UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North American Electric Reliability Corporation	**)** **)**	**Docket No. _____**

JOINT PETITION OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION AND WESTERN ELECTRICITY COORDINATING COUNCIL FOR APPROVAL OF PROPOSED REGIONAL RELIABILITY STANDARD BAL-002-WECC-3

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September 6, 2019

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Pursuant to Section 215(d)(1) of the Federal Power Act ("FPA")[1] and Section 39.5[2] of the Federal Energy Regulatory Commission's ("FERC" or the "Commission") regulations, the North American Electric Reliability Corporation ("NERC")[3] and the Western Electricity Coordinating Council ("WECC") hereby submit proposed Regional Reliability Standard BAL-002-WECC-3 – Contingency Reserve for Commission approval. Proposed Regional Reliability Standard BAL-002-WECC-3 reflects the retirement of Requirement R2 in the currently effective standard BAL-002-WECC-2a relating to the composition of the required Contingency Reserve.

NERC and WECC request that the Commission approve proposed Regional Reliability Standard BAL-002-WECC-3 (**Exhibit A**) as just, reasonable, not unduly discriminatory or preferential, and in the public interest. NERC and WECC also request approval of the associated

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[1] 16 U.S.C. § 824o (2018).

[2] 18 C.F.R. § 39.5 (2018).

[3] The Commission certified NERC as the electric reliability organization ("ERO") in accordance with Section 215 of the FPA on July 20, 2006. *N. Am. Elec. Reliability Corp.*, 116 FERC ¶ 61,062 (2006).

Unless otherwise indicated, capitalized terms used in this Petition shall have the meaning set forth in the *Glossary of Terms Used in NERC Reliability Standards* ("NERC Glossary"), https://www.nerc.com/pa/Stand/Glossary%20of%20Terms/Glossary_of_Terms.pdf, or Appendix 2 to the NERC Rules of Procedure, *Definitions Used in the NERC Rules of Procedure*, https://www.nerc.com/AboutNERC/Pages/Rules-of-Procedure.aspx.

implementation plan (**Exhibit B**) as detailed in this petition, and the associated Violation Risk Factors ("VRFs") and Violation Severity Levels ("VSLs") (**Exhibit A**), which remain unchanged from currently effective Regional Reliability Standard BAL-002-WECC-2a (*see* **Exhibit G**).

As required by Section 39.5(a)[4] of the Commission's regulations, this petition presents the technical basis and purpose of proposed Regional Reliability Standard BAL-002-WECC-3, a summary of the development proceedings (**Section III.D** and **Exhibit E**), and a demonstration that the proposed Reliability Standard meets the criteria identified by the Commission in Order No. 672[5] (**Exhibit D**). Proposed Regional Reliability Standard BAL-002-WECC-3 was approved by the WECC Board of Directors on June 19, 2019 and adopted by the NERC Board of Trustees on August 15, 2019.

I. SUMMARY

The purpose of currently effective Regional Reliability Standard BAL-002-WECC-2a – Contingency Reserve is to provide a Regional Reliability Standard that specifies the quantity and types of Contingency Reserve[6] required to ensure reliability under normal and abnormal

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[4] 18 C.F.R. § 39.5(a).

[5] The Commission specified in Order No. 672 certain general factors it would consider when assessing whether a particular Reliability Standard is just and reasonable. *See Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, 114 FERC ¶ 61,104, at PP 262, 321-37 ("Order No. 672"), *order on reh'g*, Order No. 672-A, 114 FERC ¶ 61,328 (2006).

[6] Contingency Reserve is defined in the NERC Glossary as:

> The provision of capacity that may be deployed by the Balancing Authority to respond to a Balancing Contingency Event and other contingency requirements (such as Energy Emergency Alerts as specified in the associated EOP standard). A Balancing Authority may include in its restoration of Contingency Reserve readiness to reduce Firm Demand and include it if, and only if, the Balancing Authority:
>
> • is experiencing a Reliability Coordinator declared Energy Emergency Alert level, and is utilizing its Contingency Reserve to mitigate an operating emergency in accordance with its emergency Operating Plan.
>
> • is utilizing its Contingency Reserve to mitigate an operating emergency in accordance with its emergency Operating Plan.

conditions. The standard consists of four requirements. Requirement R1 provides that each Balancing Authority and each Reserve Sharing Group shall maintain a minimum amount of Contingency Reserve, and that the Contingency Reserve shall consist of any combination of a list of specified reserve types. Requirement R2 provides that at least half of the minimum amount of Contingency Reserve shall be Operating Reserve – Spinning that meets certain reserve characteristics. Requirements R3 and R4 require entities to maintain a minimum amount of Operating Reserve.

Since the regional standard was originally developed, a continent-wide Reliability Standard has come into effect that renders Regional Reliability Standard BAL-002-WECC-2a Requirement R2 redundant and no longer needed for reliability in the Western Interconnection. Reliability Standard BAL-003-1.1 Requirement R1 provides that each Frequency Response Sharing Group or Balancing Authority shall achieve an annual Frequency Response Measure that is equal to or more negative than its Frequency Response Obligation to ensure that it is providing sufficient Frequency Response. This continent-wide requirement helps ensure that sufficient Frequency Response is provided to maintain Interconnection frequency in support of the reliable operation of the Interconnection. In light of this continent-wide Reliability Standard, and as supported by the results of a field test (*see* **Exhibit C**), WECC has determined that Requirement R2 of currently effective Regional Reliability Standard BAL-002-WECC-2a should be retired.

For these reasons, and as discussed more fully herein, NERC and WECC respectfully request the Commission approve proposed Regional Reliability Standard BAL-002-WECC-3 and the associated elements. The following petition presents the justification for approval and supporting documentation.

II. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to the following:[7]

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III. BACKGROUND

The following background information is provided below: (a) an explanation of the regulatory framework for NERC and Regional Reliability Standards; (b) an explanation of the WECC Regional Reliability Standards development process; and (c) a summary of the development process for the proposed Reliability Standard.

A. Regulatory Framework

By enacting the Energy Policy Act of 2005,[8] Congress entrusted the Commission with the duties of approving and enforcing rules to ensure the reliability of the Nation's Bulk-Power System, and with the duties of certifying an ERO that would be charged with developing and

[7] Persons to be included on the Commission's service list are identified by an asterisk. NERC respectfully requests a waiver of Rule 203 of the Commission's regulations, 18 C.F.R. § 385.203, to allow the inclusion of more than two persons on the service list in this proceeding.

[8] 16 U.S.C. § 824o.

enforcing mandatory Reliability Standards, subject to Commission approval. Section 215(b)(1)[9] of the FPA states that all users, owners, and operators of the Bulk-Power System in the United States will be subject to Commission-approved Reliability Standards. Section 215(d)(5)[10] of the FPA authorizes the Commission to order the ERO to submit a new or modified Reliability Standard. Section 39.5(a)[11] of the Commission's regulations requires the ERO to file with the Commission for its approval each Reliability Standard that the ERO proposes should become mandatory and enforceable in the United States, and each modification to a Reliability Standard that the ERO proposes should be made effective.

The Commission has the regulatory responsibility to approve Reliability Standards that protect the reliability of the Bulk-Power System and to ensure that such Reliability Standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest. Pursuant to Section 215(d)(2) of the FPA[12] and Section 39.5(c)[13] of the Commission's regulations, the Commission will give due weight to the technical expertise of the ERO with respect to the content of a Reliability Standard.

Similarly, the Commission approves regional differences proposed by Regional Entities, such as Regional Reliability Standards and Variances, if the regional difference is just, reasonable, not unduly discriminatory or preferential, and in the public interest.[14] In addition, Commission Order No. 672 requires further criteria for regional differences. A regional difference from a continent-wide Reliability Standard must either be: (1) more stringent than the continent-wide

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9 *Id*. § 824o(b)(1).

10 *Id*. § 824o(d)(5).

11 18 C.F.R. § 39.5(a).

12 16 U.S.C. § 824o(d)(2).

13 18 C.F.R. § 39.5(c)(1).

14 16 U.S.C. § 824o(d)(2) and 18 C.F.R. § 39.5(a).

Reliability Standard, including a regional difference that addresses matters that the continent-wide Reliability Standard does not; or (2) necessitated by a physical difference in the Bulk-Power System.[15] The Commission must give due weight to the technical expertise of a Regional Entity, like WECC, that is organized on an Interconnection-wide basis with respect to a regional difference to be applicable within that Interconnection.[16]

B. WECC Regional Reliability Standards Development Process

Proposed Regional Reliability Standard BAL-002-WECC-3 was developed in an open and fair manner and in accordance with the Commission-approved WECC Reliability Standards Development Procedures ("RSDP").[17] WECC's RSDP provides for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Regional Reliability Standards and thus addresses several of the Commission's criteria for approving Reliability Standards. The development process is open to any person or entity that is an interested stakeholder. WECC considers the comments of all stakeholders, and a vote of stakeholders and the WECC Board of Directors is required to approve a WECC Regional Reliability Standard or Variance. NERC posts each Regional Reliability Standard or Variance developed by a Regional Entity such as WECC for an additional comment period. The NERC Board of Trustees must adopt a proposed Regional Reliability Standard or Variance before it is submitted to the Commission for approval.

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15 Order No. 672 at P 291.

16 *Id*. at P 344.

17 The currently effective WECC RSDP was approved by the Commission on October 27, 2017 (s*ee N. Am. Elec. Reliability Corp.*, RR17-5-000 (Oct. 27, 2017) (delegated letter order)) and is available at https://www.nerc.com/FilingsOrders/us/Regional%20Delegation%20Agreements%20DL/WECC%20RSDP_20171027.pdf.

C. Procedural History

The Commission approved Regional Reliability Standard BAL-002-WECC-2 – Contingency Reserve in Order No. 789, issued on November 21, 2013.[18] In approving the regional standard, the Commission found that it contained a more stringent set of requirements than those provided in the continent-wide disturbance control standard in effect at that time, Reliability Standard BAL-002-1 – Disturbance Control Performance.[19] On January 24, 2017, the Commission approved NERC's petition for approval of BAL-002-WECC-2a, which added an interpretation to Requirement R2.[20]

Since the BAL-002-WECC-2 standard was originally approved, the Commission has approved several continent-wide BAL Reliability Standards. The Commission approved the current version of the continent-wide disturbance control standard, Reliability Standard BAL-002-3 – Disturbance Control Standard – Contingency Reserve for Recovery from a Balancing Contingency Event, in 2018.[21] Relevant to the proposal described in this petition, the Commission also approved Reliability Standard BAL-003-1 – Frequency Response and Frequency Bias Setting in 2014 in Order No. 794.[22] (The Commission subsequently approved errata version BAL-003-1.1 on November 13, 2015.[23]) In accordance with the approved implementation plan, Reliability Standard BAL-003-1.1 Requirement R1 became effective in the United States on April 1, 2016.

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[18] *Regional Reliability Standard BAL-002-WECC-2 – Contingency Reserve*, Order No. 789, 145 FERC ¶ 61,141 at P 1 (2013).

[19] *Id.* at P 26.

[20] *N. Am. Elec. Reliability Corp.*, Docket No. RD17-3-000 (Jan. 24, 2017) (delegated letter order).

[21] *N. Am. Elec. Reliability Corp.*, Docket No. RD18-7-000 (Sep. 25, 2018) (delegated letter order).

[22] *Frequency Response and Frequency Bias Setting Reliability Standard*, Order No. 794, 146 FERC ¶ 61,024 (2014).

[23] *N. Am. Elec. Reliability Corp.*, Docket No. RD15-6-000 (Nov. 13, 2015) (delegated letter order).

D. Development of Proposed Regional Reliability Standard BAL-002-WECC-3

As further described in **Exhibit E** hereto, WECC developed proposed Regional Reliability Standard BAL-002-WECC-3 in accordance with the WECC RSDP. On May 6, 2015, WECC received a Standard Authorization Request to retire Requirement R2 of the regional standard on the basis that the regional requirement would become redundant upon the April 1, 2016 effective date of continent-wide Reliability Standard BAL-003-1.1 Requirement R1. The WECC drafting team (**Exhibit F**) consisted of individuals with relevant expertise in the subject matter area.

From May 1, 2017 through April 30, 2018, WECC conducted a field test to evaluate whether the retirement of Requirement R2 would impact reliability in the Western Interconnection.[24] As discussed more fully in **Exhibit C** and summarized below, WECC determined that the retirement of Requirement R2 would have no adverse impact on reliability. The WECC standard drafting team drafted proposed Regional Reliability Standard BAL-002-WECC-3 to reflect the retirement of Requirement R2.

On April 11, 2019, the WECC ballot body approved the proposed Regional Reliability Standard with a 100 percent weighted affirmative vote at 89.5 percent quorum. The WECC Board of Directors approved the proposed Regional Reliability Standard on June 19, 2019. NERC posted the Regional Reliability Standard for a 45-day comment period from June 20, 2019 through August 5, 2019. Commenters agreed that WECC's process was open, inclusive, balanced, and transparent, and that it provided due process. The NERC Board of Trustees adopted proposed Regional Reliability Standard BAL-002-WECC-3 on August 15, 2019.

[24] As WECC did not have a separate procedure for the conduct of field tests, WECC conducted the field test in accordance with the processes specified in Section 6.2 of the then-effective NERC Standard Processes Manual, Appendix 3A to the NERC Rules of Procedure. As part of this field test, WECC (with NERC approval) provided each responsible entity with a waiver of compliance for Requirement R2.

IV. JUSTIFICATION FOR APPROVAL

This section provides a description of the purpose and applicability of proposed Reliability Standard BAL-002-WECC-3, a summary of the changes reflected in the proposed standard, and a discussion of the enforceability of the proposed standard. As discussed more fully below, the main change in the proposed standard is the retirement of Requirement R2. NERC and WECC propose to retire Requirement R2 because the requirement became redundant and no longer necessary for reliability upon the April 1, 2016 effective date of continent-wide Reliability Standard BAL-003-1.1 Requirement R1. Proposed Regional Reliability Standard BAL-002-WECC-3 continues to represent a more stringent set of requirements for entities in the Western Interconnection than those found in the continent-wide disturbance control standard, Reliability Standard BAL-002-3, and it continues to remain necessary for reliability within the Interconnection.

A. Purpose and Applicability

The stated purpose of proposed Regional Reliability Standard BAL-002-WECC-3, which remains unchanged from the currently effective version, is "to specify the quantity and types of Contingency Reserve required to ensure reliability under normal and abnormal conditions." The proposed Regional Reliability Standard applies to Balancing Authorities and Reserve Sharing Groups, which is unchanged from the currently effective version.

B. Summary of Revisions

In proposed Regional Reliability Standard BAL-002-WECC-3, the text of Requirement R2 is struck in its entirety and replaced with the word "Reserved." Corresponding revisions are made to the measures and VSL table, and the approved Interpretation to Requirement R2 is removed from Section E., Interpretations. Additionally, minor editorial and formatting changes are made throughout the document. These changes are shown in redline in **Exhibit A**.

C. Retirement of Requirement R2

As noted above, proposed Regional Reliability Standard BAL-002-WECC-3 reflects the retirement of Requirement R2 of the currently effective standard. Regional Reliability Standard BAL-002-WECC-2a Requirement R2 provides:

> R2. Each Balancing Authority and each Reserve Sharing Group shall maintain at least half of its minimum amount of Contingency Reserve identified in Requirement R1, as Operating Reserve – Spinning that meets both of the following reserve characteristics.
>
> 2.1 Reserve that is immediately and automatically responsive to frequency deviations through the action of a governor or other control system;
>
> 2.2 Reserve that is capable of fully responding within ten minutes.

A similar version of this requirement was present in the first version of the regional standard, WECC-BAL-STD-002-0, which was approved by the Commission in 2007.[25] The original intent of this requirement was to: (1) aid in frequency recovery (through governor action) for large generation loss events across the Western Interconnection; and (2) provide a part of the Contingency Reserves for generation trip events within the Balancing Authority or Reserve Sharing Group area. It was based on a historical, pre-Reliability Standards paradigm in which visibility, data exchange, and understanding of other Balancing Authority areas was minimal, frequency deviation was largely addressed by manual and analog intervention, and coordination between Balancing Authority areas was accomplished through mutual cooperation unsupported by mandatory standards.

Regional Reliability Standard WECC-BAL-STD-002-0 carried forward criteria from the Reliability Management System ("RMS") of WECC's predecessor, the Western Systems

[25] *N. Am. Elec. Reliability Corp*., 119 FERC ¶ 61,260 (2007).

Coordinating Council ("WSCC"). The RMS program was comprised of approximately 17 "criteria" that came from the NERC Operating Policies. When the initial set of NERC's Version 0 standards was developed, WSCC reviewed the standards to determine if the RMS criteria had been included. Where an RMS criterion was not addressed in a continent-wide standard, WSCC initiated development of a Regional Reliability Standard to transition the RMS criteria to a mandatory standard. The criteria and language from RMS had to be translated to a requirement in the Regional Reliability Standard without revision. In some instances, the RMS criteria were more stringent than the continent-wide requirements. This included the criteria carried forward in WECC-BAL-STD-002-0.

During the development of the RMS criteria in the late 1990s, WSCC did not conduct any simulations or assessments to determine or identify that the 50 percent level that was later specified in BAL-002-WECC Requirement R2 was what was needed for optimal system reliability. Rather, it was an agreed upon value established by a majority of the RMS drafters. While it could be assumed that a 100 percent level would be best, such a requirement would have come with unacceptably high costs. Conversely, a requirement to carry zero percent would have been unacceptable from a reliability perspective. In the end, most the participants gravitated to the number in the middle, 50 percent. There was no other technical analysis done.

In the intervening years, NERC developed a continent-wide Reliability Standard specifically to address frequency response. The stated purpose of Reliability Standard BAL-003-1.1 is "[t]o require sufficient Frequency Response from the Balancing Authority (BA) to maintain Interconnection Frequency within predefined bounds by arresting frequency deviations and supporting frequency until the frequency is restored to its scheduled value" and "[t]o provide consistent methods for measuring Frequency Response and determining the Frequency Bias

Setting." Requirement R1, which became mandatory and enforceable on entities in the United States on April 1, 2016, provides as follows:

> R1. Each Frequency Response Sharing Group (FRSG) or Balancing Authority that is not a member of a FRSG shall achieve an annual Frequency Response Measure (FRM) (as calculated and reported in accordance with Attachment A) that is equal to or more negative than its Frequency Response Obligation (FRO) to ensure that sufficient Frequency Response is provided by each FRSG or BA that is not a member of a FRSG to maintain Interconnection Frequency Response equal to or more negative than the Interconnection Frequency Response Obligation.

Reliability Standard BAL-003-1.1 addresses the same frequency response components covered in currently effective Regional Reliability Standard BAL-002-WECC-2a Requirement R2 but in a results-based manner. Requirement R2 of the regional standard requires the entity to maintain at least half of its Contingency Reserve as Operating Reserve – Spinning. By contrast, Reliability Standard BAL-003-1.1 requires the entity to achieve a calculated Frequency Response Measure and allows the entity to meet this measure through a variety of services or arrangements. The WECC standard drafting team determined that retention of the regional minimum Operating Reserve – Spinning requirement, alongside the continent-wide frequency response requirement, could lead to confusion and the needless procurement of additional reserves, thereby increasing costs without providing additional reliability benefits.

To evaluate the potential impact on reliability in the Western Interconnection should Requirement R2 be retired, WECC conducted a field test from May 1, 2017 through April 30, 2018, the results of which are summarized below and discussed in detail in **Exhibit C**. To provide more accurate results, WECC, with NERC approval, provided a compliance waiver for Requirement R2 to responsible entities. As part of the field test, responsible entities provided the following information: (1) for any reportable Disturbance Control Standard ("DCS") event, the

date and time of the event, the required amount of Contingency Reserves at the time of the event, the actual amount of Operating Reserves – Spinning at the time of the event, and the actual DCS performance; and (2) for all instances of a loss of resources 700 megawatts ("MW") or greater, whether it is a reportable DCS event or not, the date and time of the event, the name of the resource(s), and the total MW loss.

