1034.92	870.04	118.95	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DALREED (45075) -> DR E TP (45160) CKT 1 at DALREED	623.79	1034.93	873.56	118.47	NORTHWEST-NORTHWEST	230
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	MIDPOINT (60240) -> MIDHEM11 (60242) CKT 1 at MIDPOINT	1824.25	2766.21	2338.3	118.3	IDAHO-IDAHO	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MONTANA - NORTHWEST	2067.52	2504.75	2200	113.85	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MONTANA - NORTHWEST	2067.52	2504.75	2200	113.85	N/A	500
L-060155HEMINWAY-045029BURNSC1	Interface MW	MONTANA - NORTHWEST	2067.52	2357.28	2200	107.15	N/A	500
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	645.76	1057.91	1006.6	105.1	NORTHWEST-NORTHWEST	230
L-060240MIDPOINT-060155HEMINWAYC1-MS	Interface MW	MONTANA - NORTHWEST	2067.52	2307.47	2200	104.88	N/A	500
L-040621LAGRANDE-060312NPOWDERC1	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	646.1	659.5	640.11	103.03	NORTHWEST-NORTHWEST	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	IDAHO - NORTHWEST	3798.22	3888.65	3800	102.33	N/A	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Interface MW	MONTANA - NORTHWEST	2067.52	2216.66	2200	100.76	N/A	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1469.39	1508.45	1500	100.56	N/A	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:060150HELLSCYN230-045327WALAWALA230C1	Interface MW	MIDPOINT - SUMMER LAKE	1469.39	1507.86	1500	100.52	N/A	500
L-060150HELLSCYN-045103HURICANEC1	Interface MW	MIDPOINT - SUMMER LAKE	1469.39	1507.64	1500	100.51	N/A	500
G-1: Colstrip #4	Bus High Volts	ELY ENGY (64890)	1.11	1.12	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	ROBINSON (64895)	1.1	1.11	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	ANPOPC&1 (67811)	1.09	1.1	1.1		PACE	500
L-040621LAGRANDE-060312NPOWDERC1	Bus High Volts	HURWAL11 (45334)	1.09	1.1	1.1		NORTHWEST	230
L-048197LOLO-060275OXBOW	Bus High Volts	HURWAL11 (45334)	1.09	1.1	1.1		NORTHWEST	230
L-060085BRIDGER-0600843MIKNOLLC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.09	1.1	1.1		PACE	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Bus High Volts	HURWAL11 (45334)	1.09	1.11	1.1		NORTHWEST	230
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	HEMGRA11 (60157)	1.02	1.17	1.1		IDAHO	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL21 (40700)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL25 (40708)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.09	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI12 (45040)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI16 (45044)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIZZ R3 (40488)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN R1 (40684)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN (40687)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN R3 (40688)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-	Bus High	GRIMAL22 (40702)	1.09	1.11	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
045029BURNSC1	Volts							
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL23 (40704)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL24 (40706)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL26 (40710)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONDROSA (40837)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	SUMMER L (41043)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM11 (41044)	1.07	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM12 (41046)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM13 (41052)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM14 (41054)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPTJACK (45035)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI11 (45039)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI13 (45041)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI14 (45042)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	KFALLS (45262)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIJOH12 (40591)	1.09	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIJOH22 (40594)	1.09	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI15 (45043)	1.09	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	HURWAL11 (45334)	1.09	1.1	1.1		NORTHWEST	230
L-060159CEDARHIL-060155HEMINWAYC1-MS	Bus High Volts	MIDHEM11 (60242)	1.06	1.1	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.07	1.18	1.1		IDAHO	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB21 (64908)	1.15	1.16	1.1		SIERRA	500

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB23 (64910)	1.11	1.13	1.1		SIERRA	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.05	1.15	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.07	1.13	1.1		SIERRA	230
L-067790POPULUS-060085BRIDGERC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.09	1.1	1.1		PACE	500
L-067790POPULUS-060085BRIDGERC2-MS	Bus High Volts	ANPOPC&1 (67811)	1.09	1.1	1.1		PACE	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ANPOPC&1 (67811)	1.09	1.11	1.1		PACE	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	1	0.89	0.9		NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Bus High Volts	JONESCYN (47814)	1.04	1.29	1.1		NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Bus High Volts	JONTMB11 (47815)	1.04	1.15	1.1		NORTHWEST	230
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Bus High Volts	HURWAL11 (45334)	1.09	1.11	1.1		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.1	1.18	1.1		NORTHWEST	500
N-1: Great Falls -Judith Gap S 230	Bus High Volts	MARIAS S (62361)	1.29	1.3	1.1		MONTANA	230
T-067794POPULUS-067790POPULUSC1	Bus High Volts	ANPOPC&1 (67811)	1.09	1.11	1.1		PACE	500

N-1 Contingency Results for Scenario 2: AUG10H13

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	294.25	434.53	321	135.37	PACE-PACE	345
L-065220BRIDGER-066315ROCKSPGSC2	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	619.68	956.51	800.76	119.45	PACE-PACE	230
T-065140BENLOMND-065145BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	294.25	368.25	321	114.72	PACE-PACE	345
L-067795AEOLUS-067826ANTICLINC1	Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1100.83	1141.89	1000	114.19	PACE-PACE	500
T-065140BENLOMND-065145BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	294.25	346.94	321	108.08	PACE-PACE	345
T-0600843MIKNOLL-0652913MIKNOLLC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	294.25	333.97	321	104.04	PACE-PACE	345
L-065135BENLOMND-066476SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	294.25	323.52	321	100.79	PACE-PACE	345
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.1	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	MIDROB12 (64903)	1.11	1.12	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	MIDROB22 (64909)	1.11	1.12	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.09	1.11	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.09	1.11	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	ROBH A11 (64896)	1.1	1.11	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	ROBH A21 (64898)	1.1	1.11	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.09	1.1	1.1		MONTANA	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.06	1.1	1.1		IDAHO	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.06	1.15	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.08	1.13	1.1		SIERRA	230
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	KFALLS (45262)	1.09	1.1	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.99	0.88	0.9		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.12	1.19	1.1		NORTHWEST	500
robinson-h allen 500kV #1	Bus High Volts	ROBH A21 (64898)	1.1	1.11	1.1		SIERRA	500
T-067794POPULUS-067790POPULUSC1	Bus High Volts	ANPOPC&1 (67811)	1.08	1.1	1.1		PACE	500

Scenario 3: N-1 Contingency Results (Post-Generic Transmission Improvements)

N-1 Contingency Results for Scenario 3: JUL27H16 (Page 1 of 1)

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	307.13	456.29	321	142.15	PACE-PACE	345
L-065420DAVEJOHN-067814WINDSTARC2	Branch Amp	DAVEJOHN (65420) -> WINDSTAR (67814) CKT 1 at DAVEJOHN	533.47	1241.86	953.88	130.19	PACE-PACE	230
T-065140BENLOMND-065145BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	307.13	379.55	321	118.24	PACE-PACE	345
T-065140BENLOMND-065145BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	307.13	358.73	321	111.75	PACE-PACE	345
T-0600843MIKNOLL-0652913MIKNOLLC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	307.13	340.76	321	106.16	PACE-PACE	345
T-066050NAUGHTON-066065NAUGT_G3C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	307.13	336.33	321	104.78	PACE-PACE	345
T-065135BENLOMND-065140BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	307.13	331.25	321	103.19	PACE-PACE	345
T-065135BENLOMND-065140BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	307.13	331.2	321	103.18	PACE-PACE	345
L-060085BRIDGER-0600843MIKNOLLC1-MS	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	307.13	326.59	321	101.74	PACE-PACE	345
T-066050NAUGHTON-066060NAUGT_G2C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	307.13	325.21	321	101.31	PACE-PACE	345
G-1: Colstrip #4	Bus High Volts	MIDROB12 (64903)	1.1	1.11	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	MIDROB22 (64909)	1.1	1.11	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.09	1.1	1.1		MONTANA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB23 (64910)	1.11	1.12	1.1		SIERRA	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.05	1.12	1.1		PACE	230
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.13	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.1	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.97	0.88	0.9		NORTHWEST	230

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.11	1.17	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 3: DEC22H18