To evaluate the resulting impacts on reliability, the WECC standard drafting team applied two metrics. The first metric, DCS performance, monitored the performance of each Reserve Sharing Group/Balancing Authority for every reportable DCS event to see whether any were unable to meet the DCS recovery period for a DCS event. The second metric evaluated system performance for any loss of resources greater than 700 MW and for any adverse impact on frequency response.

As discussed more fully in **Exhibit C**, analysis of the data demonstrates that all 66 DCS events occurring during the field test period had a 100 percent pass rate, showing no degradation to DCS performance. Entities carried and deployed enough reserves for post disturbance Area Control Error recovery. For 63 of the total 66 events, entities carried more than the required 50 percent Operating Reserve – Spinning (on average, 166.38 percent). For the remaining three events, entities carried less than 50 percent Operating Reserve – Spinning (on average, 5.3 percent less).[26]

Western Interconnection frequency performance was assessed to further determine the impact of the field test on the Interconnection. Frequency performance data was collected for the 32 events having a verified resource loss of more than 700 MW. NERC's Essential Reliability Services Measure 4 describes a comprehensive set of frequency response measures capturing speed

[26] **Exhibit C**, Field Test Report at 6-8.

of frequency response and response withdrawal at all relevant time frames; these measures were used to analyze the collected data.[27] The WECC standard drafting team's analysis also included frequency response information from the 2018 NERC State of Reliability Report.[28] The standard drafting team's analysis indicated that frequency response performance did not degrade in the Western Interconnection during the field test period.[29]

Based on the results of the field test, the WECC standard drafting team determined that the retirement of Requirement R2 is unlikely to have an adverse impact on reliability in the Western Interconnection.[30] In light of these results, and in consideration of the redundancy with continent-wide Reliability Standard BAL-003-1.1, it is appropriate to retire Requirement R2 in the BAL-002-WECC regional standard.

D. Enforceability of Proposed Regional Reliability Standard BAL-002-WECC-3

Proposed Regional Reliability Standard BAL-002-WECC-3 includes VRFs and VSLs. The VSLs provide guidance on the way that NERC will enforce the requirements of the proposed Reliability Standard. The VRFs are one of several elements used to determine an appropriate sanction when the associated requirement is violated. The VRFs assess the impact to reliability of violating a specific requirement. The VRFs and VSLs for the three remaining requirements in proposed Regional Reliability Standard BAL-002-WECC-3 are unchanged from the currently effective version of the standard.

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[27] **Exhibit C**, Field Test Report at 8. For additional description of these measures, *see* NERC, *Essential Reliability Services Task Force Measures Framework Report* (Nov. 2015), https://www.nerc.com/comm/Other/essntlrlbltysrvcstskfrcDL/ERSTF%20Framework%20Report%20-%20Final.pdf.

[28] *See* **Exhibit C**, Field Test Report at 9-10 (citing 2018 NERC State of Reliability Report at Table 2.1).

[29] **Exhibit C**, Field Test Report at 8-10.

[30] *Id.* at 2.

The proposed Regional Reliability Standard also includes measures that support each requirement by clearly identifying what is required and how the requirement will be enforced. These measures help ensure that the requirements will be enforced in a clear, consistent, and non-preferential manner and without prejudice to any party.[31] The measures for the three remaining requirements in proposed Regional Reliability Standard BAL-002-WECC-3 are unchanged from the currently effective version of the standard.

V. EFFECTIVE DATE

NERC respectfully requests that the Commission approve the proposed implementation plan, provided in **Exhibit B** hereto. Because the only substantive change in the proposed standard is the retirement of Requirement R2, the proposed implementation plan provides that proposed Regional Reliability Standard BAL-002-WECC-3 would become effective immediately upon regulatory approval.

[31] Order No. 672 at P 327 ("There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner.").

VI. CONCLUSION

For the reasons set forth above, NERC and WECC respectfully request that the Commission approve:

- proposed Regional Reliability Standard BAL-002-WECC-3 and the other associated elements, including the VRFs and VSLs, included in **Exhibit A**;
- the proposed implementation plan, included in **Exhibit B**; and
- the retirement of currently effective Regional Reliability Standard BAL-002-WECC-2a.

Respectfully submitted,

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Date: September 6, 2019

Exhibit A

Proposed Regional Reliability Standard
BAL-002-WECC-3 – Contingency Reserve

A. Introduction

1. Title: **Contingency Reserve**

2. Number: BAL-002-WECC-3

3. Purpose: To specify the quantity and types of Contingency Reserve required to ensure reliability under normal and abnormal conditions.

4. Applicability:

4.1. Functional Entities:

4.1.1 Balancing Authority

4.1.1.1 The Balancing Authority is the responsible entity unless the Balancing Authority is a member of a Reserve Sharing Group, in which case, the Reserve Sharing Group becomes the responsible entity.

4.1.2 Reserve Sharing Group

4.1.2.1 The Reserve Sharing Group when comprised of a Source Balancing Authority becomes the source Reserve Sharing Group.

4.1.2.2 The Reserve Sharing Group when comprised of a Sink Balancing Authority becomes the sink Reserve Sharing Group.

5. Effective Date: Immediately upon receipt of regulatory approval.

B. Requirements and Measures

R1. Each Balancing Authority and each Reserve Sharing Group shall maintain a minimum amount of Contingency Reserve, except within the first sixty minutes following an event requiring the activation of Contingency Reserve, that is*: [Violation Risk Factor: High] [Time Horizon: Real-time operations]*

1.1. The greater of either:

- The amount of Contingency Reserve equal to the loss of the most severe single contingency;
- The amount of Contingency Reserve equal to the sum of three percent of hourly integrated Load plus three percent of hourly integrated generation.

1.2. Composed of any combination of the reserve types specified below:

- Operating Reserve—Spinning
- Operating Reserve—Supplemental
- Interchange Transactions designated by the Source Balancing Authority as Operating Reserve—Supplemental

- Reserve held by other entities by agreement that is deliverable on Firm Transmission Service
- A resource, other than generation or load, that can provide energy or reduce energy consumption
- Load, including demand response resources, Demand-Side Management resources, Direct Control Load Management, Interruptible Load or Interruptible Demand, or any other Load made available for curtailment by the Balancing Authority or the Reserve Sharing Group via contract or agreement.
- All other load, not identified above, once the Reliability Coordinator has declared an energy emergency alert signifying that firm load interruption is imminent or in progress.

1.3. Based on real-time hourly load and generating energy values averaged over each Clock Hour (excluding Qualifying Facilities covered in 18 C.F.R.§ 292.101, as addressed in FERC Order 464).

1.4. An amount of capacity from a resource that is deployable within ten minutes.

M1. Each Balancing Authority and each Reserve Sharing Group will have documentation demonstrating its Contingency Reserve was maintained, except within the first sixty minutes following an event requiring the activation of Contingency Reserve.

Part 1.1

Each Balancing Authority and each Reserve Sharing Group will have dated documentation that demonstrates its Contingency Reserve was maintained in accordance with the amounts identified in Requirement R1, Part 1.1, except within the first sixty minutes following an event requiring the activation of Contingency Reserve.

Attachment A is a practical illustration showing how the generation amount may be calculated under Requirement R1.

- Where Dynamic Schedules are used as part of the generation amount upon which Contingency Reserve is predicated, additional evidence of compliance with Requirement R1, Part 1.1 may include, but is not limited to, documentation showing a reciprocal acknowledgement as to which entity is carrying the reserves. This transfer may be all or some portion of the physical generator and is not limited to the entire physical capability of the generator.
- Where Pseudo-Ties are used as part of the generation amount upon which Contingency Reserve is predicated, additional evidence of compliance with Requirement R1, Part 1.1, may include, but is not limited to, documentation accounting for the transfers included in the Pseudo-Ties.

Part 1.2

Each Balancing Authority and each Reserve Sharing Group will have dated documentation that demonstrates compliance with Requirement R1, Part 1.2.

Evidence may include, but is not limited to, documentation that reserves were comprised of the types listed in Requirement R1, Part 1.2 for purposes of meeting the Contingency Reserve obligation of Requirement R1. Additionally, for purposes of the last bullet of Requirement R1, Part 1.2, evidence of compliance may include, but is not limited to, documentation that the reliability coordinator had issued an energy emergency alert, indicating that firm Load interruption was imminent or was in progress.

Part 1.3

Each Balancing Authority and each Reserve Sharing Group will have dated documentation that demonstrates compliance with Requirement R1, Part 1.3. Evidence of compliance with Requirement R1, Part 1.3 may include, but is not limited to, documentation that Contingency Reserve amounts are based upon load and generating data averaged over each Clock Hour and excludes Qualifying Facilities covered in 18 C.F.R.§ 292.101, as addressed in FERC Order 464.

Part 1.4

Evidence of compliance with Requirement R1, Part 1.4 may include, but is not limited to, documentation that the reserves maintained to comply with Requirement R1, Part 1.4 are fully deployable within ten minutes.

R2. Reserved.

M2. Reserved.

R3. Each Sink Balancing Authority and each sink Reserve Sharing Group shall maintain an amount of Operating Reserve, in addition to the minimum Contingency Reserve in Requirement R1, equal to the amount of Operating Reserve–Supplemental for any Interchange Transaction designated as part of the Source Balancing Authority's Operating Reserve–Supplemental or source Reserve Sharing Group's Operating Reserve–Supplemental, except within the first sixty minutes following an event requiring the activation of Contingency Reserve. [*Violation Risk Factor: High] [Time Horizon: Real-time operations]*

M3. Each Sink Balancing Authority and each sink Reserve Sharing Group will have dated documentation demonstrating it maintained an amount of Operating Reserve, in addition to the Contingency Reserve identified in Requirement R1, equal to the amount of Operating Reserve–Supplemental for any Interchange Transaction designated as part of the Source Balancing Authority's Operating Reserve–Supplemental or source Reserve Sharing Group's Operating Reserve–Supplemental, for the entire period of the transaction, except within the first sixty minutes following an event requiring the activation of Contingency Reserves, in accordance with Requirement 3.

R4. Each Source Balancing Authority and each source Reserve Sharing Group shall maintain an amount of Operating Reserve, in addition to the minimum Contingency Reserve amounts identified in Requirement R1, equal to the amount and type of

Operating Reserves for any Operating Reserve transactions for which it is the Source Balancing Authority or source Reserve Sharing Group. *[Violation Risk Factor: High] [Time Horizon: Real-time operations]*

M4. Each Source Balancing Authority and each source Reserve Sharing Group will have dated documentation that demonstrates it maintained an amount of additional Operating Reserves identified in Requirement R1, greater than or equal to the amount and type of that identified in Requirement 4, for the entire period of the transaction.

C. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority:

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2. Compliance Monitoring and Assessment Processes:

Compliance Audit

Self-Certification

Spot-Checking

Compliance Investigation

Self-Reporting

Complaint

1.3. Evidence Retention:

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full-time period since the last audit.

Each Balancing Authority and each Reserve Sharing Group shall keep evidence for Requirement R1 through R4 for three years plus calendar current.

1.4. Additional Compliance Information:

1.4.1 This Standard shall apply to each Balancing Authority and each Reserve Sharing Group that has registered with WECC as provided in Part 1.4.2 of Section C.

Each Balancing Authority identified in the registration with WECC as provided in Part 1.4.2 of Section C shall be responsible for compliance with this Standard through its participation in the Reserve Sharing Group and not on an individual basis.

1.4.2 A Reserve Sharing Group may register as the Responsible Entity for purposes of compliance with this Standard by providing written notice to the WECC: 1) indicating that the Reserve Sharing Group is registering as the Responsible Entity for purposes of compliance with this Standard, 2) identifying each Balancing Authority that is a member of the Reserve Sharing Group, and 3) identifying the person or organization that will serve as agent on behalf of the Reserve Sharing Group for purposes of communications and data submissions related to or required by this Standard.

1.4.3 If an agent properly designated in accordance with Part 1.4.2 of Section C identifies individual Balancing Authorities within the Reserve Sharing Group responsible for noncompliance at the time of data submission, together with the percentage of responsibility attributable to each identified Balancing Authority, then, except as may otherwise be finally determined through a duly conducted review or appeal of the initial finding of noncompliance: 1) any penalties assessed for noncompliance by the Reserve Sharing Group shall be allocated to the individual Balancing Authorities identified in the applicable data submission in proportion to their respective percentages of responsibility as specified in the data submission, 2) each Balancing Authority shall be solely responsible for all penalties allocated to it according to its percentage of responsibility as provided in subsection 1) of this Part 1.4.3 of Section C, and 3) neither the Reserve Sharing Group nor any member of the Reserve Sharing Group shall be responsible for any portion of a penalty assessed against another member of the Reserve Sharing Group in accordance with subsection 1) of this Part 1.4.3 of Section C (even if the member of Reserve Sharing Group against which the penalty is assessed is not subject to or otherwise fails to pay its allocated share of the penalty).

1.4.4 If an agent properly designated in accordance with Part 1.4.2 of Section C fails to identify individual Balancing Authorities within the Reserve Sharing Group responsible for noncompliance at the time of data submission or fails to specify percentages of responsibility attributable to each identified Balancing Authority, any penalties for noncompliance shall be assessed against the agent on behalf of the Reserve Sharing Group, and it shall be

the responsibility of the members of the Reserve Sharing Group to allocate responsibility for such noncompliance.

1.4.5 Any Balancing Authority that is a member of a Reserve Sharing Group that has failed to register as provided in Part 1.4.2 of Section C shall be subject to this Standard on an individual basis.

Violation Severity Levels

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve is less than 100% but greater than or equal to 90% of the required Contingency Reserve amount, with the characteristics specified in Requirement R1.	The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve is less than 90% but greater than or equal to 80% of the required Contingency Reserve amount, with the characteristics specified in Requirement R1.	The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve is less than 80% but greater than or equal to 70% of the required Contingency Reserve amount, with the characteristics specified in Requirement R1.	The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve is less than 70% of the required Contingency Reserve amount, with the characteristics specified in Requirement R1.
R2.	Reserved.			
R3.	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which Contingency Reserve is less than 100% but greater than or equal to 90% of the required Operating Reserve amount specified in Requirement R3.	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which Contingency Reserve is less than 90% but greater than or equal to 80% of the required Operating Reserve amount specified in Requirement R3.	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which Contingency Reserve is less than 80% but greater than or equal to 70% of the required Operating Reserve amount specified in Requirement R3.	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which Contingency Reserve is less than 70% of the required Operating Reserve amount specified in Requirement R3.
R4.	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which

	Contingency Reserve Operating Reserve is less than 100% but greater than or equal to 90% of the required Operating Reserve amount specified in Requirement R4.	Contingency Reserve Operating Reserve is less than 90% but greater than or equal to 80% of the required Operating Reserve amount specified in Requirement R4.	Contingency Reserve Operating Reserve is less than 80% but greater than or equal to 70% of the required Operating Reserve amount specified in Requirement R4.	Contingency Reserve Operating Reserve is less than 70% of the required Operating Reserve amount specified in Requirement R4.

D. Regional Variances

None.

E. Interpretations

None.

F. Associated Documents

None.

Version History

Version	Date	Action	Change Tracking
1	October 29, 2008	Adopted by NERC Board of Trustees	
1	October 21, 2010	Order issued remanding BAL-002-WECC-1	
2	November 7, 2012	Adopted by NERC Board of Trustees	
2	November 21, 2013	FERC Order issued approving BAL-002-WECC-2. (Order becomes effective 1/28/14.)	
2a	December 1, 2015	Approved by WECC Board of Directors	Clarified resources available for use in Requirement R2
2a	January 24, 2017	FERC approved	The Interpretation provides clarification regarding the types of resources that may be used to satisfy Contingency Reserve.
3	TBD	TBD	The Interpretation was removed. Requirement R2 was deleted. Template and formatting were updated. Syntax and verb tense in Guideline section were corrected.

Standard Attachments

Attachment A

Attachment A is illustrative only; it is not a requirement. Requirement R1 calls for an amount of Contingency Reserve to be maintained, predicated on an amount of generation and load required in Requirement R1, Part 1.1., specifically:

"**1.1** The greater of either:

- The amount of Contingency Reserve equal to the loss of the most severe single contingency;
- The amount of Contingency Reserve equal to the sum of three percent of hourly integrated Load plus three percent of hourly integrated generation."

Attachment A illustrates one possible way to account for and calculate the amount of generation upon which the Contingency Reserve amount is predicated.

Below is a practical illustration showing how the generation amount may be calculated under Requirement R1 for Balancing Authorities (BA) and Reserve Sharing Groups (RSG).

BA1 / RSG 1	**Generation**	**Part of Generator**
Generator 1	300 MWs online	Yes
Generator 2	200 MWs online	Yes
Generator 3 (Pseudo-Tied out to BA2)	100 MWs online	No
Generator 4 QF (has backup contract)	10 MWs online	No
Generator 5 QF in EMS	10 MWs online	Yes
Generator 6	0 MWs online	Yes
Dynamic Schedule to BA2 from BA1[1]	(50 MWs)	
Generation	620 MWs	(The sum of gen 1–6)
BA generation (EMS)	510 MWs	(The sum of gen 1, 2, and 5)
Generation to use Under BAL-002-WECC-1	460 MWs**	(The sum of gen 1, 2, and 5 minus Dynamic Schedule)

** Assumes BA1 and BA2 agree on Dynamic Schedule treatment. If no agreement, BA1 would maintain reserves based on 510 MWs Generation.

BA2 / RSG2	**Generation**	**Part of Generator**
Generator 11	100 MWs	Yes
Generator 12	100 MWs	Yes
Generator 3 (Pseudo-Tied in from BA1)	100 MWs	Yes
Dynamic Schedule from BA1 to BA2	50 MWs	Yes
Generation	300 MWs	(The sum of gen 11, 12 and 3.)
BA generation (EMS)	300 MWs	(The sum of gen 11, 12 and 3)

[1] Note: This Dynamic Schedule is not the same as the Generator 3 Pseudo-Tie.

Generation to use Under BAL-002-WECC-1	350 MWs**	(The sum of gen 11, 12 and 3 plus Dynamic Schedule)

** Assumes BA1 and BA2 agree on Dynamic Schedule treatment. If no agreement, BA1 would have to maintain reserves based on 510MWs Generation and BA2 would determine its generation to be 300 MWs.

Guideline and Technical Basis

A Guidance Document addressing implementation of this standard was filed with Version 2.

A. Introduction

1. Title: **Contingency Reserve**

2. Number: BAL-002-WECC-~~2a~~3

3. Purpose: To specify the quantity and types of Contingency Reserve required to ensure reliability under normal and abnormal conditions.

4. Applicability:

4.1. Functional Entities:

4.1.1 Balancing Authority

~~4.1.1.2~~4.1.1.1 ~~4.1.1.~~ The Balancing Authority is the responsible entity unless the Balancing Authority is a member of a Reserve Sharing Group, in which case, the Reserve Sharing Group becomes the responsible entity.

4.1.2 Reserve Sharing Group

~~4.1.2.2~~4.1.2.1 ~~4.2.1.~~ The Reserve Sharing Group when comprised of a Source Balancing Authority becomes the source Reserve Sharing Group.

~~4.1.2.4~~4.1.2.2 ~~4.2.2.~~ The Reserve Sharing Group when comprised of a Sink Balancing Authority becomes the sink Reserve Sharing Group.

~~6.~~5. ~~5.~~ Effective Date: ~~On the first day~~ Immediately upon receipt of ~~the third quarter following applicable~~ regulatory approval.

B. Requirements and Measures

~~R2.~~R1. **~~R1.~~** Each Balancing Authority and each Reserve Sharing Group shall maintain a minimum amount of Contingency Reserve, except within the first sixty minutes

following an event requiring the activation of Contingency Reserve, that is*: [Violation Risk Factor: High] [Time Horizon: Real-time operations]*

~~2.2.~~1.1. ~~1.1~~ The greater of either:

- The amount of Contingency Reserve equal to the loss of the most severe single contingency;
- The amount of Contingency Reserve equal to the sum of three percent of hourly integrated Load plus three percent of hourly integrated generation.

~~2.4.~~1.2. ~~1.2~~ ~~Comprised~~Composed of any combination of the reserve types specified below:

- Operating Reserve~~-~~ Spinning
- Operating Reserve~~-~~ Supplemental
- Interchange Transactions designated by the Source Balancing Authority as Operating Reserve~~-~~ Supplemental
- Reserve held by other entities by agreement that is deliverable on Firm Transmission Service
- A resource, other than generation or load, that can provide energy or reduce energy consumption
- Load, including demand response resources, Demand-Side Management resources, Direct Control Load Management, Interruptible Load or Interruptible Demand, or any other Load made available for curtailment by the Balancing Authority or the Reserve Sharing Group via contract or agreement.
- All other load, not identified above, once the Reliability Coordinator has declared an energy emergency alert signifying that firm load interruption is imminent or in progress.

~~2.6.~~1.3. ~~1.3~~ Based on real-time hourly load and generating energy values averaged over each Clock Hour (excluding Qualifying Facilities covered in 18 C.F.R.§ 292.101, as addressed in FERC Order 464).

~~2.8.~~1.4. ~~1.4~~ An amount of capacity from a resource that is deployable within ten minutes.

~~M2.~~M1. ~~M1.~~ Each Balancing Authority and each Reserve Sharing Group will have documentation demonstrating its Contingency Reserve was maintained, except within the first sixty minutes following an event requiring the activation of Contingency Reserve.

Part 1.1

Each Balancing Authority and each Reserve Sharing Group will have dated documentation that demonstrates its Contingency Reserve was maintained in accordance with the amounts identified in Requirement R1, Part 1.1, except within the first sixty minutes following an event requiring the activation of Contingency Reserve.

Attachment A is a practical illustration showing how the generation amount may be calculated under Requirement R1.

- Where Dynamic Schedules are used as part of the generation amount upon which Contingency Reserve is predicated, additional evidence of compliance with Requirement R1, Part 1.1 may include, but is not limited to, documentation showing a reciprocal acknowledgement as to which entity is carrying the reserves. This transfer may be all or some portion of the physical generator and is not limited to the entire physical capability of the generator.
- Where Pseudo-Ties are used as part of the generation amount upon which Contingency Reserve is predicated, additional evidence of compliance with Requirement R1, Part 1.1, may include, but is not limited to, documentation accounting for the transfers included in the Pseudo-Ties.

Part 1.2

Each Balancing Authority and each Reserve Sharing Group will have dated documentation that demonstrates compliance with Requirement R1, Part 1.2. Evidence may include, but is not limited to, documentation that reserves were comprised of the types listed in Requirement R1, Part 1.2 for purposes of meeting the Contingency Reserve obligation of Requirement R1. Additionally, for purposes of the last bullet of Requirement R1, Part 1.2, evidence of compliance may include, but is not limited to, documentation that the reliability coordinator had issued an energy emergency alert, indicating that firm Load interruption was imminent or was in progress.

Part 1.3

Each Balancing Authority and each Reserve Sharing Group will have dated documentation that demonstrates compliance with Requirement R1, Part 1.3. Evidence of compliance with Requirement R1, Part 1.3 may include, but is not limited

to, documentation that Contingency Reserve amounts are based upon load and generating data averaged over each Clock Hour and excludes Qualifying Facilities covered in 18 C.F.R.§ 292.101, as addressed in FERC Order 464.

Part 1.4

Evidence of compliance with Requirement R1, Part 1.4 may include, but is not limited to, documentation that the reserves maintained to comply with Requirement R1, Part 1.4 are fully deployable within ten minutes.

~~**R2.** Each Balancing Authority and each Reserve Sharing Group shall maintain at least half of its minimum amount of Contingency Reserve identified in Requirement R1, as Operating Reserve – Spinning that meets both of the following reserve characteristics. *[Violation Risk Factor: High] [Time Horizon: Real-time operations]*~~

~~**2.1** Reserve that is immediately and automatically responsive to frequency deviations through the action of a governor or other control system;~~

~~**2.2** Reserve that is capable of fully responding within ten minutes.~~

~~**M2.** Each Balancing Authority and each Reserve Sharing Group will have dated documentation that demonstrates it maintained at least half of the Contingency Reserve identified in Requirement R1 as Operating Reserve – Spinning, averaged over each Clock Hour, that met both of the reserve characteristics identified in Requirement R2, Part 2.1 and Requirement R2, Part 2.2.~~

R2. ~~**R3.**~~ Reserved.

M2. Reserved.

R3. Each Sink Balancing Authority and each sink Reserve Sharing Group shall maintain an amount of Operating Reserve, in addition to the minimum Contingency Reserve in Requirement R1, equal to the amount of Operating Reserve–Supplemental for any Interchange Transaction designated as part of the Source Balancing Authority's Operating Reserve–Supplemental or source Reserve Sharing Group's Operating Reserve–Supplemental, except within the first sixty minutes following an event requiring the activation of Contingency Reserve. [*Violation Risk Factor: High] [Time Horizon: Real-time operations]*

M3. ~~**M3.**~~ Each Sink Balancing Authority and each sink Reserve Sharing Group will have dated documentation demonstrating it maintained an amount of Operating Reserve, in addition to the Contingency Reserve identified in Requirement R1, equal to the amount of Operating Reserve–Supplemental for any Interchange Transaction

designated as part of the Source Balancing Authority's Operating Reserve–Supplemental or source Reserve Sharing Group's Operating Reserve–Supplemental, for the entire period of the transaction, except within the first sixty minutes following an event requiring the activation of Contingency Reserves, in accordance with Requirement 3.

R4. ~~**R4.**~~ Each Source Balancing Authority and each source Reserve Sharing Group shall maintain an amount of Operating Reserve, in addition to the minimum Contingency Reserve amounts identified in Requirement R1, equal to the amount and type of Operating Reserves for any Operating Reserve transactions for which it is the Source Balancing Authority or source Reserve Sharing Group. *[Violation Risk Factor: High] [Time Horizon: Real-time operations]*

M4. ~~**M4.**~~ Each Source Balancing Authority and each source Reserve Sharing Group will have dated documentation that demonstrates it maintained an amount of additional Operating Reserves identified in Requirement R1, greater than or equal to the amount and type of that identified in Requirement 4, for the entire period of the transaction.

C. Compliance

1. ~~**1.**~~ **Compliance Monitoring Process**

1.1. Compliance Enforcement Authority:

For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

For responsible entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2. ~~**1.2**~~ **Compliance Monitoring and Assessment Processes:**

Compliance Audit

Self-Certification

Spot-Checking

Compliance Investigation

Self-Reporting

Complaint

1.3. ~~1.3~~ Evidence Retention:

The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full-time period since the last audit.

Each Balancing Authority and each Reserve Sharing Group shall keep evidence for Requirement R1 through R4 for three years plus calendar current.

1.4. ~~1.4.~~ Additional Compliance Information:

1.4.1 ~~1.4.1.~~ This Standard shall apply to each Balancing Authority and each Reserve Sharing Group that has registered with WECC as provided in Part 1.4.2 of Section C.

Each Balancing Authority identified in the registration with WECC as provided in Part 1.4.2 of Section C shall be responsible for compliance with this Standard through its participation in the Reserve Sharing Group and not on an individual basis.

1.4.2 ~~1.4.2.~~ A Reserve Sharing Group may register as the Responsible Entity for purposes of compliance with this Standard by providing written notice to the WECC: 1) indicating that the Reserve Sharing Group is registering as the Responsible Entity for purposes of compliance with this Standard, 2) identifying each Balancing Authority that is a member of the Reserve Sharing Group, and 3) identifying the person or organization that will serve as agent on behalf of the Reserve Sharing Group for purposes of communications and data submissions related to or required by this Standard.

1.4.3 ~~**1.4.3.**~~ If an agent properly designated in accordance with Part 1.4.2 of Section C identifies individual Balancing Authorities within the Reserve Sharing Group responsible for noncompliance at the time of data submission, together with the percentage of responsibility attributable to each identified Balancing Authority, then, except as may otherwise be finally determined through a duly conducted review or appeal of the initial finding of noncompliance: 1) any penalties assessed for noncompliance by the Reserve Sharing Group shall be allocated to the individual Balancing Authorities identified in the applicable data submission in proportion to their respective percentages of responsibility as specified in the data submission, 2) each Balancing Authority shall be solely responsible for all penalties allocated to it according to its percentage of responsibility as provided in subsection 1) of this Part 1.4.3 of Section C, and 3) neither the Reserve Sharing Group nor any member of the Reserve Sharing Group shall be responsible for any portion of a penalty assessed against another member of the Reserve Sharing Group in accordance with subsection 1) of this Part 1.4.3 of Section C (even if the member of Reserve Sharing Group against which the penalty is assessed is not subject to or otherwise fails to pay its allocated share of the penalty).

1.4.4 ~~**1.4.4.**~~ If an agent properly designated in accordance with Part 1.4.2 of Section C fails to identify individual Balancing Authorities within the Reserve Sharing Group responsible for noncompliance at the time of data submission or fails to specify percentages of responsibility attributable to each identified Balancing Authority, any penalties for noncompliance shall be assessed against the agent on behalf of the Reserve Sharing Group, and it shall be the responsibility of the members of the Reserve Sharing Group to allocate responsibility for such noncompliance.

1.4.5 ~~**1.4.5.**~~ Any Balancing Authority that is a member of a Reserve Sharing Group that has failed to register as provided in Part 1.4.2 of Section C shall be subject to this Standard on an individual basis.

~~**Table of Compliance Elements**~~

Violation Severity Levels

R #	2. ~~Time Horizon~~	3. ~~VRF~~	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	4. ~~Real-time Operations~~	5. ~~High~~	The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve is less than 100% but greater than or equal to 90% of the required Contingency Reserve amount, with the characteristics specified in	The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve is less than 90% but greater than or equal to 80% of the required Contingency Reserve amount, with the characteristics specified in	The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve is less than 80% but greater than or equal to 70% of the required Contingency Reserve amount, with the characteristics specified in	The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve is less than 70% of the required Contingency Reserve amount, with the characteristics specified in Requirement R1.

			Requirement R1.	Requirement R1.	Requirement R1.			
R2.			~~Real-time Operations~~ Reserved.	~~High~~	~~The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve Operating Reserve – Spinning is less than 100% but greater than or equal to 90% of the required Operating Reserve – Spinning amount specified in Requirement R2, and both~~	~~The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve Operating Reserve – Spinning is less than 90% but greater than or equal to 80% of the required Operating Reserve – Spinning amount specified in Requirement R2, and both~~	~~The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve Operating Reserve – Spinning is less than 80% but greater than or equal to 70% of the required Operating Reserve – Spinning amount specified in Requirement R2, and both characteristics~~	**6.**	~~The Balancing Authority or the Reserve Sharing Group that incurs one Clock Hour, during a calendar month, in which Contingency Reserve Operating Reserve – Spinning is less than 70% of the required Operating Reserve – Spinning amount specified in Requirement R2, and both characteristics were met.~~

					~~characteristics were met.~~	~~characteristics were met.~~	~~were met.~~	
R3.	~~Real-time Operations~~	**7.** ~~High~~	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which Contingency Reserve is less than 100% but greater than or equal to 90% of the required Operating Reserve amount specified in Requirement R3.	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which Contingency Reserve is less than 90% but greater than or equal to 80% of the required Operating Reserve amount specified in Requirement R3.	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which Contingency Reserve is less than 80% but greater than or equal to 70% of the required Operating Reserve amount specified in Requirement R3.	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which Contingency Reserve is less than 70% of the required Operating Reserve amount specified in Requirement R3.		
R4.	~~Real-time Operations~~	**8.** ~~High~~	The Balancing Authority or the Reserve Sharing	The Balancing Authority or the Reserve Sharing	The Balancing Authority or the Reserve Sharing	The Balancing Authority or the Reserve Sharing Group that incurs one hour, during a calendar month, in which Contingency Reserve Operating Reserve is less		

			Group that incurs one hour, during a calendar month, in which Contingency Reserve Operating Reserve is less than 100% but greater than or equal to 90% of the required Operating Reserve amount specified in Requirement R4.	Group that incurs one hour, during a calendar month, in which Contingency Reserve Operating Reserve is less than 90% but greater than or equal to 80% of the required Operating Reserve amount specified in Requirement R4.	Group that incurs one hour, during a calendar month, in which Contingency Reserve Operating Reserve is less than 80% but greater than or equal to 70% of the required Operating Reserve amount specified in Requirement R4.	than 70% of the required Operating Reserve amount specified in Requirement R4.

D. ~~D.~~ Regional Variances

None.

E. E. Interpretations

Interpretation Requested

Arizona Public Service (APS) sought clarification that for purposes of BAL-002-WECC-2, Requirement R2, APS and other Balancing Authorities and/or Reserve Sharing Groups can include "technologies, such as batteries, both contemplated and not yet contemplated…as potential resources [to meet the Operating Reserve – Spinning requirement of BAL-002-WECC-2, Requirement R2] – so long as the…resource can meet the response characteristics described in the standard."

A standards interpretation team comprised of members of the original BAL drafting team concluded that APS' understanding was correct.

"[N]on-traditional resources, including electric storage facilities, may qualify as "Operating Reserve – Spinning" so long as they meet the technical and performance requirements in Requirement R2 (i.e., that the resources must be immediately and automatically responsive to frequency deviations through the action of a control system and capable of fully responding within ten minutes).[1]

In Order 789, Paragraph 48, the Federal Energy Regulatory Commission (Commission) responded to the California Independent System Operator that:

Commission Determination

[1] FERC Order 789, P47. July 18, 2013.

See also FERC Order 740, Section E, Demand-Side Management as a Resource, at P 50:
"The Commission clarified that the purpose of this directive was to ensure comparable treatment of demand-side management with conventional generation or any other technology and to allow demand-side management to be considered as a resource for contingency reserves on this basis without requiring the use of any particular contingency reserve option."

~~48. The Commission determines that non-traditional resources, including electric storage facilities, may qualify as "Operating Reserve – Spinning" provided those resources satisfy the technical and performance requirements in Requirement R2. Our determination is supported by the standard drafting team's response to a comment during the standard drafting process where the standard drafting team stated that "technologies, such as batteries, both contemplated and not yet contemplated are included in the standard as potential resources – so long as the undefined resource can meet the response characteristics described in the standard …The language does not preclude any specific technology; rather, the language delineates how that technology must [] respond."[2] We also note that non-traditional resources could contribute to contingency reserve under the regional Reliability Standard if they are resources, "other than generation or load, that can provide energy or reduce energy consumption."~~

~~[2] "Fn 44 Petition, Exhibit C at 20."~~

~~F.~~ None.

F. Associated Documents

None.

Version History

Version	Date	Action	Change Tracking
1	October 29, 2008	Adopted by NERC Board of Trustees	
1	October 21, 2010	Order issued remanding BAL-002-WECC-1	
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2a	December 1, 2015	Approved by WECC Board of Directors	Clarified resources available for use in Requirement R2
2a	January 24, 2017	FERC approved	The Interpretation provides clarification regarding the types of resources that may be used to satisfy Contingency Reserve.
3	TBD	TBD	The Interpretation was removed. Requirement R2 was deleted. Template and formatting were updated. Syntax and verb tense in Guideline section were corrected.

Standard Attachments

Attachment A

Attachment A is illustrative only; it is not a requirement. Requirement R1 calls for an amount of Contingency Reserve to be maintained, predicated on an amount of generation and load required in Requirement R1, Part 1.1., specifically:

"**1.1** The greater of either:

- The amount of Contingency Reserve equal to the loss of the most severe single contingency;
- The amount of Contingency Reserve equal to the sum of three percent of hourly integrated Load plus three percent of hourly integrated generation."

Attachment A illustrates one possible way to account for and calculate the amount of generation upon which the Contingency Reserve amount is predicated.

Below is a practical illustration showing how the generation amount may be calculated under Requirement R1 for Balancing Authorities (BA) and Reserve Sharing Groups (RSG).

BA1 / RSG 1	**Generation**	**Part of Generator**
Generator 1	300 MWs online	Yes
Generator 2	200 MWs online	Yes
Generator 3 (Pseudo-Tied out to BA2)	100 MWs online	No
Generator 4 QF (has backup contract)	10 MWs online	No
Generator 5 QF in EMS	10 MWs online	Yes
Generator 6	0 MWs online	Yes
Dynamic Schedule to BA2 from BA1[3]	(50 MWs)	
Generation	620 MWs	(The sum of gen 1—6)
BA generation (EMS)	510 MWs	(The sum of gen 1, 2, and 5)
Generation to use Under BAL-002-WECC-1	460 MWs**	(The sum of gen 1, 2, and 5 minus Dynamic Schedule)

** Assumes BA1 and BA2 agree on Dynamic Schedule treatment. If no agreement, BA1 would maintain reserves based on 510 MWs Generation.

BA2 / RSG2	**Generation**	**Part of Generator**
Generator 11	100 MWs	Yes
Generator 12	100 MWs	Yes
Generator 3 (Pseudo-Tied in from BA1)	100 MWs	Yes
Dynamic Schedule from BA1 to BA2	50 MWs	Yes
Generation	300 MWs	(The sum of gen 11, 12 and 3.)

[3] Note: This Dynamic Schedule is not the same as the Generator 3 Pseudo-Tie.

BA generation (EMS)	300 MWs	(The sum of gen 11, 12 and 3)
Generation to use Under BAL-002-WECC-1	350 MWs**	(The sum of gen 11, 12 and 3 plus Dynamic Schedule)

** Assumes BA1 and BA2 agree on Dynamic Schedule treatment. If no agreement, BA1 would have to maintain reserves based on 510MWs Generation and BA2 would determine its generation to be 300 MWs.

Guideline and Technical Basis

A Guidance Document addressing implementation of this standard ~~has been~~was filed with ~~this standard.~~ Version 2.

~~Version History~~

~~Version~~	~~Date~~	~~Action~~	~~Change Tracking~~
~~1~~	~~October 29, 2008~~	~~Adopted by NERC Board of Trustees~~	
~~1~~	~~October 21, 2010~~	~~Order issued remanding BAL-002-WECC-1~~	
~~2~~	~~November 7, 2012~~	~~Adopted by NERC Board of Trustees~~	
~~2~~	~~November 21, 2013~~	~~FERC Order issued approving BAL-002-WECC-2. (Order becomes effective 1/28/14.)~~	
~~2a~~	~~December 1, 2015~~	~~Approved by WECC Board of Directors~~	~~Clarified resources available for use in Requirement R2~~
~~2a~~	~~January 24, 2017~~	~~FERC approved~~	~~The interpretation provides clarification regarding the types of resources that may be used to satisfy Contingency Reserve.~~

Exhibit B

Implementation Plan

Electric Reliability and Security for the West

Exhibit B
Implementation Plan
WECC-0115 BAL-002-WECC-3
Contingency Reserve
Request to Retire R2

Implementation Plan

Standards Authorization Request

The original Standards Authorization Request (SAR) is located here.[1] Documentation templates have been updated for final filing.

Approvals Required

- WECC Board of Directors ..... June 19, 2019
- NERC Board of Trustees..... August 15, 2019
- FERC..... Pending

Effective Date

The WECC-0115 project asserts that BAL-002-WECC-2a,[2] Contingency Reserve, Requirement R2 became redundant to BAL-003-1.1, Frequency Response and Frequency Bias Setting, Requirement R1 effective April 1, 2016**.** Because that date has passed, retirement of BAL-002-WECC-2a, Contingency Reserve, Requirement R2 can be effective immediately on receipt of regulatory approval.

Justification of Effective Date

The reliability-related substance of WECC-0115 BAL-002-WECC-2a Contingency Reserve, Requirement R2 is contained in BAL-003-1.1 Frequency Response and Frequency Bias, Requirement R1. (See Technical Justification, Exhibit C and Response to Comments for Posting 2, Attachment E9.)

Because BAL-003-1.1 Requirement R1 addresses the reliability task, BAL-002-WECC-2a Requirement R2 is redundant and can be retired.

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[1] Attachment E1 of this filing reflects the SAR in an updated template. The original is located at https://www.wecc.org/Reliability/WECC-0115%20BAL-002-WECC-2%20Contingency%20Reserve%20SAR%20to%20Retire%20Requirement%20R2.pdf

[2] The naming nomenclature changed during development from BAL-002-WECC-2, BAL-002-WECC-2a, and will change to BAL-002-WECC-3 if approved.