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	235.82	357.7	321	111.43	PACE-PACE	345
L-065220BRIDGER-066315ROCKSPGSC2	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	569.73	882.81	800.76	110.25	PACE-PACE	230
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1351.09	1598.42	1500	106.56	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1351.09	1598.42	1500	106.56	N/A	500
L-1:040826PEARLW230-043527SHERWOOD230C1-MS	Branch Amp	PEARL # (43773) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1411.85	2409.55	2299.36	104.79	NORTHWEST-NORTHWEST	230
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1468.35	1767.89	1732.05	102.07	NORTHWEST-NORTHWEST	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1468.35	1767.89	1732.05	102.07	NORTHWEST-NORTHWEST	500
L-1:043773PEARL#230-043527SHERWOOD230C1	Branch Amp	PEASHE12 (43530) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1199.12	2322.63	2299.36	101.01	NORTHWEST-NORTHWEST	230
L-060155HEMINWAY-045029BURNSC1	Interface MW	MONTANA - NORTHWEST	1907.36	2219.68	2200	100.89	N/A	500
G-1: Colstrip #4	Bus High Volts	MIDROB12 (64903)	1.12	1.13	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	MIDROB22 (64909)	1.12	1.13	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	ROBH A11 (64896)	1.11	1.12	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.08	1.1	1.1		MONTANA	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM11 (41044)	1.09	1.11	1.1		NORTHWEST	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.06	1.12	1.1		IDAHO	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.06	1.17	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.09	1.15	1.1		SIERRA	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	GONDER (64056)	1.09	1.11	1.1		SIERRA	230

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.98	0.88	0.9		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.11	1.18	1.1		NORTHWEST	500
N-1: Great Falls -Judith Gap S 230	Bus High Volts	MARIAS S (62361)	1.27	1.28	1.1		MONTANA	230

N-1 Contingency Results for Scenario 3: MAR04H21

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	809.86	1430.56	640.11	223.49	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR E TP (45160) -> BOARD T2 (40123) CKT 1 at DR E TP	785.1	1403.59	870.04	161.32	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DALREED (45075) -> DR E TP (45160) CKT 1 at DALREED	785.11	1403.59	873.56	160.68	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	808.76	1429.86	1006.6	142.05	NORTHWEST-NORTHWEST	230
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	809.86	826.21	640.11	129.07	NORTHWEST-NORTHWEST	230
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	809.86	826.04	640.11	129.05	NORTHWEST-NORTHWEST	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1448.13	1603.99	1500	106.93	N/A	500
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	BOARD T2 (40123) -> MCNRY S2 (41352) CKT 1 at BOARD T2	781.8	1400.47	1320.12	106.09	NORTHWEST-NORTHWEST	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1589.31	1782.91	1732.05	102.94	NORTHWEST-NORTHWEST	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1448.13	1501.57	1500	100.1	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1448.13	1501.57	1500	100.1	N/A	500
G-1: Colstrip #1	Bus High Volts	MIDROB11 (64902)	1.12	1.12	1.1		SIERRA	500
G-1: Colstrip #1	Bus High Volts	MIDROB21 (64908)	1.12	1.12	1.1		SIERRA	500
G-1: Colstrip #1	Bus High Volts	GAR1EAST (40451)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GAR2EAST (40453)	1.11	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL21 (40700)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI16 (45044)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	MIDROB11 (64902)	1.12	1.12	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	MIDROB21 (64908)	1.12	1.12	1.1		SIERRA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL25 (40708)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI12 (45040)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIJOH22 (40594)	1.1	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	PONSUM11 (41048)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI13 (45041)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI14 (45042)	1.09	1.1	1.1		NORTHWEST	500
L-060061BORAH-060240MIDPOINTC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-060150HELLSCYN-060095BROWNLEEC1	Bus High Volts	HURWAL11 (45334)	1.03	1.12	1.1		NORTHWEST	230
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	ROBH A12 (64897)	1.2	1.22	1.1		SIERRA	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	ROBH A22 (64899)	1.2	1.22	1.1		SIERRA	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL21 (40700)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.09	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI16 (45044)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL25 (40708)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI12 (45040)	1.1	1.11	1.1		NORTHWEST	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	ROBH A22 (64899)	1.2	1.21	1.1		SIERRA	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	ROBH A12 (64897)	1.2	1.2	1.1		SIERRA	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.05	1.11	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	PONSUM11 (41048)	1.09	1.1	1.1		NORTHWEST	500
L-060240MIDPOINT-	Bus Low	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
060159CEDARHILC1	Volts							
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB23 (64910)	1.09	1.15	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB21 (64908)	1.12	1.13	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.9	0.88	0.9		IDAHO	500
L-065805HUNTNGTN-066225PINTOC1	Bus High Volts	ROBH A12 (64897)	1.2	1.21	1.1		SIERRA	500
L-065805HUNTNGTN-066225PINTOC1	Bus High Volts	ROBH A22 (64899)	1.2	1.21	1.1		SIERRA	500
L-065805HUNTNGTN-066225PINTOC1	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.05	1.14	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.07	1.12	1.1		SIERRA	230
L-066235PINTOPS-014101FOURCORNC1	Bus High Volts	ROBH A12 (64897)	1.2	1.21	1.1		SIERRA	500
L-066235PINTOPS-014101FOURCORNC1	Bus High Volts	ROBH A22 (64899)	1.2	1.21	1.1		SIERRA	500
L-066235PINTOPS-014101FOURCORNC1	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-066280REDBUTTE-018002HAPSC1	Bus High Volts	ROBH A22 (64899)	1.2	1.21	1.1		SIERRA	500
L-066280REDBUTTE-018002HAPSC1	Bus High Volts	ROBH A12 (64897)	1.2	1.2	1.1		SIERRA	500
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-1:043496JUNPRFT500-043950CDRSPRG500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.11	1.1		NORTHWEST	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	MERIDINP (45197)	1.09	1.11	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	DIXMER11 (45199)	1.1	1.11	1.1		NORTHWEST	500

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	ALVDIX11 (45096)	1.09	1.1	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	KFALLS (45262)	1.09	1.1	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus Low Volts	HEMGRA11 (60157)	0.9	0.9	0.9		IDAHO	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.99	0.89	0.9		NORTHWEST	230
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.11	1.18	1.1		NORTHWEST	500
N-1: Broadview-Garison 500 #1	Bus Low Volts	HEMGRA11 (60157)	0.9	0.9	0.9		IDAHO	500
N-1: Crossover-Custer 230	Bus High Volts	GAR1EAST (40451)	1.1	1.11	1.1		NORTHWEST	500
N-1: Crossover-Custer 230	Bus High Volts	GAR2EAST (40453)	1.11	1.11	1.1		NORTHWEST	500
N-1: Great Falls -Judith Gap S 230	Bus High Volts	MARIAS S (62361)	1.3	1.3	1.1		MONTANA	230
T-066225PINTO-066235PINTOPSC1_2	Bus High Volts	ROBH A12 (64897)	1.2	1.21	1.1		SIERRA	500
T-066225PINTO-066235PINTOPSC1_2	Bus High Volts	ROBH A22 (64899)	1.2	1.21	1.1		SIERRA	500
T-066225PINTO-066235PINTOPSC1_2	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
T-1: Mill Crk 230-161 #1	Bus High Volts	GAR2EAST (40453)	1.11	1.11	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 3: OCT04H21