Impact on Other Standards

As to other existing and proposed standards, the drafting team (DT) notes that some confusion may arise as to how the retirement of WECC-0115 BAL-002-WECC-2a, Requirement R2 may interplay with the existing BAL-002-1, Disturbance Control Performance standard. BAL-002-1, Requirement R2.3 requires the applicable entity (the Regional Reliability Organization *or* the Reserve Sharing Group) to "specify its Contingency Reserve policies, including … (R2.3) … the permissible mix of Operating Reserve—Spinning and Operating Reserve—Supplemental that may be included in Contingency Reserve." Arguably, BAL-002-WECC-2a Requirement R2 meets this requirement.

The DT disagrees that retention of BAL-002-WECC-2a Requirement R2 is the only way to comply with BAL-002-1. At a high level, since BAL-002-1 has no Measure for the associated Requirement R2, it is unclear how compliance might be met. Further, since the only Measure provided requires that the Balancing Authority *or* the Reserve Sharing Group "shall calculate and report compliance with the Disturbance Control Standard," there is a disconnect between the required performance (have a policy) and the required Measure (perform a calculation).

Consideration of Early Compliance

The DT sees no concerns with early compliance.

Action Plan

On June 19, 2019, the WECC Board of Directors approved the project for further regulatory disposition. The full project is available for review on the WECC website at the WECC-0115 homepage.[3]

[3] https://www.wecc.org/Standards/Pages/WECC-0115.aspx

Exhibit C

Field Test Results, WECC-0115 BAL-002-WECC-2a
Request to Retire Requirement R2

WECC

Field Test Results
WECC-0115 BAL-002-WECC-2a
Request to Retire Requirement R2

Standard Drafting Team

March 5, 2019

Executive Summary

After doing a field test from May 1, 2017, through April 30, 2018, the WECC-0115 BAL-002-WECC-2a, Contingency Reserve, Request to Retire Requirement R2 Drafting Team (DT) concluded that if Requirement R2 is retired, it is unlikely to adversely affect reliability.

On May 6, 2015, WECC received Standard Authorization Request (SAR) WECC-0115 BAL-002-WECC-2a Contingency Reserve, Request to Retire Requirement R2 (R2), requesting retirement of R2 and its compliance elements. The SAR stated that on April 1, 2016, BAL-003-1.1 Frequency Response and Frequency Bias Settings, Requirement R1 would make R2 redundant.

From May 1, 2017, through April 30, 2018, WECC conducted a NERC-approved field test to find out the effect on reliability if R2 was retired.[1] A compliance waiver for R2 was granted beginning on May 1, 2017 and ending on May 1, 2019.

WECC required U.S. entities to provide data on the quantity of reserve carried during the field test period. This was done to enable WECC to see the effects of the field test, as a condition to take part in the field test, and to meet conditions from NERC in approving WECC's request for a field test. The data showed no adverse effect to reliability if R2 is retired.

Project WECC-0115 will not be balloted until this report is presented for review to the WECC Ballot Pool and NERC meets the requirements of the NERC Rules of Procedure, 6.3 Communication and Coordination for All Types of Field Tests and Data Analyses.

[1] NERC approved the field test in late March 2017 and WECC conducted it per NERC Standards Processes Manual, Section 6.2, Field Tests and Data Analysis for Validation of Requirement.

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Figures

Introduction

On May 6, 2015, WECC received SAR WECC-0115 BAL-002-WECC-2a, Contingency Reserve requesting retirement of Requirement R2. The SAR was deemed complete the same day. The SAR asserted that on April 1, 2016, BAL-003-1.1, Frequency Response and Frequency Bias Setting, Requirement R1 would make R2 redundant.

On June 23, 2015, the WECC Standards Committee (WSC) approved the SAR after vetting by the WECC Operating Committee Steering Committee (OC; June 9, 2015) and the Joint Guidance Committee (JGC; May 27, 2015).

From October 22 through December 8, 2015, the project was posted once for comment, during which stakeholders were asked a question:

> Do you agree that WECC Regional Standard BAL-002-WECC-2,[2] Contingency Reserve, Requirement R2 should be retired as of the effective date of NERC Standard BAL-003-1[3] (BAL-003), Frequency Response and Frequency Bias Setting, Requirement R1?

Three entities responded to the posting and were in favor of retirement.[4] After discussion, the DT and WECC staff[5] agreed that a field test should be done to gauge the effect of retiring R2.

A NERC-approved field test was done from May 1, 2017, through April 30, 2018. The field test data is the foundation of this paper and was posted for comment as Posting 2 of this project. Posting 2 received three comments, one for retirement and two suggesting caution.

Field Test Description

Data Source and Description

The field test data was requested from each Balancing Authority (BA) and each Reserve Sharing Group (RSG) subject to R2. WECC received data through an online WECC portal.

The data request included the following information:

[2] During this project, the BAL-002-WECC-2 designation changed to BAL-002-WECC-2a on January 24, 2017, in FERC Docket No. RD17-3-000. The BAL-003-1 designation changed to BAL-003-1.1 on November 13, 2015, in FERC Docket RD15-6-000.

[3] BAL-003-1, Frequency Response and Frequency Bias Setting was approved by FERC on March 24, 2014, and has an enforcement date of April 1, 2016.

[4] Xcel Energy, Bonneville Power Administration, and WECC.

[5] Steven Rueckert, WECC Director of Standards, and Phil O'Donnell, WECC Manager, Operations and Planning Audits and Investigations.

1. For any reportable Disturbance Control Standard (DCS) event, the date and time of the event, the required amount of Contingency Reserves at the time of the event, the actual amount of Operating Reserves-Spinning at the time of the event, and the actual DCS performance.[6]
2. For all instances of a loss of resources 700 MW or greater, whether it is a reportable DCS event or not, the date and time of the event, the name of the resource(s), and the total MW loss.

Objective

The field test was designed to determine whether retirement of R2 would have any adverse effect on grid reliability. The test examined the effect on Disturbance Control Standard (DCS[7]) performance and frequency response in the Western Interconnection.

Overview

The first metric, DCS performance, monitored the performance of each RSG, and each BA that was not a member of an RSG, for every reportable DCS event, to see whether any were unable to meet the DCS recovery period for a DCS event. WECC asked for more information from the participants to calculate the ratio for required contingency reserve to Operating Reserve-Spinning for each qualified event.

The second metric watched system performance for any loss of resources greater than 700 MW and for any adverse effects on frequency response.[8] Data for this metric was collected using the same method NERC uses to collect information to analyze interconnection frequency response for its State of Reliability and Frequency Response Annual Analysis reports.

Field Test Analysis and Results

R2 was intended to do two things: 1) to aid in frequency recovery (through governor action) for large generation loss events across the Western Interconnection, and 2) to provide a part of the Contingency Reserves (on-line generation minus 10-minute response) for generation trip events within the BA or RSG if the party is an RSG member. With new standards being applied and generation resources changing in the Western Interconnection, the SAR was based on the presumptions that R2 became

[6] During the field test, only the DCS responsible entity was asked to provide data during DCS events. Entities that did not have a reportable DCS event were not requested to provide data.

[7] "The reliability standard that sets the time limit following a Disturbance within which a BA must return its Area Control Error to within a specified range." NERC Glossary of Terms Used in Reliability Standards (Glossary).

[8] The DT noted that the WECC Interconnection Frequency Response Obligation (IFRO) is roughly -840 MW per 0.1 HZ. The 700-MW loss was chosen as a more conservative number than the IFRO and represents a value large enough to cause a significant frequency excursion. For an example, see *Frequency Response Analysis Tool*, Dmitry Kosterev, Bonneville Power Administration, 2014. https://www.wecc.org/Reliability/Frequency%20Response%20Analysis%20-%20Dmitry%20Kosterev.pdf

redundant on April 1, 2016—the effective date of BAL-003-1.1—and that, with R2's retirement, neither metrics for the interconnection's frequency performance nor DCS performance would degrade.

With BAL-003-01.1 in effect, frequency response became measurable, and the field test gave entities a compliance waiver for R2, thus splitting DCS and frequency response. Entities were responsible for ensuring both reliability performance metrics were met. On that basis, WECC used the data captured from the field test with interconnection frequency response performance data to assess any effect to individual DCS performance, as well as the overall frequency performance of the interconnection.

Data Description

Data from the field test covered 66 DCS events. During each of those events, entities provided data to help assess DCS performance. This data included Contingency Reserve Obligation, Required Spin (assuming no compliance waiver), Actual Spin, and whether Area Control Error (ACE) recovery was met to successfully pass the DCS event. See Table 1 for the data set collected.

Table 1—DCS Event Field Test Data

Entity #	Reported MW Loss	DCS Event	Contingency (Cont) Reserve Obligation	Required Spin	Actual Spin	Pass(x)	Cont/Spin (Pre-Contingency Value)
Entity 3	530	Yes	585	293	878	x	150.09%
Entity 3	480	Yes	585	293	1165	x	199.15%
Entity 5	341	Yes	2624	1312	5595	x	213.22%
Entity 5	309	Yes	2528	1264	4095	x	161.99%
Entity 5	310	Yes	2830	1415	4428	x	156.47%
Entity 5	294	Yes	2992	1496	4010	x	134.02%
Entity 5	480	Yes	2349	1174.5	4360	x	185.61%
Entity 5	375	Yes	3068	1534	4986	x	162.52%
Entity 5	393	Yes	3106	1553	3989	x	128.43%
Entity 5	587	Yes	2373	1187	4483	x	188.92%
Entity 5	628	Yes	3124	1562	4201	x	134.48%
Entity 5	388	Yes	3211	1606	4217	x	131.33%
Entity 5	838	Yes	2988	1494	4223	x	141.33%
Entity 5	353	Yes	3234	1617	4658	x	144.03%
Entity 2	655	Yes	656	328	552	x	84.26%
Entity 5	356	Yes	3646	1823	5956	x	163.36%
Entity 5	619	Yes	3732	1866	6193	x	165.94%
Entity 2	430	Yes	468	234	417	x	89.11%
Entity 5	513	Yes	3514	1757	6063	x	172.54%
Entity 5	519	Yes	2823	1412	6001	x	212.58%
Entity 5	748	Yes	3688	1844	6271	x	170.04%
Entity 5	630	Yes	3024	1512	6680	x	220.90%
Entity 2	**442**	**Yes**	**538**	**269**	**231**	**x**	**42.97%**

Entity #	Reported MW Loss	DCS Event	Contingency (Cont) Reserve Obligation	Required Spin	Actual Spin	Pass(x)	Cont/Spin (Pre-Contingency Value)
Entity 5	506	Yes	3610	1805	6703	x	185.68%
Entity 5	760	Yes	3742	1871	6133	x	163.90%
Entity 5	522	Yes	3612	1806	5698	x	157.75%
Entity 5	1061	Yes	3791	1896	6799	x	179.35%
Entity 5	411	Yes	2964	1482	5358	x	180.77%
Entity 5	1882	Yes	2497	1249	4952	x	198.32%
Entity 5	486	Yes	3536	1768	5855	x	165.58%
Entity 5	475	Yes	3422	1711	6647	x	194.24%
Entity 5	723	Yes	3006	1503	8401	x	279.47%
Entity 5	796	Yes	3293	1647	5844	x	177.47%
Entity 5	492	Yes	3174	1587	5111	x	161.03%
Entity 5	460	Yes	5129	2565	9318	x	181.67%
Entity 5	398	Yes	5614	2807	11920	x	212.33%
Entity 5	1150	Yes	5231	2616	13142	x	251.23%
Entity 5	1699	Yes	6028	3014	9288	x	154.08%
Entity 5	786	Yes	5874	2937	9350	x	159.18%
Entity 5	479	Yes	5155	2578	14798	x	287.06%
Entity 3	538	Yes	585	293	1329	x	227.23%
Entity 5	714	Yes	5869	2935	11056	x	188.38%
Entity 5	656	Yes	6090	3045	14291	x	234.66%
Entity 5	760	Yes	5517	2759	8679	x	157.31%
Entity 3	790	Yes	790	395	1607	x	203.42%
Entity 2	496	Yes	573	286	379	x	66.15%
Entity 5	1046	Yes	8090	4045	12613	x	155.91%
Entity 5	493	Yes	7099	3550	12659	x	178.32%
Entity 5	651	Yes	3351	1676	5962	x	177.92%
Entity 1	388	Yes	1040	520	979	x	94.13%
Entity 4	851	Yes	2181	1091	1091	x	50.02%
Entity 1	970	Yes	1037	519	1151	x	110.99%
Entity 4	1059	Yes	1175	588	600	x	51.06%
Entity 3	582	Yes	790	395	924	x	116.96%
Entity 2	**800**	**Yes**	**565**	**283**	**234**	**x**	**41.44%**
Entity 1	471	Yes	1040	520	1359	x	130.67%
Entity 1	699	Yes	1041	521	1426	x	136.98%
Entity 4	**817**	**Yes**	**1543**	**772**	**768**	**x**	**49.77%**
Entity 5	1026	Yes	2832	1416	6038	x	213.21%
Entity 5	850	Yes	2741	1371	6543	x	238.71%
Entity 5	660	Yes	2691	1346	5911	x	219.66%
Entity 1	500	Yes	1040	520	1589	x	152.79%

Entity #	Reported MW Loss	DCS Event	Contingency (Cont) Reserve Obligation	Required Spin	Actual Spin	Pass(x)	Cont/Spin (Pre-Contingency Value)
Entity 5	506	Yes	3206	1603	5893	x	183.81%
Entity 5	707	Yes	3056	1528	5952	x	194.76%
Entity 1	322	Yes	1020	510	1454	x	142.55%
Entity 4	866	Yes	1186	593	672	x	56.66%

All 66 events had a 100-percent pass rate showing no degradation to DCS performance. With the R2 compliance waiver in effect, entities carried and deployed enough reserves for post-disturbance ACE recovery. Also, Spinning Reserve more than the required 50 percent was carried during all but three events. Of the remaining 63, on average, the entity was carrying 166.38 percent Spinning Reserve as opposed to 50 percent Spinning Reserve required by the standard. In the remaining three events, the entities carried an average of 5.3 percent less Spinning Reserve than mandated.[9]

WECC assessed Western Interconnection frequency performance to further determine the effect of the field test on the Interconnection. Frequency performance data was collected for the 32 events having a verified resource loss of more than 700 MW.

According to NERC, Essential Reliability Services (ERS) Measure 4[10] is a comprehensive set of Frequency Response measures capturing speed of Frequency Response and response withdrawal at all relevant time frames:

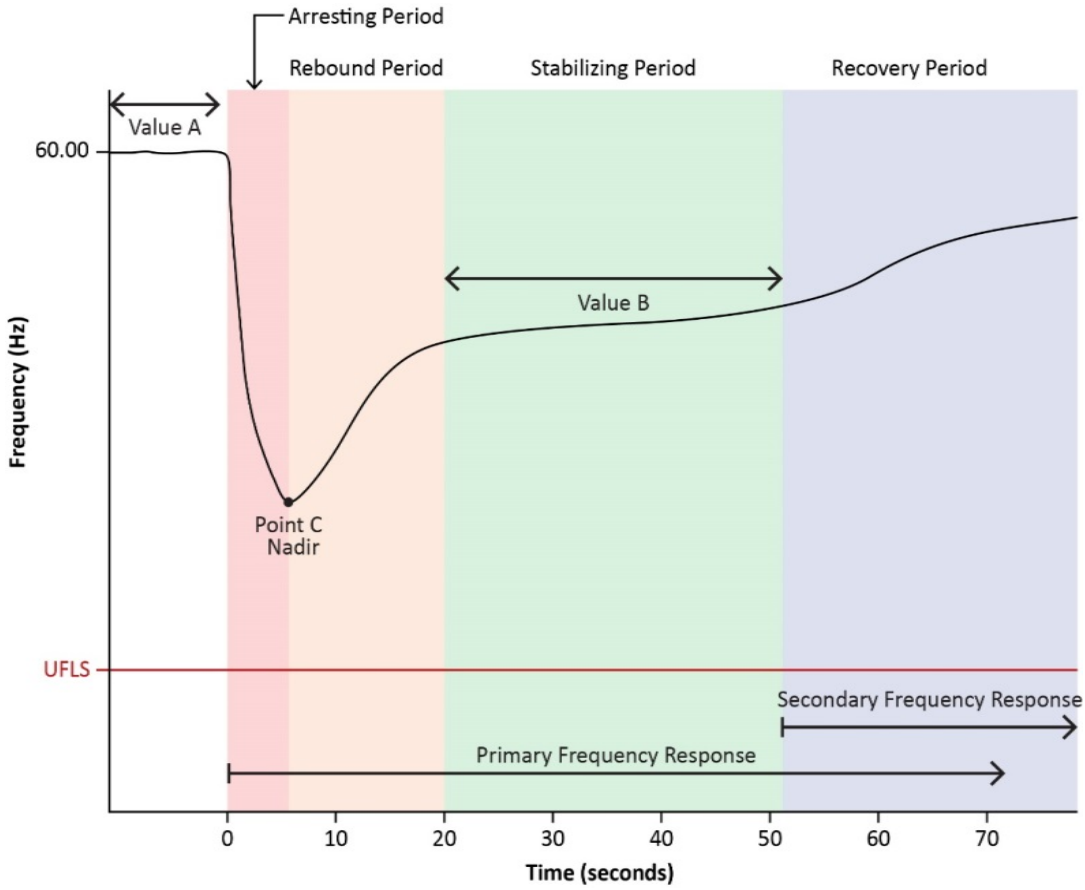
- Point A to C frequency response in MW/0.1 Hz;
- Point A to B frequency response in MW/0.1 Hz (similar to Adequate Level of Reliability (ALR)-12);
- C:B Ratio;
- C:C′ Ratio; and
- Three time-based measures: t0 to tC, tC to tC′, and t0 to tC′.

Figure 1 shows a frequency deviation due to a loss of generation resource and the methodology for calculating frequency response. The event starts at time t0. Value A is the average frequency from t-16 to t-2 seconds, Point C is the lowest frequency point observed in the first 12 seconds, and Value B is the average from t+20 to t+52 seconds. Point C′ occurs when the frequency after 52 seconds falls below either the Point C (12 seconds) or average Value B (20–52 seconds), as illustrated below.

[9] This analysis does not speculate on why reporting entities carried more reserve than required. It only notes that excess reserves were carried.

[10] Please note that, although similar in title, *NERC's Essential Reliability Services (ERS) Measure 4* (page 8) is different from *NERC's State of Reliability Report, Metric M-4* (page 9).

Figure 1—Frequency Deviation due to Loss of Generation Resource



Per the NERC State of Reliability Report, Metric M-4 has two parts of interest: 1) performance of the Western Interconnection to arrest the frequency decline after a loss-of-generation event to prevent activation of underfrequency load shedding (UFLS), and 2) performance of the Western Interconnection to stabilize quickly at a high enough frequency to successfully respond to a second frequency event, should one occur.[11]

- Arresting Period: In 2017, the Western Interconnection experienced an event in which the Point C nadir was 59.697 Hz, resulting in a Point C to UFLS margin of 0.197 Hz, the smallest margin since a 0.171-Hz event in 2014. The resource MW losses for these two events were 2,685 MW and 2,826 MW, respectively. This is more than double the mean resource MW loss for each year and larger than the Resource Contingency Criteria of 2,626 MW, which is defined in the 2016 Frequency Response Annual Analysis and used to calculate 2017 IFRO. Over the 2013–2017 operating years, the Western Interconnection trend was neither statistically improving nor

[11] NERC State of Reliability, June 2018, Appendix E: Frequency Response Statistics and Essential Reliability Services, DADS Metric 4: Performance—Demand Response Events by Month—Dispatched vs. Realized, page 112. https://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/NERC_2018_SOR_06202018_Final.pdf

declining. This indicates that the BAL-002-WECC-2a field test did not adversely affect Western Interconnection arresting period frequency performance.