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	644.95	1058.01	640.11	165.29	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	156.67	201.46	125	161.16	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	JONTMB11 (47815) -> TMBLCR T (41079) CKT 1 at TMBLCR T	403.78	981.61	640.11	153.35	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	TMBLCR T (41079) -> SANTIAM (40939) CKT 1 at SANTIAM	398.32	980.25	640.11	153.14	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	JONESCYN (47814) -> JONTMB11 (47815) CKT 1 at JONTMB11	405.09	966.76	640.11	151.03	NORTHWEST-NORTHWEST	230
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1631.87	2208.74	1732.1	127.52	NORTHWEST-NORTHWEST	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1631.87	2208.74	1732.1	127.52	NORTHWEST-NORTHWEST	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1448.22	1890.27	1500	126.02	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1448.22	1890.27	1500	126.02	N/A	500
L-066510TERMINAL-067790POPULUSC1	Interface MW	PATH C	1282.11	1682.56	1400	120.18	N/A	N/A
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR E TP (45160) -> BOARD T2 (40123) CKT 1 at DR E TP	622.78	1034.85	870.04	118.94	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DALREED (45075) -> DR E TP (45160) CKT 1 at DALREED	622.79	1034.85	873.56	118.46	NORTHWEST-NORTHWEST	230
T-067794POPULUS-067790POPULUSC1	Interface MW	PATH C	1282.11	1634.71	1400	116.77	N/A	N/A
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MONTANA - NORTHWEST	2086.96	2520.42	2200	114.56	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MONTANA - NORTHWEST	2086.96	2520.42	2200	114.56	N/A	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	MIDPOINT (60240) -> MIDHEM11 (60242) CKT 1 at MIDPOINT	1726.87	2619.3	2338.3	112.02	IDAHO-IDAHO	500
L-060155HEMINWAY-045029BURNSC1	Interface MW	MONTANA - NORTHWEST	2086.96	2383.48	2200	108.34	N/A	500
L-067794POPULUS-060061BORAHC1-MS	Interface MW	PATH C	1282.11	1487.07	1400	106.22	N/A	N/A
L-060190KINPORT-067790POPULUSC1-MS	Interface MW	PATH C	1282.11	1483.94	1400	106	N/A	N/A
L-060085BRIDGER-0600843MIKNOLLC1-MS	Interface MW	PATH C	1282.11	1483.42	1400	105.96	N/A	N/A
L-060240MIDPOINT-060155HEMINWAYC1-MS	Interface MW	MONTANA - NORTHWEST	2086.96	2318.84	2200	105.4	N/A	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	644.59	1057.81	1006.6	105.09	NORTHWEST-NORTHWEST	230
L-067795AEOLUS-067826ANTICLINC1	Interface MW	PATH C	1282.11	1453.7	1400	103.84	N/A	N/A
L-067794POPULUS-067826ANTICLINC1	Interface MW	PATH C	1282.11	1452.32	1400	103.74	N/A	N/A
L-067794POPULUS-060159CEDARHILC1-MS	Interface MW	PATH C	1282.11	1442.08	1400	103.01	N/A	N/A
L-040621LAGRANDE-060312NPOWDERC1	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	644.95	659.05	640.11	102.96	NORTHWEST-NORTHWEST	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	IDAHO - NORTHWEST	3759.01	3872.63	3800	101.91	N/A	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Interface MW	MONTANA - NORTHWEST	2086.96	2234.36	2200	101.56	N/A	500
G-1: Colstrip #4	Bus High Volts	ELY ENGY (64890)	1.11	1.12	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	ROBINSON (64895)	1.11	1.12	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	MIDROB12 (64903)	1.09	1.11	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	MIDROB22 (64909)	1.09	1.11	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	BORMID11 (60241)	1.08	1.1	1.1		IDAHO	500
L-040621LAGRANDE-060312NPOWDERC1	Bus High Volts	HURWAL11 (45334)	1.09	1.1	1.1		NORTHWEST	230
L-048197LOLO-060275OXBOW	Bus High Volts	HURWAL11 (45334)	1.09	1.11	1.1		NORTHWEST	230
L-060155HEMINWAY-043049GRASSLNDC1-MS	Bus High Volts	ROBH A22 (64899)	1.11	1.12	1.1		SIERRA	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Bus High Volts	HURWAL11 (45334)	1.09	1.11	1.1		NORTHWEST	230
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	HEMGRA11 (60157)	1.01	1.16	1.1		IDAHO	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL21 (40700)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-	Bus High	GRIMAL25 (40708)	1.1	1.12	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
045029BURNSC1	Volts							
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.09	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI12 (45040)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI16 (45044)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	ROBH A12 (64897)	1.11	1.12	1.1		SIERRA	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	ROBH A22 (64899)	1.11	1.12	1.1		SIERRA	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIZZ R3 (40488)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN R1 (40684)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN (40687)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN R3 (40688)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL22 (40702)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL23 (40704)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL24 (40706)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL26 (40710)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONDROSA (40837)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	SUMMER L (41043)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM11 (41044)	1.07	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM12 (41046)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM13 (41052)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM14 (41054)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPTJACK (45035)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI11 (45039)	1.1	1.11	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI13 (45041)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI14 (45042)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	HURWAL11 (45334)	1.09	1.11	1.1		NORTHWEST	230
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIJOH12 (40591)	1.09	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIJOH22 (40594)	1.09	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI15 (45043)	1.09	1.1	1.1		NORTHWEST	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Bus High Volts	MIDHEM11 (60242)	1.07	1.12	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.06	1.15	1.1		IDAHO	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB21 (64908)	1.15	1.16	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	MIDROB23 (64910)	1.11	1.13	1.1		SIERRA	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.04	1.14	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.06	1.12	1.1		SIERRA	230
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	1	0.89	0.9		NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Bus High Volts	JONESCYN (47814)	1.04	1.36	1.1		NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Bus High Volts	JONTMB11 (47815)	1.03	1.2	1.1		NORTHWEST	230
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Bus High Volts	ROBH A22 (64899)	1.11	1.12	1.1		SIERRA	500
L-1:060155HEMINWAY500-	Bus High	HURWAL11 (45334)	1.09	1.11	1.1		NORTHWEST	230

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
043049GRASSLND500C1-MS	Volts							
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.1	1.18	1.1		NORTHWEST	500
N-1: Great Falls -Judith Gap S 230	Bus High Volts	MARIAS S (62361)	1.29	1.3	1.1		MONTANA	230

N-1 Contingency Results for Scenario 3: AUG10H13

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	297.15	436.64	321	136.03	PACE-PACE	345
L-065220BRIDGER-066315ROCKSPGSC2	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	693.36	1050.59	800.76	131.2	PACE-PACE	230
L-065420DAVEJOHN-067814WINDSTARC2	Branch Amp	DAVEJOHN (65420) -> WINDSTAR (67814) CKT 1 at DAVEJOHN	491.65	1144.05	953.88	119.94	PACE-PACE	230
T-065140BENLOMND-065145BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	297.15	368.92	321	114.93	PACE-PACE	345
L-065220BRIDGER-066315ROCKSPGSC1	Branch Amp	BRIDGER (65220) -> PT ROCKS (66250) CKT 1 at BRIDGER	777.4	1188.44	1066.8	111.4	PACE-PACE	230
T-065140BENLOMND-065145BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	297.15	348.27	321	108.5	PACE-PACE	345
T-0600843MIKNOLL-0652913MIKNOLLC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	297.15	335.12	321	104.4	PACE-PACE	345
L-065135BENLOMND-066476SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	297.15	329.34	321	102.6	PACE-PACE	345
T-066050NAUGHTON-066065NAUGT_G3C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	297.15	326.3	321	101.65	PACE-PACE	345
L-060085BRIDGER-0600843MIKNOLLC1-MS	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	693.36	805.21	800.76	100.56	PACE-PACE	230
G-1: Colstrip #4	Bus High Volts	MIDROB12 (64903)	1.13	1.14	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	MIDROB22 (64909)	1.13	1.14	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.1	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BORMID11 (60241)	1.09	1.11	1.1		IDAHO	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.1	1.11	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.1	1.11	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.1	1.11	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	MIDPOINT (60240)	1.09	1.1	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	BURSUM11 (45030)	1.1	1.12	1.1		NORTHWEST	500
L-060240MIDPOINT-	Bus High	CEDHEM11 (60166)	1.08	1.12	1.1		IDAHO	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
060155HEMINWAYC1-MS	Volts							
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	HEMINWAY (60155)	1.1	1.11	1.1		IDAHO	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.05	1.16	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.08	1.13	1.1		SIERRA	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	GONDER (64056)	1.08	1.1	1.1		SIERRA	230
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.11	1.13	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.1	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	1	0.88	0.9		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.13	1.19	1.1		NORTHWEST	500

Scenario 4: N-1 Contingency Results (Post-Generic Transmission Improvements)

N-1 Contingency Results for Scenario 4: JUL27H16

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	294.64	442.82	321	137.95	PACE-PACE	345
T-065140BENLOMND-065145BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	294.64	371.96	321	115.88	PACE-PACE	345
T-065140BENLOMND-065145BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	294.64	349.69	321	108.94	PACE-PACE	345
T-0600843MIKNOLL-0652913MIKNOLLC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	294.64	328.91	321	102.46	PACE-PACE	345
T-066050NAUGHTON-066065NAUGT_G3C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	294.64	324.4	321	101.06	PACE-PACE	345
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.14	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.14	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.13	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.12	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.12	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.11	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.11	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.11	1.13	1.1		MONTANA	500
L-060085BRIDGER-0600843MIKNOLLC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.12	1.14	1.1		PACE	500
L-060155HEMINWAY-045029BURNSC1	Bus Low Volts	HEMGRA11 (60157)	0.91	0.89	0.9		IDAHO	500
L-067790POPULUS-060085BRIDGERC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.12	1.13	1.1		PACE	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-067790POPULUS-060085BRIDGERC2-MS	Bus High Volts	ANPOPC&1 (67811)	1.12	1.13	1.1		PACE	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.16	1.1		PACE	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.96	0.88	0.9		NORTHWEST	230
N-1: Colstrip-Broadview 500 #1	Bus High Volts	BROADV&2 (62053)	1.14	1.15	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.15	1.17	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.15	1.17	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.13	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.13	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.13	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.11	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF12 (41068)	1.12	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.11	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF22 (41072)	1.12	1.13	1.1		NORTHWEST	500
T-1: Great Falls 230-100	Bus High Volts	MATL AB (62365)	1.1	1.11	1.1		MONTANA	230

N-1 Contingency Results for Scenario 4: DEC22H18

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	233.21	359.02	321	111.85	PACE-PACE	345
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1334.02	1664.73	1500	110.98	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1334.02	1664.73	1500	110.98	N/A	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1472.33	1869.37	1732.05	107.93	NORTHWEST-NORTHWEST	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1472.33	1869.37	1732.05	107.93	NORTHWEST-NORTHWEST	500
L-1:040826PEARLW230-043527SHERWOOD230C1-MS	Branch Amp	PEARL # (43773) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1415.46	2414.37	2299.36	105	NORTHWEST-NORTHWEST	230
L-1:043773PEARL#230-043527SHERWOOD230C1	Branch Amp	PEASHE12 (43530) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1202.49	2343.7	2299.36	101.93	NORTHWEST-NORTHWEST	230
L-1:043313MCLOUGLN230-040824PEARL E230-043527SHERWOOD230C1	Branch Amp	PEASHE12 (43530) -> SHERWOOD (43527) CKT 1 at SHERWOOD	1202.49	2320.26	2299.36	100.91	NORTHWEST-NORTHWEST	230
G-1: Colstrip #1	Bus High Volts	TOWN2 (62012)	1.14	1.15	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	TOWN1 (62013)	1.14	1.15	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	GARRISON (40459)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	BROADVU (62046)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	GARTAF12 (41068)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF22 (41072)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF11 (41066)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF21 (41070)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.14	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.14	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.12	1.15	1.1		MONTANA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.12	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.11	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.11	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.1	1.13	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	HOT SPR (40553)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TAFT (41057)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	BELTAF11 (41060)	1.09	1.1	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIZZ R3 (40488)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONDROSA (40837)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	SUMMER L (41043)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM11 (41044)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM12 (41046)	1.1	1.11	1.1		NORTHWEST	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.91	0.89	0.9		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.06	1.13	1.1		IDAHO	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.06	1.15	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.08	1.13	1.1		SIERRA	230
L-067829CLOVER-	Bus High	ANPOPC&1 (67811)	1.1	1.13	1.1		PACE	500

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
067795AEOLUSC1	Volts							
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.11	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.98	0.88	0.9		NORTHWEST	230
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.13	1.15	1.1		NORTHWEST	500
T-067829CLOVER-065996CLOVERC1	Bus High Volts	AEMNC&1C (67804)	1.09	1.1	1.1		PACE	500
T-067829CLOVER-065996CLOVERC2	Bus High Volts	AEMNC&1C (67804)	1.09	1.1	1.1		PACE	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.14	1.15	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.14	1.15	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.13	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.13	1.14	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.12	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.1	1.12	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.1	1.12	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 4: MAR04H21

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	812.74	1430.55	640.11	223.49	NORTHWEST-NORTHWEST	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	1146.58	552.25	207.62	PACE-NEVADA	345
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	1135.96	552.25	205.7	PACE-PACE	345
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	1062.67	552.25	192.43	PACE-NEVADA	345
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	1055.1	552.25	191.06	PACE-NEVADA	345
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	1055.05	552.25	191.05	PACE-NEVADA	345
L-065805HUNTNGTN-066225PINTOC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	1052.88	552.25	190.65	PACE-PACE	345
L-066235PINTOPS-014101FOURCORNC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	1045.38	552.25	189.3	PACE-PACE	345
T-066225PINTO-066235PINTOPSC1_2	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	1045.33	552.25	189.29	PACE-PACE	345
L-066355SIGURDPS-079031GLENCANYC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	999.82	552.25	181.05	PACE-NEVADA	345
T-066345SIGURD-066355SIGURDPSC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	999.76	552.25	181.03	PACE-NEVADA	345
L-066355SIGURDPS-079031GLENCANYC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	990.59	552.25	179.37	PACE-PACE	345
T-066345SIGURD-066355SIGURDPSC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	990.52	552.25	179.36	PACE-PACE	345
L-060155HEMINWAY-045029BURNSC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	990.26	552.25	179.31	PACE-NEVADA	345
L-060155HEMINWAY-045029BURNSC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	981.12	552.25	177.66	PACE-PACE	345
L-067794POPULUS-067826ANTICLINC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	971.29	552.25	175.88	PACE-NEVADA	345
L-060061BORAH-060240MIDPOINTC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	970.24	552.25	175.69	PACE-NEVADA	345
L-067795AEOLUS-067826ANTICLINC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	965.14	552.25	174.77	PACE-NEVADA	345
L-067794POPULUS-067826ANTICLINC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	962.33	552.25	174.26	PACE-PACE	345
L-060061BORAH-060240MIDPOINTC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	961.28	552.25	174.07	PACE-PACE	345
L-067794POPULUS-060159CEDARHILC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	959.38	552.25	173.72	PACE-NEVADA	345

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-067795AEOLUS-067826ANTICLINC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	956.23	552.25	173.15	PACE-PACE	345
L-067794POPULUS-060159CEDARHILC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	950.52	552.25	172.12	PACE-PACE	345
L-065510EMERY-065805HUNTNGTNC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	943.13	552.25	170.78	PACE-NEVADA	345
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	941.1	552.25	170.41	PACE-NEVADA	345
L-065545EXXONWY-066010MONUMENTC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	939.04	552.25	170.04	PACE-NEVADA	345
L-065510EMERY-066400SPANFRKC1	Branch Amp	UTAH-NEV (67657) -> HA PS (18002) CKT 1 at HA PS	926.94	938.24	552.25	169.9	PACE-NEVADA	345
L-065510EMERY-065805HUNTNGTNC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	934.42	552.25	169.2	PACE-PACE	345
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	932.41	552.25	168.84	PACE-PACE	345
L-065545EXXONWY-066010MONUMENTC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	930.37	552.25	168.47	PACE-PACE	345
L-065510EMERY-066400SPANFRKC1	Branch Amp	REDBUTTE (66280) -> UTAH-NEV (67657) CKT 1 at UTAH-NEV	918.37	929.58	552.25	168.33	PACE-PACE	345
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	204.53	207.06	125	165.65	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR E TP (45160) -> BOARD T2 (40123) CKT 1 at DR E TP	787.86	1403.58	870.04	161.32	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DALREED (45075) -> DR E TP (45160) CKT 1 at DALREED	787.87	1403.59	873.56	160.68	NORTHWEST-NORTHWEST	230
L-065220BRIDGER-066315ROCKSPGSC2	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	729.54	1142.71	800.76	142.7	PACE-PACE	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	DR W TP (45162) -> DALREED (45075) CKT 1 at DR W TP	811.67	1429.85	1006.6	142.05	NORTHWEST-NORTHWEST	230
L-066010MONUMENT-065555FIREHOLEC1	Branch Amp	ROCKSPGS (66315) -> PALISADE (66180) CKT 1 at ROCKSPGS	968.07	1388.62	1064.33	130.47	PACE-PACE	230
L-066010MONUMENT-065555FIREHOLEC1	Branch Amp	PALISADE (66180) -> RAVEN (66266) CKT 1 at PALISADE	966.9	1387.91	1064.33	130.4	PACE-PACE	230
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	812.74	828.13	640.11	129.37	NORTHWEST-NORTHWEST	230
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	812.74	827.85	640.11	129.33	NORTHWEST-NORTHWEST	230
L-066315ROCKSPGS-066266RAVENC1	Branch Amp	FIREHOLE (65555) -> MANSFACE (65176) CKT 1 at FIREHOLE	740.42	1337.36	1064.33	125.65	PACE-PACE	230
L-065555FIREHOLE-	Branch	ROCKSPGS (66315) -> PALISADE (66180)	968.07	1296.69	1064.33	121.83	PACE-PACE	230