- Stabilizing Period: The mean frequency response in 2017 of 1,836 MW/0.1 Hz was the highest of all years evaluated in this report. The Western Interconnection had no events in 2017 in which its interconnection frequency response measure (IFRM) was below its IFRO, including the event noted above, wherein the Point C nadir to UFLS margin was less than 0.200 Hz. Frequency response over the 2013–2017 operating years indicated that the Western Interconnection experienced significant improvement during the stabilizing period. This indicates that the BAL-002-WECC-2a field test did not adversely affect Western Interconnection stabilizing period frequency performance.

Figure 2—Table 2.1 from NERC 2018 State of Reliability Report, June 2018

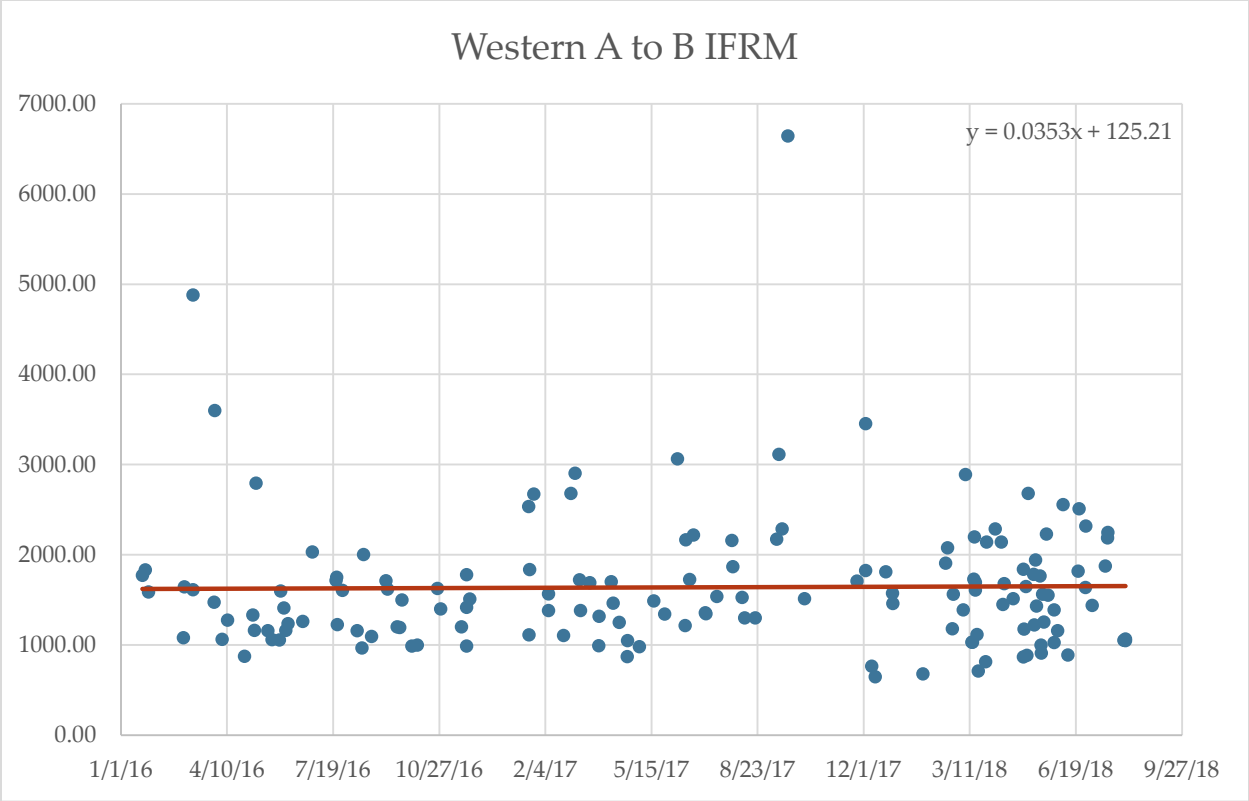
Table 2.1: Interconnection Performance Summary Statistics

Interconnection	2017 OY Largest Resource Loss		2017 OY Lowest A-B IFRM Performance		2013–2017 OY Arresting Period Performance Trend	2013–2017 OY Stabilizing Period Performance Trend
	MW Loss	UFLS Margin (Hz)	MW Loss	UFLS Margin (Hz)		
Eastern	1,661	0.453	511	0.472	Improving	No Change
Texas	1,219	0.433	369	0.603	Improving	Improving
Quebec	954	0.873	314	1.199	Improving	No Change
Western	2,776	0.210	383	0.450	No Change	Improving

Below is a summary of Western Interconnection frequency performance metrics:

1. A to B frequency response shows the effectiveness of primary frequency response in stabilizing frequency after a large frequency excursion. This measure is the conventional means of calculating Frequency Response as the ratio of net MW lost to the difference between Point A and Point B frequency values.

Figure 3—A to B IFRM



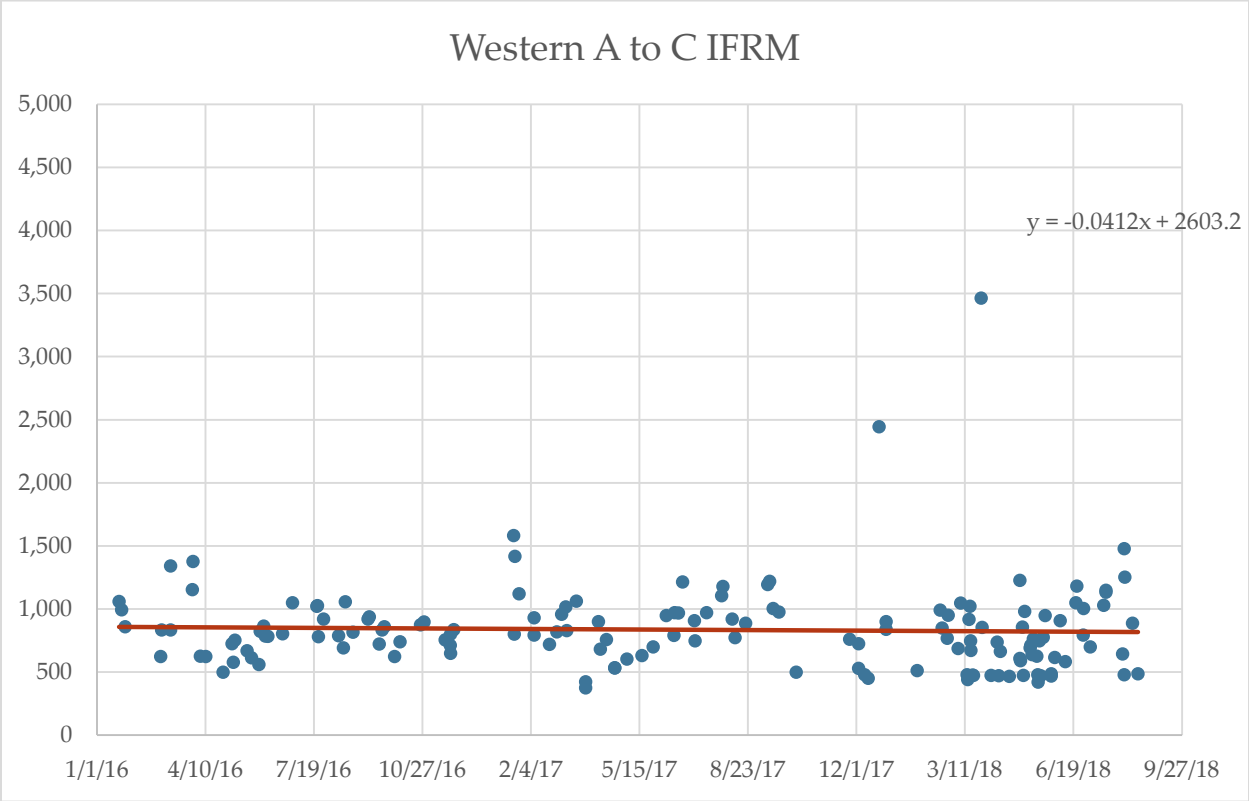
An increasing trend indicates that frequency response is improving. The Western Interconnection A to C metric shows no degradation.

For example:

- 60.0 Hz pre-event (A frequency), Loss of 1,000 MW, 59.9 Hz primary frequency response (B frequency)
  - A to B Measure = 1,000 MW/0.1 HZ
- 60.0 Hz pre-event (A frequency), Loss of 1,500 MW, 59.9 Hz primary frequency response (B frequency)
  - A to B Measure = 1,500 MW/0.1 HZ
  - A to B measure increases, showing that larger loss of resource results in same post-event disturbance
- 60.0 Hz pre-event (A frequency), Loss of 1,000 MW, 59.92 Hz primary frequency response (B frequency)
  - A to B Measure = 1,250 MW/0.1 HZ
  - A to B measure increases, showing that the same loss in resource results in higher post-event (primary frequency response measure)

2. A to C frequency response shows the effects of inertial response, load response (load damping), and initial governor response. Governor response is triggered immediately after frequency exceeds a preset deadband; however, depending on generator technology, full governor response may take up to 30 seconds to fully deploy. This measure is calculated as the ratio of net megawatts lost to the difference between Point A and Point C frequency values.

Figure 4—A to C IFRM



An increasing trend indicates that frequency response is improving. The Western Interconnection A to C metric shows no degradation.

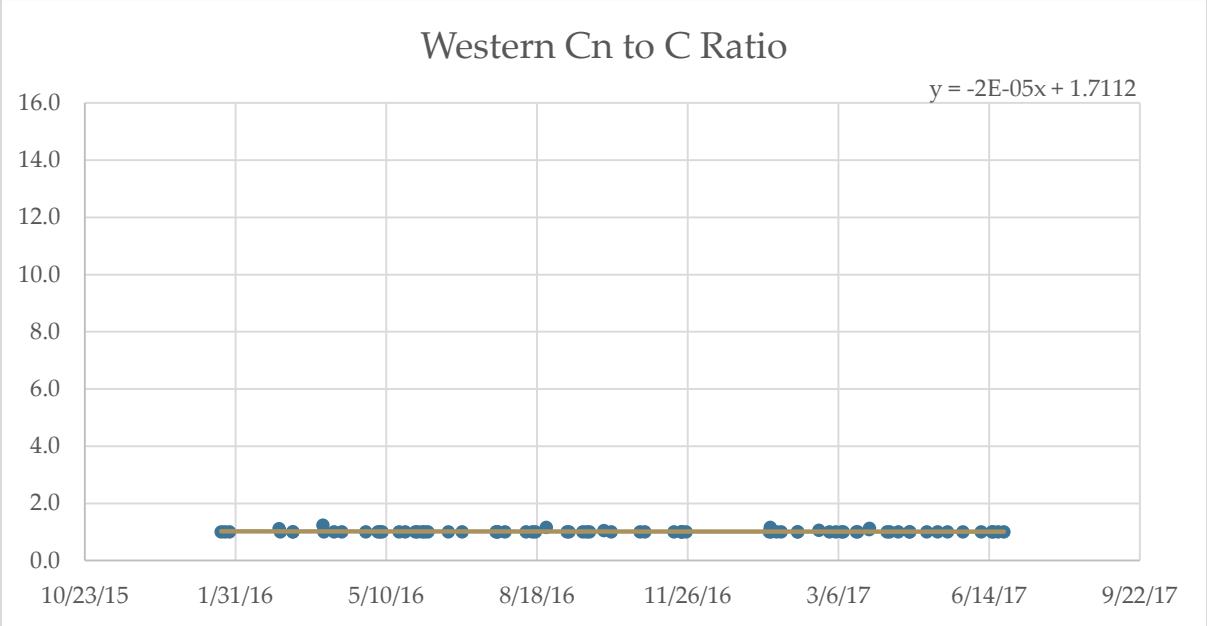
For example:

- 60.0 Hz pre-event (A frequency), Loss of 1000 MW, 59.85 Hz lowest frequency (C frequency)
  - A to C Measure = 667 MW/0.1 HZ
- 60.0 Hz pre-event (A frequency), Loss of 1500 MW, 59.85 Hz lowest frequency (C frequency)
  - A to C Measure = 1000 MW/0.1 HZ
  - A to C measure increases, representing that larger loss of resource results in same post event disturbance

- 60.0 Hz pre-event (A frequency), Loss of 1000 MW, 59.90 Hz lowest frequency (C frequency)
  - A to C Measure = 1000 MW/0.1 HZ
  - A to C measure increases, representing that the same loss in resource results in higher post event (primary frequency response measure)

3. Cn to C is the ratio between the absolute frequency minimum (Point Cn) caused by governor withdrawal and the initial nadir (Point C). This metric measures withdrawal of primary frequency response. A response greater than 1.0 indicates withdrawal. A declining trend is an indication of improving primary frequency response. The Western Interconnection has shown no indications of response withdrawal.

Figure 5—Cn to C Ratio



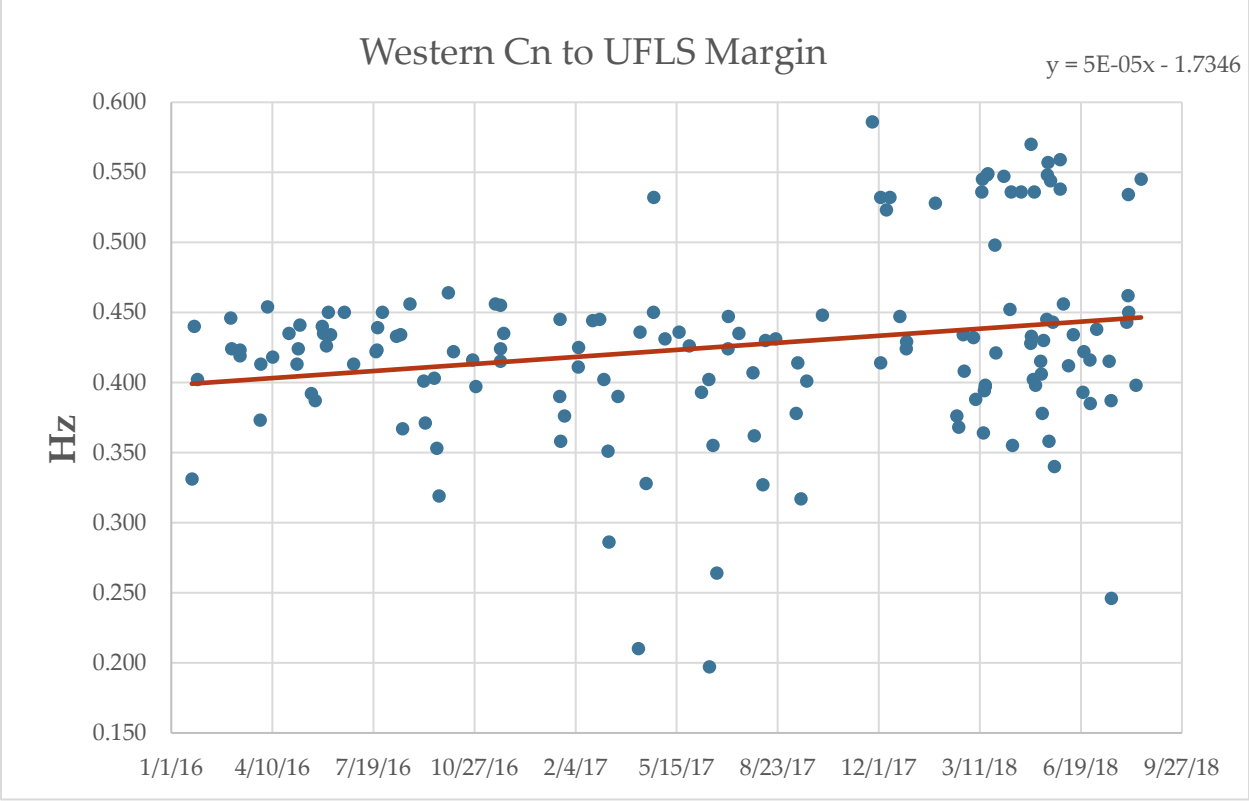
When the DT drafted this white paper, Cn data was only publicly available through August 2017. However, in addition to trended data, the NERC Frequency Response Annual Analysis, published November 2018, also shows that the Western Interconnection continues to experience no frequency response withdrawal during the BAL-002-WECC-2a field test.

Figure 6—Table 2.2 from NERC 2018 Frequency Response Annual Analysis, November 2018

Table 2.2: Statistical Analysis of the Adjustment for C' Nadir (BC'_{adj})						
Interconnection	Number of Events Analyzed	C' Lower than B	C' Lower than C	Mean Difference	Standard Deviation	BC'ADJ (95% Quantile)
Eastern	112	66	34	0.005	0.003	0.006
Western	86	45	0	N/A	N/A	N/A
ERCOT	143	61	2	N/A	N/A	N/A
Québec	135	31	12	-0.019	0.028	-0.004

4. Cn to UFLS ratio measures the margin between the frequency nadir and the first step in UFLS.

Figure 7—Cn to UFLS margin



The trend does show a statistical increase in UFLS margin. Also note that the magnitude of the resource loss directly affects Interconnection performance calculation as measured by IFRMs and Point C to UFLS margins. During 2017 and 2018, there were three events in which the resource loss was 2,776

MW, 2,685 MW, and 2741 MW; more than double the mean resource MW loss for each year and larger than the defined Resource Contingency Criteria of 2,626 MW.[12]

One event occurred on April 6, 2017, 11:00 p.m. PDT when the field test was not in effect and the other two events on June 16, 2017, at 5:14 a.m. PDT and July 18, 2018, at 5:30 p.m. PDT when the field test was in effect. All events, however, had comparable results and significant UFLS margin before and after the field test. Also, all three events had an IFRM that exceeded the IFRO.

Per the WECC Off-Nominal Frequency Load Shedding Plan (UFLSP), load shedding occurs sequentially in five blocks with a minimum separation of 0.1 Hz between steps. UFLS entities taking part in the UFLS plan (aka, Coordinated Plan) must shed their first block of load as soon as frequency has declined to 59.5 Hz.[13]

[12] See the 2017 Frequency Response Annual Analysis https://www.nerc.com/comm/OC/BAL0031_Supporting_Documents_2017_DL/2017_FRAA_Final_20171113.pdf

[13] "UFLS Entities participating in the Coordinated Plan are required to shed their first block of load as soon as frequency has declined to 59.5 Hz, with additional minimum requirements for further load shedding steps" (as set forth in the accompanying table)." WECC Off-Nominal Frequency Load Shedding Plan, Coordinated Plans, P. 1a, page 8, December 5, 2012.

WECC receives data used in its analyses from a wide variety of sources. WECC strives to source its data from reliable entities and undertakes reasonable efforts to validate the accuracy of the data used. WECC believes the data contained herein and used in its analyses is accurate and reliable. However, WECC disclaims any and all representations, guarantees, warranties, and liability for the information contained herein and any use thereof. Persons who use and rely on the information contained herein do so at their own risk.

Exhibit D

Order No. 672 Criteria

Electric Reliability and Security for the West

Exhibit D
Order 672 Criteria
WECC-0115 Contingency Reserve
Request to Retire R2

Introduction

The North American Electric Reliability Corporation (NERC) is responsible for ensuring that the Reliability Standards, Violation Risk Factors (VRF), Violation Severity Levels (VSL), definitions, Variances, and Interpretations developed by drafting teams are developed in accordance with NERC processes. These standards must also meet NERC's benchmarks for Reliability Standards, as well as criteria for governmental approval.

In Federal Energy Regulatory Commission (FERC) Order No. 672,[1] FERC identified criteria that it will use to analyze proposed Reliability Standards for approval to ensure they are just, reasonable, not unduly discriminatory or preferential, and in the public interest. The discussion below identifies these factors, and explains how the proposed Reliability Standard meets or exceeds the criteria.

Designed for a Specific Goal

Proposed Reliability Standards must be designed to achieve a specified reliability goal.

The proposed Reliability Standard must address a reliability concern that falls within the requirements of Section 215 of the Federal Power Act. That is, it must provide for the reliable operation of Bulk-Power System facilities. It may not extend beyond reliable operation of such facilities or apply to other facilities. Such facilities include all those necessary for operating an interconnected electric energy transmission network, or any portion of that network, including control systems. The proposed Reliability Standard may apply to any design of planned additions or modifications of such facilities that is necessary to provide for reliable operation. It may also apply to Cybersecurity protection. Order No. 672 at P 321.