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
066315ROCKSPGSC1	Amp	CKT 1 at ROCKSPGS						
L-065555FIREHOLE-066315ROCKSPGSC1	Branch Amp	PALISADE (66180) -> RAVEN (66266) CKT 1 at PALISADE	966.9	1296.08	1064.33	121.77	PACE-PACE	230
L-066315ROCKSPGS-066266RAVENC1	Branch Amp	MANSFACE (65176) -> BLUE RIM (65175) CKT 1 at MANSFACE	688.41	1283.24	1064.33	120.57	PACE-PACE	230
L-066010MONUMENT-065555FIREHOLEC1	Branch Amp	RAVEN (66266) -> WESTVACO (66670) CKT 1 at RAVEN	854.98	1274.85	1064.33	119.78	PACE-PACE	230
L-066315ROCKSPGS-066266RAVENC1	Branch Amp	BLUE RIM (65175) -> S. TRONA (66325) CKT 1 at BLUE RIM	675.33	1273	1064.33	119.61	PACE-PACE	230
L-066315ROCKSPGS-066266RAVENC1	Branch Amp	ROCKSPGS (66315) -> FIREHOLE (65555) CKT 1 at FIREHOLE	631.99	1262.01	1064.33	118.57	PACE-PACE	230
L-067829CLOVER-067795AEOLUSC1	Interface MW	BRIDGER WEST	3672.14	4371.57	3700	118.15	N/A	N/A
L-066010MONUMENT-065555FIREHOLEC1	Branch Amp	WESTVACO (66670) -> BLACKSFK (65165) CKT 1 at WESTVACO	830.42	1250.51	1064.33	117.49	PACE-PACE	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1366.09	1741.12	1500	116.07	N/A	500
L-067794POPULUS-067826ANTICLINC1	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	729.54	905.22	800.76	113.05	PACE-PACE	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	1500.46	1940.63	1732.05	112.04	NORTHWEST-NORTHWEST	500
L-065555FIREHOLE-066315ROCKSPGSC1	Branch Amp	RAVEN (66266) -> WESTVACO (66670) CKT 1 at RAVEN	854.98	1182.61	1064.33	111.11	PACE-PACE	230
L-066315ROCKSPGS-066266RAVENC1	Branch Amp	S. TRONA (66325) -> MONUMENT (66010) CKT 1 at S. TRONA	579.41	1176.7	1064.33	110.56	PACE-PACE	230
L-066266RAVEN-066010MONUMENTC1	Branch Amp	FIREHOLE (65555) -> MANSFACE (65176) CKT 1 at FIREHOLE	740.42	1170	1064.33	109.93	PACE-PACE	230
L-065555FIREHOLE-066315ROCKSPGSC1	Branch Amp	WESTVACO (66670) -> BLACKSFK (65165) CKT 1 at WESTVACO	830.42	1159.79	1064.33	108.97	PACE-PACE	230
L-060085BRIDGER-0600843MIKNOLLC1-MS	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	729.54	867.37	800.76	108.32	PACE-PACE	230
L-067794POPULUS-067826ANTICLINC1	Branch Amp	ROCKSPGS (66315) -> PALISADE (66180) CKT 1 at ROCKSPGS	968.07	1152.62	1064.33	108.3	PACE-PACE	230
L-067794POPULUS-067826ANTICLINC1	Branch Amp	PALISADE (66180) -> RAVEN (66266) CKT 1 at PALISADE	966.9	1151.39	1064.33	108.18	PACE-PACE	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	BOARD T2 (40123) -> MCNRY S2 (41352) CKT 1 at BOARD T2	784.59	1400.46	1320.12	106.09	NORTHWEST-NORTHWEST	230
L-066305RIVERTON-065090ATLANTICC1	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	729.54	841.66	800.76	105.11	PACE-PACE	230
L-066266RAVEN-066010MONUMENTC1	Branch Amp	MANSFACE (65176) -> BLUE RIM (65175) CKT 1 at MANSFACE	688.41	1116.36	1064.33	104.89	PACE-PACE	230
L-065090ATLANTIC-066315ROCKSPGSC1	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	729.54	839.76	800.76	104.87	PACE-PACE	230

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Branch MVA	JGAPCLCT (62214) -> JUDITHSO (62083) CKT 1 at JUDITHSO	161.92	174.69	166.6	104.86	MONTANA-MONTANA	230
L-066266RAVEN-066010MONUMENTC1	Branch Amp	BLUE RIM (65175) -> S. TRONA (66325) CKT 1 at BLUE RIM	675.33	1105.87	1064.33	103.9	PACE-PACE	230
L-067795AEOLUS-067826ANTICLINC1	Interface MW	TOT 4A	503.71	840.04	810	103.71	N/A	230
L-066266RAVEN-066010MONUMENTC1	Branch Amp	ROCKSPGS (66315) -> FIREHOLE (65555) CKT 1 at FIREHOLE	631.99	1103.25	1064.33	103.66	PACE-PACE	230
L-067790POPULUS-060085BRIDGERC1-MS	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	729.54	829.24	800.76	103.56	PACE-PACE	230
L-067790POPULUS-060085BRIDGERC2-MS	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	729.54	829.24	800.76	103.56	PACE-PACE	230
T-066050NAUGHTON-066065NAUGT_G3C1	Branch Amp	ROCKSPGS (66315) -> PALISADE (66180) CKT 1 at ROCKSPGS	968.07	1101.08	1064.33	103.45	PACE-PACE	230
T-066050NAUGHTON-066065NAUGT_G3C1	Branch Amp	PALISADE (66180) -> RAVEN (66266) CKT 1 at PALISADE	966.9	1100.02	1064.33	103.35	PACE-PACE	230
L-067829CLOVER-067795AEOLUSC1	Branch Amp	ROCKSPGS (66315) -> PALISADE (66180) CKT 1 at ROCKSPGS	968.07	1098.78	1064.33	103.24	PACE-PACE	230
L-067829CLOVER-067795AEOLUSC1	Branch Amp	PALISADE (66180) -> RAVEN (66266) CKT 1 at PALISADE	966.9	1097.69	1064.33	103.13	PACE-PACE	230
T-066010MONUMENT-066011MONUPSTC1	Branch MVA	MONUMENT (66010) -> MONU PST (66011) CKT 2 at MONU PST	174.6	309.07	300	103.02	PACE-PACE	230
T-066010MONUMENT-066011MONUPSTC2	Branch MVA	MONUMENT (66010) -> MONU PST (66011) CKT 1 at MONU PST	174.6	309.07	300	103.02	PACE-PACE	230
L-066266RAVEN-066010MONUMENTC1	Interface MW	BRIDGER WEST	3672.14	3794.47	3700	102.55	N/A	N/A
L-066315ROCKSPGS-066266RAVENC1	Interface MW	BRIDGER WEST	3672.14	3781.05	3700	102.19	N/A	N/A
L-067829CLOVER-067795AEOLUSC1	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	729.54	818.24	800.76	102.18	PACE-PACE	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	TOT 2B	710.09	796.44	780	102.11	N/A	345
L-066280REDBUTTE-018002HAPSC1	Interface MW	TOT 2B	710.09	796.1	780	102.06	N/A	345
T-066050NAUGHTON-066065NAUGT_G3C1	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	729.54	816.71	800.76	101.99	PACE-PACE	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	TOT 2C	1829.67	2138.46	2100	101.83	N/A	500
L-066010MONUMENT-065555FIREHOLEC1	Interface MW	BRIDGER WEST	3672.14	3759.47	3700	101.61	N/A	N/A
L-065555FIREHOLE-	Interface	BRIDGER WEST	3672.14	3758.54	3700	101.58	N/A	N/A

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
066315ROCKSPGSC1	MW							
L-065193BONANZA-065995MONAC1	Interface MW	BRIDGER WEST	3672.14	3757.64	3700	101.56	N/A	N/A
L-065220BRIDGER-066315ROCKSPGSC1	Interface MW	BRIDGER WEST	3672.14	3751.88	3700	101.4	N/A	N/A
L-060085BRIDGER-0600843MIKNOLLC1-MS	Branch Amp	ROCKSPGS (66315) -> PALISADE (66180) CKT 1 at ROCKSPGS	968.07	1076.6	1064.33	101.15	PACE-PACE	230
L-060085BRIDGER-0600843MIKNOLLC1-MS	Branch Amp	PALISADE (66180) -> RAVEN (66266) CKT 1 at PALISADE	966.9	1075.54	1064.33	101.05	PACE-PACE	230
L-065420DAVEJOHN-067814WINDSTARC2	Branch Amp	WINDSTAR (67814) -> DAVEJOHN (65420) CKT 1 at WINDSTAR	413.77	956.76	953.88	100.3	PACE-PACE	230
G-1: Colstrip #1	Branch MVA	JGAPCLCT (62214) -> JUDITHSO (62083) CKT 1 at JUDITHSO	161.92	166.78	166.6	100.11	MONTANA-MONTANA	230
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	729.54	801.54	800.76	100.1	PACE-PACE	230
G-1: Colstrip #1	Bus High Volts	TOWN2 (62012)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	TOWN1 (62013)	1.13	1.15	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	BROADVU (62046)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&2 (62053)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	BROADV&1 (62054)	1.12	1.13	1.1		MONTANA	500
G-1: Colstrip #1	Bus High Volts	GARRISON (40459)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	HOT SPR (40553)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF11 (41066)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF12 (41068)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF21 (41070)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	GARTAF22 (41072)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #1	Bus High Volts	COLSTRP (62057)	1.1	1.11	1.1		MONTANA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #1	Bus High Volts	TAFT (41057)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	MARIAS S (62361)	1.3	1.31	1.1		MONTANA	230
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.11	1.14	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	MIDROB11 (64902)	1.14	1.14	1.1		SIERRA	500
G-1: Colstrip #4	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.1	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.09	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.09	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI16 (45044)	1.11	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.1	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	HOT SPR (40553)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GRIMAL21 (40700)	1.11	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TAFT (41057)	1.09	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High	GRIMAL25 (40708)	1.1	1.1	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
	Volts							
G-1: Colstrip #4	Bus High Volts	BELTAF11 (41060)	1.09	1.1	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	CAPGRI12 (45040)	1.1	1.1	1.1		NORTHWEST	500
L-0600843MIKNOLL-065665GOSHENC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.13	1.1		PACE	500
L-060085BRIDGER-0600843MIKNOLLC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.12	1.14	1.1		PACE	500
L-060150HELLSCYN-045103HURICANEC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
L-060150HELLSCYN-060095BROWNLEEC1	Bus High Volts	HURWAL11 (45334)	1.01	1.11	1.1		NORTHWEST	230
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	ROBH A12 (64897)	1.17	1.2	1.1		SIERRA	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.09	1.11	1.1		NORTHWEST	500
L-060190KINPORT-067790POPULUSC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	ROBH A12 (64897)	1.17	1.18	1.1		SIERRA	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.06	1.11	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	PONSUM11 (41048)	1.09	1.1	1.1		NORTHWEST	500
L-060240MIDPOINT-060159CEDARHILC1	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	ELY ENGY (64890)	1.08	1.15	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	ROBINSON (64895)	1.08	1.15	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus High Volts	ROBH A11 (64896)	1.06	1.14	1.1		SIERRA	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-065293CARRDRA-076400PUMPKIN_C1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.13	1.1		PACE	500
L-065545EXXONWY-066010MONUMENTC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
L-065555FIREHOLE-066315ROCKSPGSC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.13	1.1		PACE	500
L-065805HUNTNGTN-066225PINTOC1	Bus High Volts	ROBH A12 (64897)	1.17	1.19	1.1		SIERRA	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-066010MONUMENT-065555FIREHOLEC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.13	1.1		PACE	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.04	1.15	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.07	1.13	1.1		SIERRA	230
L-066235PINTOPS-014101FOURCORNC1	Bus High Volts	ROBH A12 (64897)	1.17	1.19	1.1		SIERRA	500
L-066266RAVEN-066010MONUMENTC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.13	1.1		PACE	500
L-066280REDBUTTE-018002HAPSC1	Bus High Volts	ROBH A12 (64897)	1.17	1.19	1.1		SIERRA	500
L-066355SIGURDPS-079031GLENCANYC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
L-067790POPULUS-060085BRIDGERC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.12	1.14	1.1		PACE	500
L-067790POPULUS-060085BRIDGERC2-MS	Bus High Volts	ANPOPC&1 (67811)	1.12	1.14	1.1		PACE	500
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	MIDROB11 (64902)	1.14	1.14	1.1		SIERRA	500
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	POPBRI11 (67793)	1.04	1.14	1.1		PACE	345
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	POPBRI21 (67800)	1.04	1.14	1.1		PACE	345
L-067795AEOLUS-067826ANTICLINC1	Bus High Volts	MIDROB11 (64902)	1.14	1.14	1.1		SIERRA	500
L-067827ANTICLIN-060085BRIDGERC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.16	1.1		PACE	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ROBH A12 (64897)	1.17	1.19	1.1		SIERRA	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.17	1.1		PACE	500
L-067829CLOVER-067795AEOLUSC1	Bus Low Volts	HEMGRA11 (60157)	0.9	0.89	0.9		IDAHO	500
L-1:040051ALVEY500-045095DIXONVLE500C1-MS	Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
L-1:043496JUNPRFT500-043950CDRSPRG500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.11	1.1		NORTHWEST	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-	Bus High	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
043049GRASSLND500C1-MS	Volts							
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.09	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	MERIDINP (45197)	1.1	1.11	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	DIXMER11 (45199)	1.1	1.11	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	KFALLS (45262)	1.09	1.11	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	DIXONVLE (45095)	1.09	1.1	1.1		NORTHWEST	500
L-1:045035CAPTJACK500-045262KFALLS500C1	Bus High Volts	ALVDIX11 (45096)	1.1	1.1	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-044900DIXNV230230C1	Bus High Volts	ALVDIX11 (45096)	1.1	1.1	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	0.99	0.89	0.9		NORTHWEST	230
L-1:045095DIXONVLE500-045197MERIDINP500C1-MS	Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
L-1:060150HELLSCYN230-045327WALAWALA230C1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.12	1.15	1.1		NORTHWEST	500
N-1: Mill Crk-Garrison #1 230	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
N-1: Mill Crk-Garrison #1 230	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
T-060155HEMINWAY-060156HEMINWAYC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
T-066225PINTO-066235PINTOPSC1_2	Bus High Volts	ROBH A12 (64897)	1.17	1.19	1.1		SIERRA	500
T-066345SIGURD-066355SIGURDPSC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.12	1.1		PACE	500
T-067794POPULUS-067790POPULUSC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.13	1.1		PACE	500
T-067826ANTICLIN-067801ANTPSTC1	Bus High Volts	ANPOPC&1 (67811)	1.12	1.16	1.1		PACE	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.13	1.15	1.1		MONTANA	500

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.13	1.15	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.12	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.12	1.13	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	BROADV&2 (62053)	1.12	1.13	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	BROADV&1 (62054)	1.12	1.13	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.11	1.12	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	BROADVU (62046)	1.12	1.12	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.09	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF12 (41068)	1.1	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.09	1.11	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF22 (41072)	1.1	1.11	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 4: OCT04H21