Further, NERC Reliability Standards are based on certain reliability principles that define the foundation of reliability for North American bulk power systems. Each Reliability Standard shall enable or support one or more of the reliability principles, thereby ensuring that each standard serves a

[1] FERC Order 672

purpose in support of reliability of the North American bulk power systems. Each Reliability Standard shall also be consistent with all of the reliability principles, thereby ensuring that no standard undermines reliability through an unintended consequence. NERC Reliability Principles[2]

The Purpose of BAL-002-WECC-2a Contingency Reserve is:

"To specify the quantity and types of Contingency Reserve required to ensure reliability under normal and abnormal conditions."

Of the eight NERC Reliability Principles, this standard addresses Reliability Principle 1, which states:

"Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards."

Technically Sound

Proposed Reliability Standards must contain a technically sound method to achieve the goal.

The proposed Reliability Standard must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve this goal. Although any person may propose a topic for a Reliability Standard to the Electric Reliability Organization (ERO), in the ERO's process, the specific proposed Reliability Standard should be developed initially by persons within the electric power industry and community with a high level of technical expertise and be based on sound technical and engineering criteria. It should be based on actual data and lessons learned from past operating incidents, where appropriate. The process for ERO approval of a proposed Reliability Standard should be fair and open to all interested persons. Order No. 672 at P 324.

Standard Development

This proposed Reliability Standard was developed using the NERC and Western Electricity Coordinating Council (WECC) Reliability Standards Development Procedures (Procedures) approved by FERC and in effect at each point in the process. Among other things, these processes include drafting of the standard by a drafting team composed of subject matter experts (SME); biographies of those SMEs are provided with this filing.

These processes also include repeated public iterative comment/response cycles whereby comments are received from the industry, and responses to those comments are provided by the drafting team.

Technically Sound

On May 6, 2015, WECC received Standard Authorization Request (SAR) WECC-0115 BAL-002-WECC-2 Contingency Reserve, Request to Retire Requirement R2 (R2) requesting retirement of R2 and its

[2] https://www.nerc.com/files/Reliability_Principles.pdf

compliance elements.[3] The SAR stated that, on April 1, 2016, BAL-003-1.1 Frequency Response and Frequency Bias Settings, Requirement R1 would make R2 redundant.

To assess the potential risk of retiring R2, WECC conducted a NERC-approved field test from May 1, 2017, through April 30, 2018.[4] WECC required U.S. entities to provide data on the quantity of reserve carried during the field test period. Between October 18, 2018, and January 10, 2019, the WECC-0115 BAL-002-WECC-2a drafting team (DT) reviewed the test data and concluded that, if BAL-002-WECC-2a Requirement R2 is retired, it is unlikely to have an adverse effect on reliability.

To enable WECC to monitor the reliability effects of the field test, as a condition to participate in the field test, and to meet NERC's conditions in approving the field test, WECC required U.S. entities to provide the following information for any reportable Disturbance Control Standard (DCS) event:

- The date and time of the event;
- The required amount of Contingency Reserve at the time of the event;
- The actual amount of Operating Reserve—Spinning at the time of the event;
- The actual DSC performance.

Additionally, whether or not an incident was a reportable DCS event, for all instances of a loss of resources 700 MW or greater, entities were to report:

- The date and time of the event;
- The name of the resource(s);
- The total MW loss; and
- Any other relevant information.

Entities gave this information to WECC staff for each incident.

Applicability

Proposed Reliability Standards must be applicable to users, owners, and operators of the bulk power system, and not others.

The proposed Reliability Standard may impose a requirement on any user, owner, or operator of such facilities, but not on others. Order No. 672 at P 322.

The Applicability section of BAL-002-WECC-2a, Contingency Reserve is as follows:

[3] The naming nomenclature changed during development from BAL-002-WECC-2, BAL-002-WECC-2a, and will change to BAL-002-WECC-3 if approved.

[4] NERC approved the field test in late March 2017 and WECC conducted it per NERC Standards Processes Manual, Section 6.2, Field Tests and Data Analysis for Validation of Requirement. A compliance waiver for R2 was granted beginning on May 1, 2017, and ending on May 1, 2019.

4. Applicability:

4.1 Balancing Authority

4.1.1. The Balancing Authority is the responsible entity unless the Balancing Authority is a member of a Reserve Sharing Group, in which case, the Reserve Sharing Group becomes the responsible entity.

4.2 Reserve Sharing Group

4.2.1. The Reserve Sharing Group when comprised of a Source Balancing Authority becomes the source Reserve Sharing Group

4.2.2. The Reserve Sharing Group when comprised of a Sink Balancing Authority becomes the sink Reserve Sharing Group.

Clear and Unambiguous

Proposed Reliability Standards must be clear and unambiguous as to what is required and who is required to comply.

The proposed Reliability Standard should be clear and unambiguous regarding what is required and who is required to comply. Users, owners, and operators of the Bulk-Power System must know what they are required to do to maintain reliability. Order No. 672 at P 325.

Understandable Consequence

Proposed Reliability Standards must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.

The possible consequences, including range of possible penalties, for violating a proposed Reliability Standard should be clear and understandable by those who must comply. Order No. 672 at P 326.

This filing does not propose changes to the FERC-approved VSLs or VRFs. This filing proposes only a formatting change to the VRF.

Measurability for Compliance

Proposed Reliability Standards must identify a clear and objective criterion or measure for compliance, so that it can be enforced in a consistent and non-preferential manner.

There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner. Order No. 672 at P 327.

This filing proposes retirement of BAL-002-WECC-2a, Requirement R2 with no further substantive changes to the existing FERC-approved standard.

Effective and Efficient

Proposed Reliability Standards should achieve a reliability goal effectively and efficiently - but does not necessarily have to reflect "best practices" without regard to implementation cost.

The proposed Reliability Standard does not necessarily have to reflect the optimal method, or "best practice," for achieving its reliability goal without regard to implementation cost or historical regional infrastructure design. It should however achieve its reliability goal effectively and efficiently. Order No. 672 at P 328.

During the two posting periods, no concerns were raised about implementation costs or regional infrastructure.

Lowest Common Denominator

Proposed Reliability Standards cannot be "lowest common denominator," i.e., cannot reflect a compromise that does not adequately protect bulk power system reliability.

The proposed Reliability Standard must not simply reflect a compromise in the ERO's Reliability Standard development process based on the least effective North American practice — the so-called "lowest common denominator" — if such practice does not adequately protect Bulk-Power System reliability. Although the Commission will give due weight to the technical expertise of the ERO, we will not hesitate to remand a proposed Reliability Standard if we are convinced it is not adequate to protect reliability. Order No. 672 at P 329.

The filing proposes retirement of BAL-002-WECC-2a, Requirement R2 because it is redundant to BAL-003-1.1 Frequency Response and Frequency Bias Settings, Requirement R1.

Costs

Proposed Reliability Standards may consider costs to implement for smaller entities but not at consequence of less than excellence in operating system reliability.

A proposed Reliability Standard may take into account the size of the entity that must comply with the Reliability Standard and the cost to those entities of implementing the proposed Reliability Standard. However, the ERO should not propose a "lowest common denominator" Reliability Standard that would achieve less than excellence in operating system reliability solely to protect against reasonable expenses for supporting this vital national infrastructure. For example, a small owner or operator of the Bulk-Power System must bear the cost of complying with each Reliability Standard that applies to it. Order No. 672 at P 330.

During the development of the project, the industry raised no such concerns.

Continent-wide and Regional Variations

Proposed Reliability Standards must be designed to apply throughout North America to the maximum extent achievable with a single reliability standard while not favoring one area or approach.

A proposed Reliability Standard should be designed to apply throughout the interconnected North American Bulk-Power System, to the maximum extent this is achievable with a single Reliability Standard. The proposed Reliability Standard should not be based on a single geographic or regional model but should take into account geographic variations in grid characteristics, terrain, weather, and other such factors; it should also take into account regional variations in the organizational and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard. Order No. 672 at P 331.

In the Order 740 Remand at P4, the Commission states that:

"Reliability Standards that the ERO proposes to the Commission may include Reliability Standards that are proposed to the ERO by a Regional Entity… When the ERO reviews a regional Reliability Standard that would be applicable on an interconnection-wide basis and that has been proposed by a Regional Entity organized on an interconnection-wide basis, the ERO must rebuttably presume that the regional Reliability Standard is just, reasonable, not unduly discriminatory or preferential, and in the public interest. In turn, the Commission must give "due weight" to the technical expertise of the ERO and of a Regional Entity organized on an interconnection-wide basis."

Further, regional entities may propose Regional Reliability Standards that set more stringent reliability requirements than the NERC Reliability Standard or cover matters not covered by an existing NERC Reliability Standard. NERC Rules of Procedure, Section 312, Regional Reliability Standards.

The filing requests retirement of BAL-002-WECC-2a Contingency Reserve, Requirement R2. If approved, the reliability-related tasks will default to the continent-wide requirement of BAL-003-1.1 Frequency Response and Frequency Bias Settings, Requirement R1.

No Undue Negative Effect

Proposed reliability standards should cause no undue negative effect on competition or restriction of the grid.

As directed by section 215 of the FPA, the Commission itself will give special attention to the effect of a proposed Reliability Standard on competition. The ERO should attempt to develop a proposed Reliability Standard that has no undue negative effect on competition. Among other possible

considerations, a proposed Reliability Standard should not unreasonably restrict available transmission capability on the Bulk-Power System beyond any restriction necessary for reliability and should not limit use of the Bulk-Power System in an unduly preferential manner. It should not create an undue advantage for one competitor over another. Order No. 672 at P 332

The DT does not foresee any negative effects on competition resulting from the proposed retirement.

During the development phase of this project, the industry raised no concerns about competition or restrictive use of the grid.

Implementation of New Requirements (Effective Date)

The implementation time for the proposed Reliability Standards must be reasonable.

In considering whether a proposed Reliability Standard is just and reasonable, the Commission will consider also the timetable for implementation of the new requirements, including how the proposal balances any urgency in the need to implement it against the reasonableness of the time allowed for those who must comply to develop the necessary procedures, software, facilities, staffing or other relevant capability. Order No. 672 at P 333

Per the WECC Reliability Standards Development Procedures, Posting 1 (Attachment E4) of this project included an implementation plan for the proposed retirement. The Implementation Plan is included as Exhibit B of this filing.

When the DT published Posting 1 in October 2015, it proposed a retirement date coincident with the then-future effective date of BAL-003-1.1 Frequency Response and Frequency Bias Settings, Requirement R1. Because BAL-003-1.1, Requirement R1 is now effective, and while the reliability-related tasks of BAL-002-WECC-2a are addressed in BAL-003-1.1, Requirement R1, retirement of BAL-002-WECC-2a, Requirement R2 can be effective immediately upon receipt of regulatory approval.

Fair and Open Process

The Reliability Standard development process must be open and fair.

Further, in considering whether a proposed Reliability Standard meets the legal standard of review, we will entertain comments about whether the ERO implemented its Commission-approved Reliability Standard development process for the development of the particular proposed Reliability Standard in a proper manner, especially whether the process was open and fair. However, we caution that we will not be sympathetic to arguments by interested parties that choose, for whatever reason, not to participate in the ERO's Reliability Standard development process if it is conducted in good faith in accordance with the procedures approved by the Commission. Order No. 672 at P 334

WECC followed the WECC Reliability Standards Development Procedures (Procedures) approved by FERC in effect at the time of each step in the process.

In accordance with the Procedures, all drafting team meetings are open to the public.

All drafting team meetings were announced via the WECC Standards Email List for the period prescribed in the Procedures. Notice of the meetings was provided to NERC and posted on the WECC Calendar along with meeting minutes.

All meetings were supported by a telephone conference bridge associated with an on-line internet visual capability allowing all participants to see the document(s) as they were being developed. Further, this team held an open-mic Standards Briefing prior to balloting affording the industry an additional opportunity to have its questions addressed.

This project was posted twice for public comment at WECC.

Comments and the associated responses are currently posted on the WECC website at the WECC-0115 project page on the Submitt and Review accordion.[5] Response to Comments forms were provided with this filing.

In addition to posting under the WECC Procedures, this project was also posted by NERC for 45-days in accordance with NERC's Rules of Procedure and NERC's internal business practices.

All comments received in that posting indicated WECC's development processes were: 1) open, 2) inclusive, 3) balanced, 4) transparent, and 5) provided due process.

Balanced with Other Vital Interests

Proposed Reliability Standards must balance with other vital public interests.

Finally, we understand that at times development of a proposed Reliability Standard may require that a particular reliability goal must be balanced against other vital public interests, such as environmental, social and other goals. We expect the ERO to explain any such balancing in its application for approval of a proposed Reliability Standard. Order No. 672 at P 335

WECC is not aware of any other vital public interests. No such balancing concerns were raised or noted.

Consideration of Other Facts

Proposed Reliability Standards must consider any other relevant factors.

In considering whether a proposed Reliability Standard is just and reasonable, [FERC] will consider [several] general factors, as well as other factors that are appropriate for the particular Reliability Standard proposed. Order No. 672 at P 323

[5] https://www.wecc.org/Standards/Pages/WECC-0115.aspx

WECC is not aware of any other general factors in need of consideration.

Exhibit E

Summary of Development History and
Complete Record of Development

Summary of Development History

The development record for proposed Regional Reliability Standard BAL-002-WECC-3 is summarized below.

I. Overview of the Standard Drafting Team

When evaluating a proposed Reliability Standard, the Commission is expected to give "due weight" to the technical expertise of the ERO.[1] The technical expertise of the ERO is derived from the standard drafting team ("SDT") selected by the WECC Standards Committee ("WSC") to lead each project in accordance with Step 3 of the WECC Reliability Standards Development Procedures.[2] For this project, the SDT consisted of industry experts, all with a diverse set of experiences. A roster of the BAL-002-WECC-3 SDT members is included in **Exhibit F**.

II. Standard Development History

A. Standard Authorization Request Development

On May 6, 2015, WECC received Standard Authorization Request ("SAR") WECC-0115 to examine whether to retire BAL-002-WECC-2 Requirement R2.[3] After an affirmative review by the WECC Operating Committee, the SAR was approved by the WSC on June 23, 2015. Nominations for the drafting team were open from June 23, 2015 through July 31, 2015. The WSC approved the drafting team roster on August 12, 2015.

B. First Posting – Comment Period[4]

The project's first posting opened October 22, 2015, closing on December 8, 2015. After considering all comments received, on December 17, 2015, the SDT agreed to conduct a field test

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1 Section 25(d)(2) of the Federal Power Act; 16 U.S.C. 824(d)(2) (2012).

2 The currently effective WECC RSDP is located at https://www.wecc.org/Reliability/WECC%20Reliability%20Standards%20Development%20Procedures%20-%20FERC%20Approved%20October%2027%202017%20-%202019%20Template.pdf.

3 The currently-effective version, BAL-002-WECC-2a, came into effect during the development of proposed BAL-002-WECC-3.

4 Posting materials for all postings are located on the WECC project page: https://www.wecc.org/Standards/Pages/WECC-0115.aspx. An implementation plan was filed as part of Posting 1.

to examine the ramifications of retiring Requirement R2.[5] On January 7, 2016, the SDT concluded a one-year data set would be sufficient to determine the impacts of retirement. The one-year data set began on May 1, 2017 and terminated on April 30, 2018.

C. Field Test

In late March 2017, NERC approved WECC's request for the field test. The test allowed WECC to waive compliance with BAL-002-WECC-2a Requirement 2 for all Reserve Sharing Groups ("RSG"), and all Balancing Authorities ("BA") that were not members of an RSG, that opted to participate in the field test. Participants were required to notify WECC of their intent to participate in the field test prior to receiving the waiver.

In late March 2017, NERC approved WECC's request for the field test.[6] The test allowed WECC to waive compliance with BAL-002-WECC-2a Requirement 2 for all Reserve Sharing Groups ("RSG") and all Balancing Authorities ("BA") which were not members of an RSG and who opted to participate in the field test. Participants were required to notify WECC of their intent to participate in the field test prior to receiving the waiver.

To enable WECC to monitor the reliability impacts of the field test, as a condition to participation in the field test, and to meet conditions specified by NERC in approving WECC's request for a field test, WECC required U.S. entities to provide the following information for any reportable Disturbance Control Standard ("DCS") event:

- The date and time of the event;
- The required amount of Contingency Reserves at the time of the event;
- The actual amount of Operating Reserves – Spinning at the time of the event; and

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[5] "WECC-0115 Notice of Field Test" (2017), available at https://www.wecc.org/Reliability/WECC-0115%20Notice%20of%20Field%20Test.pdf.

- The actual DCS performance.

Additionally, whether or not an incident was a reportable DCS event, for all instances of a loss of resources 700 MW or greater, entities were to report:

- The date and time of the event;
- The name of the resource(s);
- The total MW loss; and
- Any other relevant information.

This information was provided to WECC staff for each incident.

Between October 18, 2018 and January 10, 2019, the SDT reviewed the test data and concluded that if Requirement R2 is retired, it is unlikely to have an adverse impact on reliability.

D. Second Posting – Comment Period

From January 18, 2019 through February 18, 2019, the SDT posted Posting 2 of the project (a technical white paper) in support of the retirement.[7] Posting 2 received three comments. After considering all comments, the SDT made editorial changes to its technical findings and provided additional footnotes to clarify data and language; however, the SDT did not change its conclusion that Requirement R2 should be retired. On February 28, 2019, the SDT agreed by majority vote to forward the project to the WSC with a request for ballot.

E. Ballot

On March 5, 2019, the WSC approved the project for ballot. Balloting was open from March 28, 2019 through April 11, 2019. It received 100% affirmative ballot in favor of retirement of Requirement R2, supported by an 89.5 percent quorum. On June 18, 2019, the WSC approved

7 "Field Test Results, WECC-0115 BAL-002-WECC-2a Request to Retire Requirement R2," Standard Drafting Team, March 5, 2019, Executive Summary, https://www.wecc.org/Reliability/WECC-0115%20Posting%202%20BAL-002-WECC-2%20Request%20to%20Retire%20R2%20-%20From%20Tech%20Editor.docx.

the ballot results and forwarded the project to the WECC Board of Directors ("Board") with a request for approval and subsequent disposition.

F. WECC Board of Directors Approval

On June 19, 2019, the WECC Board approved BAL-002-WECC-3 with the following resolution:

> Resolved, that the WECC Board of Directors (Board), acting upon the recommendation of the WECC Standards Committee (WSC) at the meeting of the Board on June 19, 2019, hereby approves the June 19, 2019 Board Voting Record 2 retirement of BAL-002-WECC-2a, Contingency Reserve, Requirement R2, the associated Measure M2, and the associated violation risk factor and violation severity levels, as presented and attached hereunto.[8]

G. NERC Comment Period and Board of Trustees Adoption

NERC posted proposed Regional Reliability Standard BAL-002-WECC-3 for a 45-day public comment period from June 20, 2019 through August 5, 2019. The NERC Board of Trustees adopted the proposed Regional Reliability Standard on August 15, 2019.

[8] Voting Record, WECC Board of Directors, June 19, 2019, Item 6. "Retire BAL-002-WECC-2a, Requirement," https://www.wecc.org/_layouts/15/WopiFrame.aspx?sourcedoc=/Administrative/2019-06-19%20Board%20Voting%20Record.pdf.

Complete Record of Development

Steven Rueckert
WECC Director of Standards
August 14, 2019

Ms. Nasheema Santos

NERC Reliability Standards Department

North American Electric Reliability Corporation

3353 Peachtree Rd. NE, North Tower—Suite 600

Atlanta, GA 30326

Subject: WECC-0115 BAL-002-WECC-3

Request to Retire Requirement R2

Dear Nasheema,

WECC is seeking approval from the NERC Board of Trustees, with subsequent disposition by the Federal Energy Regulatory Commission (FERC), to approve retirement of WECC Regional Reliability Standard, BAL-002-WECC-2a, Contingency Reserve, Requirement R2.

This project proposes retirement of R2 on the premise that R2 is redundant to BAL-003-1.1 Frequency Response and Frequency Bias Setting. The drafting team's conclusion is supported by technical justification (Exhibit C) premised on a NERC-approved field test.[1] Results of the field test indicate that adverse impact on reliability is unlikely.