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-060155HEMINWAY-043049GRASSLNDC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	2015.63	2762.99	1732.05	159.52	NORTHWEST-NORTHWEST	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	2015.63	2762.99	1732.05	159.52	NORTHWEST-NORTHWEST	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1761.95	2309.74	1500	153.98	N/A	500
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1761.95	2309.74	1500	153.98	N/A	500
L-067794POPULUS-067826ANTICLINC1	Interface MW	PATH C	1512.36	1959.76	1400	139.98	N/A	N/A
L-067794POPULUS-060061BORAHC1-MS	Interface MW	PATH C	1512.36	1954.39	1400	139.6	N/A	N/A
L-066510TERMINAL-067790POPULUSC1	Interface MW	PATH C	1512.36	1870.67	1400	133.62	N/A	N/A
L-1:040123BOARDT2230-045075DALREED230C1	Branch MVA	PEBBL 1 (47816) -> JONESCYN (47814) CKT 1 at PEBBL 1	156.62	166.56	125	133.25	NORTHWEST-NORTHWEST	230
L-067795AEOLUS-067826ANTICLINC1	Interface MW	PATH C	1512.36	1812.27	1400	129.45	N/A	N/A
T-067794POPULUS-067790POPULUSC1	Interface MW	PATH C	1512.36	1804.31	1400	128.88	N/A	N/A
L-060085BRIDGER-0600843MIKNOLLC1-MS	Interface MW	PATH C	1512.36	1778.03	1400	127	N/A	N/A
L-067829CLOVER-067795AEOLUSC1	Interface MW	BRIDGER WEST	4179.32	4681.92	3700	126.54	N/A	N/A
L-060240MIDPOINT-064895ROBINSONC1-MS	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	2015.63	2186.6	1732.05	126.24	NORTHWEST-NORTHWEST	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	MIDPOINT - SUMMER LAKE	1761.95	1874.08	1500	124.94	N/A	500
L-060190KINPORT-067790POPULUSC1-MS	Interface MW	PATH C	1512.36	1732.43	1400	123.75	N/A	N/A
L-067794POPULUS-060159CEDARHILC1-MS	Interface MW	PATH C	1512.36	1723.59	1400	123.11	N/A	N/A
L-060159CEDARHIL-060155HEMINWAYC1-MS	Branch Amp	MIDPOINT (60240) -> MIDHEM11 (60242) CKT 1 at MIDHEM11	1813.68	2874.99	2338.27	122.95	IDAHO-IDAHO	500
L-1:060150HELLSCYN230-045327WALAWALA230C1	Interface MW	MIDPOINT - SUMMER LAKE	1761.95	1819.21	1500	121.28	N/A	500
L-060150HELLSCYN-045103HURICANEC1	Interface MW	MIDPOINT - SUMMER LAKE	1761.95	1818.91	1500	121.26	N/A	500
L-1:060150HELLSCYN230-045327WALAWALA230C1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	2015.63	2093.08	1732.05	120.84	NORTHWEST-NORTHWEST	500
L-060150HELLSCYN-045103HURICANEC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURSUM11	2015.63	2092.79	1732.05	120.83	NORTHWEST-NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-040621LAGRANDE-060312NPOWDERC1	Interface MW	MIDPOINT - SUMMER LAKE	1761.95	1802.37	1500	120.16	N/A	500
L-048197LOLO-060275OXBOW	Interface MW	MIDPOINT - SUMMER LAKE	1761.95	1799.39	1500	119.96	N/A	500
L-040621LAGRANDE-060312NPOWDERC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	2015.63	2070.31	1732.05	119.53	NORTHWEST-NORTHWEST	500
L-048197LOLO-060275OXBOW	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	2015.63	2065.56	1732.05	119.26	NORTHWEST-NORTHWEST	500
L-065075ANTLOPE-062355PMLCKPHAC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	2015.63	2054.73	1732.05	118.63	NORTHWEST-NORTHWEST	500
L-060150HELLSCYN-060095BROWNLEEC1	Branch Amp	BURNS (45029) -> BURSUM11 (45030) CKT 1 at BURNS	2015.63	2051.51	1732.05	118.44	NORTHWEST-NORTHWEST	500
L-060190KINPORT-060060BORAHC1	Interface MW	PATH C	1512.36	1650.67	1400	117.9	N/A	N/A
L-065193BONANZA-065995MONAC1	Interface MW	BRIDGER WEST	4179.32	4254.04	3700	114.97	N/A	N/A
T-060190KINPORT-060185KINPORTC1	Interface MW	PATH C	1512.36	1601.08	1400	114.36	N/A	N/A
L-065805HUNTNGTN-066225PINTOC1	Interface MW	PATH C	1512.36	1579.56	1400	112.83	N/A	N/A
T-0600843MIKNOLL-0652913MIKNOLLC1	Interface MW	PATH C	1512.36	1577.02	1400	112.64	N/A	N/A
L-066235PINTOPS-014101FOURCORNC1	Interface MW	PATH C	1512.36	1573.98	1400	112.43	N/A	N/A
T-066225PINTO-066235PINTOPSC1_2	Interface MW	PATH C	1512.36	1573.92	1400	112.42	N/A	N/A
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	PAVANT, INTRMTN - GONDER 230 KV	214.23	273.61	245	111.68	N/A	230
L-0600843MIKNOLL-065665GOSHENC1	Interface MW	PATH C	1512.36	1557.08	1400	111.22	N/A	N/A
L-065545EXXONWY-066010MONUMENTC1	Interface MW	PATH C	1512.36	1553.19	1400	110.94	N/A	N/A
L-066355SIGURDPS-079031GLENCANYC1	Interface MW	PATH C	1512.36	1552.89	1400	110.92	N/A	N/A
T-066345SIGURD-066355SIGURDPSC1	Interface MW	PATH C	1512.36	1552.77	1400	110.91	N/A	N/A
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	JONTMB11 (47815) -> TMBLCR T (41079) CKT 1 at JONTMB11	304.25	707.89	640.11	110.59	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	JONESCYN (47814) -> JONTMB11 (47815) CKT 1 at JONTMB11	307.46	707.89	640.11	110.59	NORTHWEST-NORTHWEST	230
L-066210PAVANT-	Interface	PATH C	1512.36	1540.5	1400	110.04	N/A	N/A

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
066345SIGURDC1	MW							
L-1:040123BOARDT2230-045075DALREED230C1	Branch Amp	JONESCYN (47814) -> JONTMB11 (47815) CKT 1 at JONESCYN	307.46	699.58	640.11	109.29	NORTHWEST-NORTHWEST	230
L-1:040123BOARDT2230-045075DALREED230C1	Branch Amp	JONTMB11 (47815) -> TMBLCR T (41079) CKT 1 at JONTMB11	304.25	699.1	640.11	109.22	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-045075DALREED230C1	Branch Amp	TMBLCR T (41079) -> SANTIAM (40939) CKT 1 at TMBLCR T	299.89	697.88	640.11	109.03	NORTHWEST-NORTHWEST	230
L-1:047814JONESCYN230-041079TMBLCRT230C1-MS	Branch Amp	JONESCYN (47814) -> DR W TP (45162) CKT 1 at JONESCYN	378.83	688.47	640.11	107.56	NORTHWEST-NORTHWEST	230
L-1:040123BOARDT2230-045075DALREED230C1	Branch Amp	TMBLCR T (41079) -> SANTIAM (40939) CKT 1 at TMBLCR T	299.89	686.24	640.11	107.21	NORTHWEST-NORTHWEST	230
L-067794POPULUS-067826ANTICLINC1	Interface MW	PAVANT, INTRMTN - GONDER 230 KV	214.23	259.04	245	105.73	N/A	230
L-067827ANTICLIN-060085BRIDGERC1	Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1012.61	1039.87	1000	103.99	PACE-PACE	500
T-067826ANTICLIN-067801ANTPSTC1	Branch MVA	WY_CLCT2 (189) -> AEOLUS (67795) CKT 1 at AEOLUS	1012.61	1039.87	1000	103.99	PACE-PACE	500
L-060240MIDPOINT-064895ROBINSONC1-MS	Interface MW	IDAHO - NORTHWEST	3716.84	3948.78	3800	103.92	N/A	500
L-067794POPULUS-067826ANTICLINC1	Branch MVA	WY_CLCT3 (190) -> ANTICLIN (67826) CKT 1 at ANTICLIN	996.23	1022.09	1000	102.21	PACE-PACE	500
L-060061BORAH-060240MIDPOINTC1-MS	Interface MW	PAVANT, INTRMTN - GONDER 230 KV	214.23	247.71	245	101.11	N/A	230
L-067795AEOLUS-067826ANTICLINC1	Interface MW	PAVANT, INTRMTN - GONDER 230 KV	214.23	245.08	245	100.03	N/A	230
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.13	1.16	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.12	1.15	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.12	1.14	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.12	1.14	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.11	1.13	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.09	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.1	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.09	1.12	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.1	1.12	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.1	1.12	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	HOT SPR (40553)	1.1	1.11	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	TAFT (41057)	1.09	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-043049GRASSLNDC1-MS	Bus High Volts	ROBH A12 (64897)	1.12	1.13	1.1		SIERRA	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL21 (40700)	1.12	1.14	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM11 (41048)	1.08	1.14	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	ROBH A12 (64897)	1.12	1.14	1.1		SIERRA	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL23 (40704)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL24 (40706)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL25 (40708)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL26 (40710)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	SUMMER L (41043)	1.09	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM11 (41044)	1.07	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALSUM12 (41046)	1.09	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM13 (41052)	1.1	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONSUM14 (41054)	1.1	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI11 (45039)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI12 (45040)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI13 (45041)	1.11	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-	Bus High	CAPGRI14 (45042)	1.11	1.13	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
045029BURNSC1	Volts							
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI16 (45044)	1.12	1.13	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIZZ R3 (40488)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIZZLY (40489)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIJOH12 (40591)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIJOH22 (40594)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN R1 (40684)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN (40687)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	MALIN R3 (40688)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	GRIMAL22 (40702)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	PONDROSA (40837)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPTJACK (45035)	1.1	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	CAPGRI15 (45043)	1.11	1.12	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	ROUND BU (43485)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	DIXMER11 (45199)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	KFALLS (45262)	1.1	1.11	1.1		NORTHWEST	500
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	HURWAL11 (45334)	1.08	1.1	1.1		NORTHWEST	230
L-060155HEMINWAY-045029BURNSC1	Bus High Volts	HEMGRA11 (60157)	0.92	1.1	1.1		IDAHO	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Bus High Volts	ROBH A12 (64897)	1.12	1.13	1.1		SIERRA	500
L-060159CEDARHIL-060155HEMINWAYC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.92	0.89	0.9		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.07	1.19	1.1		IDAHO	500
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	ROBH A12 (64897)	1.12	1.14	1.1		SIERRA	500