When considering retirement of R2 it should be noted that BAL-003-1.1 represents a measurable performance calculated as an entity's known contribution to frequency response. By contrast, R2 has no technical foundation; rather, it represents a negotiated threshold established circa 1998 prior to mandatory standards.[2]

The request to retire R2 was approved by a WECC Ballot Pool with a 100 percent weighted approval.

Sincerely,

Steven Rueckert

WECC Director of Standards

[1] A NERC-approved field test was conducted from May 1, 2017, through April 30, 2018 examining the impact of retirement.

[2] Western System Coordinating Council, Reliability Criteria Agreement, 2. WSCC Criterion, (a.) Minimum Operating Reserve, (ii) Contingency reserve. Circa November 1998.

For documentation support please contact W. Shannon Black, at (503) 307-5782.

WECC-0115 BAL-002-WECC-3, Contingency Reserve[3] **Request to Retire Requirement R2**			
	QR	**BOT**	**Gov't Auth.***
Exhibit A – Final Standard - Clean			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Exhibit A - Final Standard - Clean			
Exhibit A1 - Final Standard – Redline			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Exhibit A1 - Final Standard – Redline			
Exhibit B – Final Implementation Plan			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Exhibit B – Final Implementation Plan			
Exhibit C – Final Technical Justification			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Exhibit C – Final Technical Justification			
Exhibit D - Order 672 Criteria			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Exhibit D – Order 672 Criteria			
Exhibit E - Summary of Development and WECC's Record of Development - NERC Provided Template			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve – Exhibit E - Summary of Development – NERC Provided			
Attachment E1 – WECC Standard Authorization Request			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E1 – WECC SAR			
Attachment E2 – Project Roadmap			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E2 – Project Roadmap			

[3] The naming nomenclature changed during development from BAL-002-WECC-2, BAL-002-WECC-2a, and will change to BAL-002-WECC-3 if approved.

Attachment E3 – NERC Submittal Request			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E3 – NERC Submittal Request			
Attachment E4 – Posting 1 Clean			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E4 – Posting 1 Clean			
Attachment E5 – Posting 1 Redline			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E5 – Posting 1 Redline – Not Used			
Attachment E6 – Posting 2 Clean			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E6 – Posting 2 Clean			
Attachment E7 – Posting 2 Redline			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E7 – Posting 2 Redline			
Attachment E8 – Posting 1 WECC Response to Comments			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E8 – Posting 1 Response to Comments			
Attachment E9 – Posting 2 WECC Response to Comments			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E9 – Posting 2 Response to Comments			
Attachment E10 – Minority Issues			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E10 – Minority Issues			
Attachment E11 – Ballot Pool Members			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E11 – Ballot Pool Members			
Attachment E12 – Ballot Pool Results			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E12 – Ballot Pool Results			
Attachment E13 – Posting 1 NERC Response to Comments			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E13 – NERC Posting 1 Response to Comments			

Attachment E14 – WECC Standards Committee Roster			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Attachment E14 – WECC Standards Committee Roster			
Exhibit F - WECC-0115 Drafting Team Roster			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Exhibit F – WECC Drafting Team Roster			
Exhibit G - VRF & VSL Justification			
File Name: WECC-0115 BAL-002-WECC-3 – Contingency Reserve —Exhibit G - VRF & VSL Justification			
Exhibit H - Issue Table and Mapping Document – Optional			
Not Used			
Exhibit I - Guidance Document - Optional			
Not Used			
Exhibit J - Additional Supporting Documentation – Optional			
Not Used			
The above documents have been provided to NERC in MS Word format.			

Electric Reliability and Security for the West

Attachment E1
WECC Standard Authorization Request
WECC-0115 BAL-002-WECC-3
Contingency Reserve
Request to Retire R2

Introduction

This Standard Authorization Request (SAR) was assigned WECC Tracking Number WECC-0115.

On May 6, 2015, WECC received Standard Authorization Request (SAR) WECC-0115 to examine whether to retire BAL-002-WECC-2 Requirement R2.[1] After an affirmative review by the WECC Operating Committee, the SAR was approved by the WECC Standards Committee (WSC) on June 23, 2015. Nominations for the drafting team were received from June 23, 2015 through July 31, 2015. The WSC approved the drafting team roster on August 12, 2015.[2]

Requester Information

Provide your contact information and your alternate's contact information:

Primary contact

- First name: James
- Last name: Wells
- Email: James.wells@ladwp.com
- Phone: (818) 77-6701
- Organization name: Los Angeles Department of Water and Power

Alternate

- First name: W. Shannon
- Last name: Black
- Email: sblack@wecc.org
- Phone: (503) 307-5782

[1] The naming nomenclature changed during development from BAL-002-WECC-2, BAL-002-WECC-2a, and will change to BAL-002-WECC-3 if approved.

[2] This document was added to the WECC Intranet on August 12, 2019, after being updated to WECC's newest document templates. The SAR in its original format is available upon request from the WECC Standards Department.

Type of Request

Specify the type of request: (Select one)

- Request to Modify a Regional Reliability Standard (RRS)

Create, Modify, Retire, or Review a Document

Provide information for your request to create, modify, retire, or review the document.

Pick from the dropdown provided in the online form.

Requested Action (Select one)

- Request to Retire BAL-002-WECC-2, Requirement R2[3]

Document Type (Select one)

- Regional Reliability Standard

Issue

Specify what industry problem this request is trying to resolve.

BAL-003-1, Frequency Response and Frequency Bias Setting

On January 16, 2014, FERC approved BAL-003-1, Frequency Response and Frequency Bias Setting, Requirement R1, with an effective date of April 1, 2016. The text of BAL-003-1, Requirement R1 states:

R1. Each Frequency Response Sharing Group (FRSG) or Balancing Authority that is not a member of a FRSG shall achieve an annual Frequency Response Measure (FRM) that is equal to or more negative than its Frequency Response Obligation (FRO) to ensure that sufficient Frequency Response is provided by each FRSG or BA that is not a member of a FRSG to maintain Interconnection Frequency Response equal to or more negative than the Interconnection Frequency Response Obligation.

BAL-003-1, Requirement R1 is an annual measure requiring a full 12 months of performance measurements, collected through Frequency Response Forms (FRS) 1 and 2, summarizing frequency response settings for participating Balancing Authorities (BA), for a period of December through November of the following year, in accordance with BAL-003-1 and its Attachment A.

[3] On January 24, 2017, the Federal Energy Regulatory Commission (FERC) approved interpretation of BAL-002-WECC-2, which clarified the types of resources that may be used to satisfy Contingency Reserve. The standard's name was changed to BAL-002-WECC-2a.

BAL-003-1, Requirement R1 will become enforceable for frequency events occurring December 2016 through November 2017. Frequency Response Measures for compliance with BAL-003-1, Requirement R1 will be submitted no later than March 7, 2018.

Compliance will be judged against Balancing Authority Frequency Response Obligations (BA FRO) calculated annually based on the Interconnection Frequency Response Obligations (IFROs) calculated and approved by the NERC Operating Committee.

With the implementation of BAL-003-1, standards now exist that define requirements for acceptable Frequency Response from the BA to maintain Interconnection Frequency within predefined bounds by arresting frequency deviations and supporting frequency until the frequency is restored to its scheduled value. Additionally, [BAL-003-1] provides consistent methods for measuring Frequency Response and determining the Frequency Bias Setting.

BAL-002-WECC-2, Contingency Reserve

BAL-002-WECC-2, Requirement R2 becomes redundant as of the April 1, 2016, effective date of BAL-003-1. Further, there is no technical support or reason for retaining BAL-002-WECC-2, Requirement R2 once BAL-003-1 becomes effective.

Leaving BAL-002-WECC-2 in place would require the BA or Reserve Sharing Group to carry additional spinning reserve with the intended purpose of supporting the frequency of the Western Interconnection. The 50 percent spinning reserve requirement has no measurable performance metric with respect to interconnection frequency support.

Proposed Remedy

Specify how this request will address the issue you stated above.

- Retire BAL-002-WECC-2, Contingency Reserve, Requirement R2.

Purpose:

The purpose of this Standard Authorization Request (SAR) is to delete BAL-002-WECC-2, Contingency Reserve, Requirement R2 and Measurement M2. The modification should be coincident with implementation of BAL-003-1, Requirement R1 that specifies BA frequency response obligation and performance measurement. The text of BAL-002-WECC-2, Requirement R2 is as follows:

R2. Each Balancing Authority and each Reserve Sharing Group shall maintain at least half of its minimum amount of Contingency Reserve identified in Requirement R1, as Operating Reserve – Spinning that meets both of the following reserve characteristics. [Violation Risk Factor: High] [Time Horizon: Real-time operations]

2.1 Reserve that is immediately and automatically responsive to frequency deviations through the action of a governor or other control system;

2.2 Reserve that is capable of fully responding within ten minutes.

Removing BAL-002-WECC- 2, Requirement R2 does not change the amount of a BA's contingency reserve requirement specified in BAL-002-WECC-2, Requirement R1.

Operating Reserve will only require reserve fully capable of responding within ten minutes to support the Disturbance Control Standard (DCS).

Applicable Entities

- Balancing Authority
- Reserve Sharing Groups
- Frequency Response Sharing Group

Detailed Description

See above.

Affected Reliability Principles

Which of the NERC Reliability Principles is most affected by this request?

- **Reliability Principle 1** — Interconnected bulk electric systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.

Reference Uploads

Specify the document title, document number, and affected section regarding the request.

- BAL-002-WECC-2, Contingency Reserve, Requirement R2

Additional Comments

Please reference or upload any affected standards, regional business practices, criteria, policies, white papers, technical reports, or other relevant documents. If this request is based on a conflict of law, please include a copy of—or accessible reference to—the specific law or regulatory mandate in conflict.

- None

Electric Reliability and Security for the West

Attachment E2
Project Roadmap
WECC-0115 BAL-002-WECC-3
Contingency Reserve
Request to Retire R2

Description of Current Draft

Per the WECC Reliability Standards Development Procedures (Procedures) this is a request to retire Requirement R2 of BAL-002-WECC-2, Contingency Reserve.

Completed Actions	Date Completed
WECC-0115 Standard Authorization Request (SAR)—Request to Retire Requirement R2 of BAL-002-WECC-2 received and deemed complete	May 6, 2015
WECC Joint Guidance Committee approved the SAR approach	May 27, 2015
WECC Operating Committee approved the SAR approach	June 9, 2015
WECC Standards Committee (WSC) approved the SAR	June 23, 2015
Notice of Solicitation—WECC-0115 Drafting Team	June 29, 2015
Notice of Solicitation—WECC-0115 Drafting Team—Extended	July 14, 2015
Nominations closed	July 31, 2015
WSC approved the team roster	August 12, 2015
Drafting Team (DT) meeting	October 1, 2015
DT Meeting	October 22, 2015
Posting 1—opened	October 22, 2015
Posting 1—closed	December 8, 2015
DT meeting[1]	December 17, 2015
DT meeting—DT approved field test parameters (Exhibit C)	January 7, 2016
WSC updated	September 6, 2016
Field test approval under development by WECC and NERC. The NERC vice president of Standards and Compliance had to approve the test.	
NERC approved WECC request for field test to examine retirement of R2	March 2017
Notice of field test dispatched	April 11, 2017
Field test begins	May 1, 2017

[1] The DT agreed by majority vote to pursue a field trial to determine the potential effects of retiring BAL-002-WECC-2, Requirement R2.

Field test ends	April 30, 2018
DT meeting[2]	October 18, 2018
DT meeting	November 1, 2018
DT meeting	November 29, 2018
DT meeting	January 10, 2019
Posting 2—open	January 18, 2019
Posting 2—closed	February 18, 2019
DT meeting	February 21, 2019
DT meeting	February 28, 2019
Field test ends (originally proposed end date)	March 30, 2019
Initial compliance waiver ends	May 1, 2019
WSC approved for ballot	March 5, 2019
Notice of Ballot Pool forming / Notice of Ballot	March 7, 2019
Ballot Pool opened	March 11, 2019
Notice of Standards Briefing	March 12, 2019
Ballot Pool closed	March 26, 2019
Standards Briefing	March 27, 2019
Ballot opened	March 28, 2019
Ballot closed	April 11, 2019
WSC approves sending to WECC Board of Directors (Board)	June 18, 2019
Board approves for NERC/FERC disposition	June 19, 2019
NERC 45-day comment open	June 20, 2019
NERC 45-day comment closed	August 5, 2019
NERC Board of Trustees approved	August 15, 2019
Filed with FERC	Pending

[2] Analysis of the field test data indicated that sufficient reserves were being carried even though a compliance waiver was in effect. The threshold conclusion was that retirement of Requirement R2 would have no detrimental effect on the grid.

Regional Reliability Standard Submittal Request
Attachment E3

Region:	**Western Electricity Coordinating Council**
Regional Standard Number:	**BAL-002-WECC-3**[1]
Regional Standard Title:	**Contingency Reserve**
Date Submitted:	**August 30, 2019**
Regional Contact Name:	**Steven Rueckert**
Regional Contact Title:	**Director of Standards**
Regional Contact Telephone Number:	**(801) 883-6878**

Request (check all that apply):

- ☒ Retirement of WECC Regional Reliability Standard Requirement BAL-002-WECC-2a (R2)
- ☐ Interpret an existing standard
- ☐ Approval of a new standard
- ☒ Revision of an existing standard: BAL-002-WECC-2a
- ☐ Withdrawal of an existing standard
- ☐ Urgent action

Has this action been approved by your Board of Directors:

- ☒ Yes
- ☐ No

(If no please indicate date standard action is expected along with the current status (e.g., third comment period with anticipated board approval on mm/dd/year)):

On June 19, 2019, the WECC Board of Directors (Board) approved BAL-002-WECC-3 with the following resolution:

[1] The naming nomenclature changed during development from BAL-002-WECC-2, BAL-002-WECC-2a, and will change to BAL-002-WECC-3 if approved.

"Resolved, that the WECC Board of Directors (Board), acting upon the recommendation of the WECC Standards Committee (WSC) at the meeting of the Board on June 19, 2019, hereby approves the retirement of BAL-002-WECC-2a, Contingency Reserve, Requirement R2, the associated Measure M2, and the associated violation risk factor and violation severity levels, as presented and attached hereunto."	
[Note: The purpose of the remaining questions is to provide NERC with the information needed to file the regional standard(s) with FERC. The information provided may to a large degree be used verbatim. It is extremely important for the entity submitting this form to provide sufficient detail that clearly delineates the scope and justification of the request.]	
Concise statement of the basis and purpose (scope) of request:	This project proposes retirement of BAL-002-WECC-3 Contingency Reserve, Requirement R2 on the premise that R2 is redundant to BAL-003-1.1 Frequency Response and Frequency Bias Setting.
Concise statement of the justification of the request:	The project drafting team recommendation to retire Requirement R2 is supported by technical justification (Exhibit C) premised on a NERC-approved field test. Results of the field test indicate that adverse impact on reliability is unlikely. When considering retirement of Requirement R2 it should be noted that BAL-003-1.1 Frequency Response and Frequency Bias Setting represents a measurable performance calculated as an entity's known contribution to frequency response. By contrast, BAL-002-WECC-2a, Requirement R2 has no technical foundation; rather, it represents a negotiated threshold established circa 1998 prior to mandatory standards.

Electric Reliability and Security for the West

Attachment E4

Posting 1

WECC-0115 BAL-002-WECC-3, Contingency Reserve

Request to Retire R2

Memo

Date: October 23, 2019

To: WECC Standards Email List

Subject: WECC-0115 BAL-002-WECC-2—Contingency Reserve Request to Retire Requirement R2

Question for Survey[1]

Do you agree that WECC Regional Standard BAL-002-WECC-2, Contingency Reserve, Requirement R2 should be retired as of the effective date of NERC Standard BAL-003-1[2] (BAL-003), Frequency Response and Frequency Bias Setting, Requirement R1?

If you answered no to the above question, please explain your answer.

Recommendation

The WECC-0115, BAL Drafting Team is recommending retirement of BAL-002-WECC-2, Contingency Reserve, Requirement R2 as of the effective date of BAL-003-1, Frequency Response and Frequency Bias Setting, Requirement R1.

BAL Requirement R1 is not impacted by this project.

Language for Retirement

The language proposed for retirement is as follows:

R2. Each Balancing Authority and each Reserve Sharing Group shall maintain at least half of its minimum amount of Contingency Reserve identified in Requirement R1, as

[1] This document has been updated to reflect the most recent WECC template. The document in its original format is located on the WECC-0115 project page: https://www.wecc.org/Reliability/WECC-0115%20Posting%201%20BAL-002-WECC-2%20Request%20to%20Retire%20R2%20-%2010-23-2015%20through%2012-8-2015.docx

[2] BAL-003-1, Frequency Response and Frequency Bias Setting is approved by the Federal Energy Regulatory Commission (March 24, 2014) and has an enforcement date of April 1, 2016.

Operating Reserve – Spinning that meets both of the following reserve characteristics. *[Violation Risk Factor: High] [Time Horizon: Real-time operations]*

2.1 Reserve that is immediately and automatically responsive to frequency deviations through the action of a governor or other control system;

2.2 Reserve that is capable of fully responding within ten minutes.

Background

On November 21, 2013 in Order 789, the Federal Energy Regulatory Commission (FERC) approved WECC Regional Standard BAL-002-WECC-2 (the WECC BAL) with an Effective Date of October 1, 2014.

The WECC BAL applies to Balancing Authorities and Reserve Sharing Groups in the WECC Region and is meant to specify the quantity (Requirement R1) and types (Requirement R2) of contingency reserve required to ensure reliability under normal and disturbance conditions.

Requirement R1 requires the applicable entity to "maintain a minimum amount of Contingency Reserve" whereas Requirement R2 requires that "at least half of [an entity's] minimum amount of Contingency Reserve identified in Requirement R1, as Operating Reserve – Spinning [must meet specific] reserve characteristics."

To qualify as Operating Reserve—Spinning,[3] the reserve maintained in accordance with Requirement R2 must be:

- Generation synchronized to the system and fully available to serve load [automatically] within the Disturbance Recovery Period following the contingency event; or
- Load fully removable from the system within the Disturbance Recovery Period following the contingency event.

Intent of BAL-002-WECC-2, Requirement R2

The intent of Requirement R2 was to delineate "how" a reserve type must respond without creating a definitive list of the types of reserve that might be used to meet the requirement. This intent was made clear in the WECC-0115, BAL Drafting Team's (DT) Guidance Document that included Frequently Asked Questions (FAQ) regarding the development of the WECC BAL. There the drafting team noted that in the absence of a frequency response standard the original WECC Minimum Operating Reliability Criteria[4] (MORC) needed to have an element that was capable of arresting a frequency excursion and supporting frequency during the recovery period.

[3] See the definition of Operating Reserve contained in the NERC Glossary of Terms Used in NERC Reliability Standards.

[4] WECC Minimum Operating Reliability Criteria, April 6, 2005 (MORC).

The drafting team noted at FAQ 11[5]:

> When the drafting team incorporated the FERC mandated [glossary] terms, it determined that the definition for Contingency Reserve – Spinning did not require that it be automatically responsive to frequency. To fill that void, the drafting team included in the current version [of the WECC BAL] the historical WECC requirement that spinning reserve must be automatically responsive proportionally to frequency deviations. Parenthetically, this approach should also assuage some concerns that the frequency component of the earlier Purpose statement is no longer offered.

The intent of Requirement R2 was to ensure that the right type of reserve was available specifically to address frequency response.

Subsequent to the approval of the WECC BAL, FERC has approved BAL-003 specifically addressing frequency response. The Purpose of BAL-003 is "to require sufficient Frequency Response" from Balancing Authorities and Frequency Response Sharing Groups as specified in the Applicability section of BAL-003. The frequency response component of the WECC BAL's Requirement R2 is now covered in BAL-003; the specific content of BAL-003 directly addresses the indirect and general content of the WECC BAL, and the historical[6] premise for the WECC BAL no longer reflects the present-day granular visibility from one Balancing Authority to another; therefore, the language of the WECC BAL's Requirement R2 should be retired. The reliability-related substance of the WECC BAL is provided for by the frequency response performance components of BAL-003.