Scenario Cases – Violation Tables

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus Low Volts	HEMGRA11 (60157)	0.92	0.89	0.9		IDAHO	500
L-065975MINERS-066240PLATTEC1	Bus High Volts	ANPOPC&1 (67811)	1.13	1.14	1.1		PACE	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.04	1.11	1.1		PACE	230
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	POPBRI11 (67793)	1.01	1.11	1.1		PACE	345
L-067794POPULUS-067826ANTICLINC1	Bus High Volts	POPBRI21 (67800)	1.01	1.11	1.1		PACE	345
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ANPOPC&1 (67811)	1.13	1.2	1.1		PACE	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ROBH A12 (64897)	1.12	1.13	1.1		SIERRA	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.1	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	1	0.89	0.9		NORTHWEST	230
L-1:060155HEMINWAY500-043049GRASSLND500C1-MS	Bus High Volts	ROBH A12 (64897)	1.12	1.13	1.1		SIERRA	500
N-1: Broadview-Garison 500 #1	Bus High Volts	GAR2EAST (40453)	1.12	1.18	1.1		NORTHWEST	500
T-060155HEMINWAY-060156HEMINWAYC1	Bus Low Volts	HEMGRA11 (60157)	0.92	0.9	0.9		IDAHO	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.09	1.1	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.09	1.1	1.1		NORTHWEST	500

N-1 Contingency Results for Scenario 4: AUG10H13

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
T-066476SYRACUSE-066480SYRACUSEC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	299.9	446.76	321	139.18	PACE-PACE	345
T-065140BENLOMND-065145BENLOMNDC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	299.9	375.92	321	117.11	PACE-PACE	345
T-065140BENLOMND-065145BENLOMNDC2	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	299.9	354	321	110.28	PACE-PACE	345
L-065220BRIDGER-066315ROCKSPGSC2	Branch Amp	BRIDGER (65220) -> ROCKSPGS (66315) CKT 1 at BRIDGER	546.66	852.47	800.76	106.46	PACE-PACE	230
T-0600843MIKNOLL-0652913MIKNOLLC1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	299.9	338.36	321	105.41	PACE-PACE	345
L-067829CLOVER-067795AEOLUSC1	Interface MW	BRIDGER WEST	3281	3818.3	3700	103.2	N/A	N/A
T-066050NAUGHTON-066065NAUGT_G3C1	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	299.9	329.88	321	102.77	PACE-PACE	345
L-060085BRIDGER-0600843MIKNOLLC1-MS	Branch MVA	BENLOMND (65135) -> BENLOMND (65145) CKT 1 at BENLOMND	299.9	325.31	321	101.34	PACE-PACE	345
G-1: Colstrip #4	Bus High Volts	TOWN2 (62012)	1.17	1.19	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	TOWN1 (62013)	1.17	1.19	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADVU (62046)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&2 (62053)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	BROADV&1 (62054)	1.15	1.17	1.1		MONTANA	500
G-1: Colstrip #4	Bus High Volts	GARRISON (40459)	1.15	1.16	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF11 (41066)	1.13	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF12 (41068)	1.14	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF21 (41070)	1.13	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	GARTAF22 (41072)	1.14	1.15	1.1		NORTHWEST	500
G-1: Colstrip #4	Bus High Volts	COLSTRP (62057)	1.11	1.14	1.1		MONTANA	500
L-060085BRIDGER-0600843MIKNOLLC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.11	1.12	1.1		PACE	500
L-060155HEMINWAY-045029BURNSC1	Bus Low Volts	HEMGRA11 (60157)	0.92	0.9	0.9		IDAHO	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
L-060240MIDPOINT-060155HEMINWAYC1-MS	Bus High Volts	CEDHEM11 (60166)	1.07	1.12	1.1		IDAHO	500
L-066210PAVANT-066345SIGURDC1	Bus High Volts	PAVANT (66210)	1.05	1.14	1.1		PACE	230
L-066210PAVANT-066345SIGURDC1	Bus High Volts	UTAH-NEV (64124)	1.07	1.11	1.1		SIERRA	230
L-067790POPULUS-060085BRIDGERC1-MS	Bus High Volts	ANPOPC&1 (67811)	1.11	1.12	1.1		PACE	500
L-067790POPULUS-060085BRIDGERC2-MS	Bus High Volts	ANPOPC&1 (67811)	1.11	1.12	1.1		PACE	500
L-067829CLOVER-067795AEOLUSC1	Bus High Volts	ANPOPC&1 (67811)	1.11	1.14	1.1		PACE	500
L-1:043496JUNPRFT500-043954MIKKALO500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	JUNMIK21 (43956)	1.1	1.13	1.1		NORTHWEST	500
L-1:043950CDRSPRG500-043049GRASSLND500C1-MS	Bus High Volts	MIKGRA21 (43955)	1.1	1.11	1.1		NORTHWEST	500
L-1:043954MIKKALO500-043049GRASSLND500C2-MS	Bus High Volts	JUNCDR11 (43952)	1.1	1.12	1.1		NORTHWEST	500
L-1:045093DIXONVLE230-045123DGRANTPS230C1	Bus Low Volts	NICKLMTN (44995)	1	0.88	0.9		NORTHWEST	230
N-1: Colstrip-Broadview 500 #1	Bus High Volts	BROADV&2 (62053)	1.15	1.16	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN2 (62012)	1.17	1.19	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	TOWN1 (62013)	1.17	1.19	1.1		MONTANA	500
T-1: Garrison 500-230	Bus High Volts	GAR1EAST (40451)	1.14	1.16	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GAR2EAST (40453)	1.14	1.16	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARRISON (40459)	1.15	1.16	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF11 (41066)	1.13	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF12 (41068)	1.14	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High Volts	GARTAF21 (41070)	1.13	1.15	1.1		NORTHWEST	500
T-1: Garrison 500-230	Bus High	GARTAF22 (41072)	1.14	1.15	1.1		NORTHWEST	500

Contingency Name	Category	Element	Reference Value	Value	Limit	Percent	Area Name Assoc.	Nom kV Assoc.
	Volts							