Requirement R2—Main Body

BAL-003 is a superior standard to the WECC BAL because BAL-003 is a result-based standard that achieves the WECC BAL's Requirement R2 reliability goal by requiring the applicable entity to perform in accordance with a specified performance metric. By contrast, the WECC BAL has no stated performance requirement or compliance metric associated with requirement2 and is measured solely on documentation presented after-the-fact.

Retention of both WECC BAL Requirement R2 as well as BAL-003 Requirement R1 could lead to confusion and the needless procurement of additional reserve, thereby increasing costs without benefit. The WECC BAL's Requirement R2 specifies procurement of Contingency Reserve, at least one half of

[5] WECC-00083 BAL-002-WECC-1 (and 2), Guidance Document, presented to the industry in Posting 5 of the BAL project and also provided as Attachment S as part of WECC's filing to NERC/FERC that sought approval of the BAL.

[6] The language of the existing BAL is premised on the MORC that was originally drafted to address a 1970s-era paradigm in which visibility, data exchange, and understanding of other Balancing Areas was minimal. During that pre-standards era, frequency deviation was largely addressed by manual and analogue intervention, and interaction between control areas was based on the premise of mutual cooperation not supported by regulatory mandates.

which must be comprised of Operating Reserve—Spinning. The intent of Requirement R2 is to have reserve resources that both arrest and support frequency. BAL-003 meets the same reliability-related goal without specifying the type of resource from which the outcome can be produced. If kept in tandem the result could be that an entity procures a specific amount and type of reserve to meet the WECC BAL and also procures a different and possibly superior resource to meet the separate requirement of BAL-003. As a result, retirement of R2 will not create a reliability gap because BAL-003, Requirement R1 meets the same need. Further, retirement of R2 could actually lower the cost of reliability by eliminating the potential for redundant reserve procurement.[7]

As illustrated in BAL-003, "how" frequency support is achieved need not be prescribed like it is in the WECC BAL. Under the WECC BAL, the response must result from Operating Reserve – Spinning provided in a specific quantity. As pointed out in the supporting documentation for BAL-003, the same reliability-related goal can be met by any of the following: 1) Regulation services, 2) contract services, 3) tariff arrangements, or 4) generator/load agreements. Since the goal of BAL-003, Requirement R1 is to meet a Frequency Response Measure, by definition, Frequency Response can be obtained by either a system or more discrete sub-elements of the system. There is no need to prescribe the specific stockpile of resources as has been done in the WECC BAL's Requirement R2. This position is in accord with that of the BAL-003 drafting team.[8]

Section 2.1

Requirement R2, Section 2.1 can be retired because it is already addressed in BAL-003. Requirement R2.1 requires use of resources that are immediately and automatically responsive to frequency deviations through the action of a governor or other control system. BAL-003, without specifying the stockpile of resources, requires the applicable entity to meet a specific Frequency Response Measure equal to or more negative than its Frequency Response Obligation.

Section 2.2

Requirement R2, Section 2.2 can be retired because it is already addressed in Requirement R2, Section 2.1. Section 2.1 requires the applicable entity to carry reserve "that is immediately and automatically responsive to frequency." Section 2.2 requires the applicable entity to carry reserves "capable of fully responding within ten minutes." Section 2.1's immediate response-time renders the Section 2.2 ten-

[7] A good contract for the acquisition of Frequency Response will provide "a method to evaluate the least cost mix of resources necessary to provide the minimum required Frequency Response for maintain reliability. Finally, it will provide the least complex method of evaluation considering the complexity and efficient of the acquisition process." NERC Frequency Response Standard Background Document, Frequency Response Costs – Supply Side, page 20, November 2012.

[8] NERC Frequency Response Standard Background Document, Methods of Obtaining Frequency Response, page 37, November 2012.

minute response time moot. The drafting team notes the language is a carryover from the MORC and should be updated through retirement.

Implementation Plan

In accordance with the Reliability Standards Development Procedures (Procedures), Step 5- Post for Comment, "[a]n implementation plan shall be included in at least one iterative posting during the development of the [Regional Reliability Standard] and shall be a part of the final record for consideration prior to ballot."

On May 6, 2015, WECC accepted a Standards Authorization Request (SAR) requesting retirement of BAL-002-WECC-02, Contingency Reserve, Requirement R2.

The SAR is located at the Standards Authorization Request accordion of the WECC-0115 BAL-002-WECC-2, Request to Retire Requirement R2 project page.

Procedural approvals are required from:

- The WECC Standards Committee
- The Ballot Pool
- The WECC Board of Directors
- The NERC Board of Trustees
- The Federal Energy Regulation Commission
- Other regulatory bodies as applicable

Proposed Effective Date

The WECC-0115, BAL Drafting Team is recommending retirement of BAL-002-WECC-2, Contingency Reserve, Requirement R2 as of the effective date of BAL-003, Frequency Response and Frequency Bias Setting, Requirement R1.

Justification of Effective Date

The reliability-related substance of WECC BAL's Requirement R2 is contained in BAL-003. Because the reliability task is addressed in BAL-003, once BAL-003 Requirement R1 is effective there will no longer be a need for WECC BAL Requirement R2.

Impact on Other Standards

As to other existing and proposed standards, the drafting team notes that some confusion may arise as to how the retirement of WECC BAL Requirement R2 may interplay with the existing BAL-002-1, Disturbance Control Performance standard. BAL-002-1, Requirement R2.3 requires the applicable entity (the Regional Reliability Organization "or" the Reserve Sharing group) to "specify its Contingency Reserve policies, including…(R2.3.)…the permissible mix of Operating Reserve—Spinning and

Operating Reserve—Supplemental that may be included in Contingency Reserve." Arguably, BAL-002-WECC-2, Requirement R2 meets this requirement.

The drafting team disagrees that retention of BAL-002-WECC-2, Requirement R2 is the only means of compliance with BAL-002-1. At a high level, since BAL-002-1 has no Measure for the associated Requirement R2, how compliance might be met is ethereal. Further, since the only Measure provided requires that the Balancing Authority "or" the Reserve Sharing group "shall calculate and report compliance with the Disturbance Control Standard" there is a decided disconnect between the required performance (have a policy) and the required Measure (perform a calculation).

Consideration of Early Compliance

Retirement of WECC BAL Requirement R2 should not take place until the industry mandate to comply with BAL-003-1 goes into place. Early retirement could create a reliability gap resulting from insufficient reserves.

Not Used

Posting 1 asks only whether BAL-002-WECC-2a Contingency Reserve, Requirement R2 should be deleted. No other language changes were proposed.

Attachment E6

Posting 2—Clean

WECC-0115 BAL-002-WECC-3

Contingency Reserve

Request to Retire R2

WECC

Field Test Results
WECC-0115 BAL-002-WECC-2a
Request to Retire Requirement R2

Standard Drafting Team

March 5, 2019

Executive Summary

After doing a field test from May 1, 2017, through April 30, 2018, the WECC-0115 BAL-002-WECC-2a, Contingency Reserve, Request to Retire Requirement R2 Drafting Team (DT) concluded that if Requirement R2 is retired, it is unlikely to have an adverse impact on reliability.

On May 6, 2015, WECC received Standard Authorization Request (SAR) WECC -0115 BAL-002-WECC -2a Contingency Reserve, Request to Retire Requirement R2 (R2) requesting retirement of R2 and its compliance elements. The SAR stated that on April 1, 2016, R2 would become redundant to BAL-003-1.1 Frequency Response and Frequency Bias Settings, Requirement R1.

From May 1, 2017, through April 30, 2018, WECC did a NERC-approved field test to find out the impact on reliability if R2 was retired.[1] A compliance waiver for R2 was granted beginning on May 1, 2017 and ending on May 1, 2019.

WECC required U.S. entities to provide data on the quantity of reserve carried during the field test period. This was done to enable WECC to see the impacts of the field test, as a condition to take part in the field test, and to meet conditions from NERC in approving WECC's request for a field test. The data showed no adverse impact to reliability if R2 is retired.

Project WECC-0115 will not be balloted until this report is presented for review to the WECC Ballot Pool and the requirements of the NERC Rules of Procedure, 6.3 Communication and Coordination for All Types of Field Tests and Data Analyses have been met by NERC.

[1] The field test was approved by NERC in late March 2017 and conducted per NERC Standards Processes Manual, Section 6.2, Field Tests and Data Analysis for Validation of Requirement.

Table of Contents

Figures

Introduction

On May 6, 2015, WECC received Standard Authorization Request (SAR) WECC-0115 BAL-002-WECC-2a, Contingency Reserve requesting retirement of Requirement R2 (R2). The SAR was deemed complete the same day. The SAR asserted that, on April 1, 2016, Requirement R2 would become redundant to BAL-003-1.1, Requirement R1, Frequency Response and Frequency Bias Setting.

On June 23, 2015, the WECC Standards Committee (WSC) approved the SAR after vetting by the WECC Operating Committee Steering Committee (OC; June 9, 2015) and the Joint Guidance Committee (JGC; May 27, 2015).

From October 22 through December 8, 2015, the project was posted once for comment, during which stakeholders were asked a question:

> Do you agree that WECC Regional Standard BAL-002-WECC-2,[2] Contingency Reserve, Requirement R2 should be retired as of the effective date of NERC Standard BAL-003-1[3] (BAL-003), Frequency Response and Frequency Bias Setting, Requirement R1?

Three entities responded to the posting and were in favor of retirement.[4] After discussion with staff, the DT and WECC staff[5] agreed that a field test should be done to gauge the impact of retiring R2.

A NERC-approved field test was done from May 1, 2017, through April 30, 2018. The field test data is the foundation of this paper and was posted for comment as Posting 2 of this project. Posting 2 received three comments, one for retirement and two suggesting caution.

Field Test Description

Data Source and Description

The field test data was requested from each Balancing Authority (BA) and each Reserve Sharing Group (RSG) subject to R2. Data was received by WECC through an online WECC portal.

The data request included the following information:

[2] During this project, the BAL-002-WECC-2 designation changed to BAL-002-WECC-2a on January 24, 2017, in FERC Docket No. RD17-3-000. The BAL-003-1 designation changed to BAL-003-1.1 on November 13, 2015, in FERC Docket RD15-6-000.

[3] BAL-003-1, Frequency Response and Frequency Bias Setting is approved by the FERC on March 24, 2014 and has an enforcement date of April 1, 2016.

[4] Xcel Energy, Bonneville Power Administration, and WECC.

[5] Steven Rueckert, WECC Director of Standards, and Phil O'Donnell, WECC Manager, Operations and Planning Audits and Investigations.

1. For any reportable Disturbance Control Standard (DCS) event, the date and time of the event, the required amount of Contingency Reserves at the time of the event, the actual amount of Operating Reserves-Spinning at the time of the event, and the actual DCS performance.[6]
2. For all instances of a loss of resources 700 MW or greater, whether it is a reportable DCS event or not, the date and time of the event, the name of the resource(s), and the total MW loss.

Objective

The field test was designed to determine whether retirement of R2 would have any adverse impact on grid reliability. The test examined the impact on Disturbance Control Standard (DCS[7]) performance and frequency response in the Western Interconnection.

Overview

The first metric, DCS performance, monitored the performance of each RSG and each BA that was not a member of an RSG, for every reportable DCS event, to see whether any were unable to meet the DCS recovery period for a DCS event. More information was requested from the participants to calculate the ratio for required contingency reserve to Operating Reserve-Spinning for each qualified event.

The second metric watched system performance for any loss of resources greater than 700 MW and for any adverse impact on frequency response.[8] Data for this metric was collected using the same information used by NERC to collect information to perform analysis on interconnection frequency response analysis for the NERC State of Reliability and Frequency Response Annual Analysis reports.

Field Test Analysis and Results

BAL-002-WECC-2a, Requirement R2 was intended to do two things: 1) to aid in frequency recovery (through governor action) for large generation loss events across the Western Interconnection, and 2) to provide a part of the Contingency Reserves (on-line generation minus 10-minute response) for generation trip events within the BA or RSG, if the party is an RSG member. With the implementation of new standards and a change of generation resources in the Western Interconnection, the SAR was based on the presumptions that BAL-002-WECC-2a, Requirement R2 became redundant as of the April

[6] During the field test, only the DCS responsible entity was asked to provide data during DCS events. Entities that did not have a reportable DCS event were not requested to provide data.

[7] "The reliability standard that sets the time limit following a Disturbance within which a BA must return its Area Control Error to within a specified range." NERC Glossary of Terms Used in Reliability Standards (Glossary).

[8] The DT noted that the WECC Interconnection Frequency Response Obligation (IFRO) is roughly -840 MW per 0.1 HZ. The 700-MW loss was chosen as a more conservative number than the IFRO and represents a value large enough to cause a significant frequency excursion. For an example, see Frequency Response Analysis Tool, Dmitry Kosterev, Bonneville Power Administration, 2014. https://www.wecc.org/Reliability/Frequency%20Response%20Analysis%20-%20Dmitry%20Kosterev.pdf

1, 2016, effective date of BAL-003-1.1 Frequency Response and Frequency Bias Setting, and that, with its retirement, neither interconnection frequency performance metrics nor DCS performance would degrade.

With the implementation of BAL-003-01.1, frequency response became measurable, and the field test gave entities a compliance waiver for WECC BAL-002-WECC-2a Requirement R2, thus splitting DCS and frequency response. Entities were responsible for ensuring both reliability performance metrics were met. On that basis, the data captured from the field test was used with interconnection frequency response performance data to assess any impact to individual DCS performance as well as overall interconnection frequency performance.

Data Description

Data from the field test covered 66 DCS events. During each of those events, entities provided data to help assess DCS performance. This data included Contingency Reserve Obligation, Required Spin (assuming no compliance waiver), Actual Spin, and whether Area Control Error recovery was met to successfully pass the DCS event. See Table 1 for the data set collected.

Table 1—DCS Event Field Test Data

Entity #	Reported MW Loss	DCS Event	Contingency (Cont) Reserve Obligation	Required Spin	Actual Spin	Pass(x)	Cont/Spin (Pre-Contingency Value)
Entity 3	530	Yes	585	293	878	x	150.09%
Entity 3	480	Yes	585	293	1165	x	199.15%
Entity 5	341	Yes	2624	1312	5595	x	213.22%
Entity 5	309	Yes	2528	1264	4095	x	161.99%
Entity 5	310	Yes	2830	1415	4428	x	156.47%
Entity 5	294	Yes	2992	1496	4010	x	134.02%
Entity 5	480	Yes	2349	1174.5	4360	x	185.61%
Entity 5	375	Yes	3068	1534	4986	x	162.52%
Entity 5	393	Yes	3106	1553	3989	x	128.43%
Entity 5	587	Yes	2373	1187	4483	x	188.92%
Entity 5	628	Yes	3124	1562	4201	x	134.48%
Entity 5	388	Yes	3211	1606	4217	x	131.33%
Entity 5	838	Yes	2988	1494	4223	x	141.33%
Entity 5	353	Yes	3234	1617	4658	x	144.03%
Entity 2	655	Yes	656	328	552	x	84.26%
Entity 5	356	Yes	3646	1823	5956	x	163.36%
Entity 5	619	Yes	3732	1866	6193	x	165.94%
Entity 2	430	Yes	468	234	417	x	89.11%
Entity 5	513	Yes	3514	1757	6063	x	172.54%
Entity 5	519	Yes	2823	1412	6001	x	212.58%
Entity 5	748	Yes	3688	1844	6271	x	170.04%

Entity #	Reported MW Loss	DCS Event	Contingency (Cont) Reserve Obligation	Required Spin	Actual Spin	Pass(x)	Cont/Spin (Pre-Contingency Value)
Entity 5	630	Yes	3024	1512	6680	x	220.90%
Entity 2	**442**	**Yes**	**538**	**269**	**231**	**x**	**42.97%**
Entity 5	506	Yes	3610	1805	6703	x	185.68%
Entity 5	760	Yes	3742	1871	6133	x	163.90%
Entity 5	522	Yes	3612	1806	5698	x	157.75%
Entity 5	1061	Yes	3791	1896	6799	x	179.35%
Entity 5	411	Yes	2964	1482	5358	x	180.77%
Entity 5	1882	Yes	2497	1249	4952	x	198.32%
Entity 5	486	Yes	3536	1768	5855	x	165.58%
Entity 5	475	Yes	3422	1711	6647	x	194.24%
Entity 5	723	Yes	3006	1503	8401	x	279.47%
Entity 5	796	Yes	3293	1647	5844	x	177.47%
Entity 5	492	Yes	3174	1587	5111	x	161.03%
Entity 5	460	Yes	5129	2565	9318	x	181.67%
Entity 5	398	Yes	5614	2807	11920	x	212.33%
Entity 5	1150	Yes	5231	2616	13142	x	251.23%
Entity 5	1699	Yes	6028	3014	9288	x	154.08%
Entity 5	786	Yes	5874	2937	9350	x	159.18%
Entity 5	479	Yes	5155	2578	14798	x	287.06%
Entity 3	538	Yes	585	293	1329	x	227.23%
Entity 5	714	Yes	5869	2935	11056	x	188.38%
Entity 5	656	Yes	6090	3045	14291	x	234.66%
Entity 5	760	Yes	5517	2759	8679	x	157.31%
Entity 3	790	Yes	790	395	1607	x	203.42%
Entity 2	496	Yes	573	286	379	x	66.15%
Entity 5	1046	Yes	8090	4045	12613	x	155.91%
Entity 5	493	Yes	7099	3550	12659	x	178.32%
Entity 5	651	Yes	3351	1676	5962	x	177.92%
Entity 1	388	Yes	1040	520	979	x	94.13%
Entity 4	851	Yes	2181	1091	1091	x	50.02%
Entity 1	970	Yes	1037	519	1151	x	110.99%
Entity 4	1059	Yes	1175	588	600	x	51.06%
Entity 3	582	Yes	790	395	924	x	116.96%
Entity 2	**800**	**Yes**	**565**	**283**	**234**	**x**	**41.44%**
Entity 1	471	Yes	1040	520	1359	x	130.67%
Entity 1	699	Yes	1041	521	1426	x	136.98%
Entity 4	**817**	**Yes**	**1543**	**772**	**768**	**x**	**49.77%**
Entity 5	1026	Yes	2832	1416	6038	x	213.21%
Entity 5	850	Yes	2741	1371	6543	x	238.71%

Entity #	Reported MW Loss	DCS Event	Contingency (Cont) Reserve Obligation	Required Spin	Actual Spin	Pass(x)	Cont/Spin (Pre-Contingency Value)
Entity 5	660	Yes	2691	1346	5911	x	219.66%
Entity 1	500	Yes	1040	520	1589	x	152.79%
Entity 5	506	Yes	3206	1603	5893	x	183.81%
Entity 5	707	Yes	3056	1528	5952	x	194.76%
Entity 1	322	Yes	1020	510	1454	x	142.55%
Entity 4	866	Yes	1186	593	672	x	56.66%

All 66 events had a 100-percent pass rate showing no degradation to DCS performance. With the BAL-002-WECC-2a R2 compliance waiver in effect, entities carried and deployed enough reserves for post disturbance ACE recovery. Also, Spinning Reserve more than the required 50 percent was carried during all but three events. Of the remaining 63, on average the entity was carrying 166.38 percent Spinning Reserve as opposed to 50 percent Spinning Reserve required by the standard. In the remaining three events, the entities carried an average of 5.3 percent less Spinning Reserve than mandated.[9]

Western Interconnection frequency performance was assessed to further determine the impact of the field test on the Interconnection. Frequency performance data was collected for the 32 events having a verified resource loss of more than 700 MW.

According to NERC, Essential Reliability Services (ERS) Measure 4[10] is a comprehensive set of Frequency Response measures capturing speed of Frequency Response and response withdrawal at all relevant time frames:

- Point A to C frequency response in MW/0.1 Hz;
- Point A to B frequency response in MW/0.1 Hz (similar to Adequate Level of Reliability (ALR)-12);
- C:B Ratio;
- C:C' Ratio; and
- Three time-based measures: t0 to tC, tC to tC', and t0 to tC'.

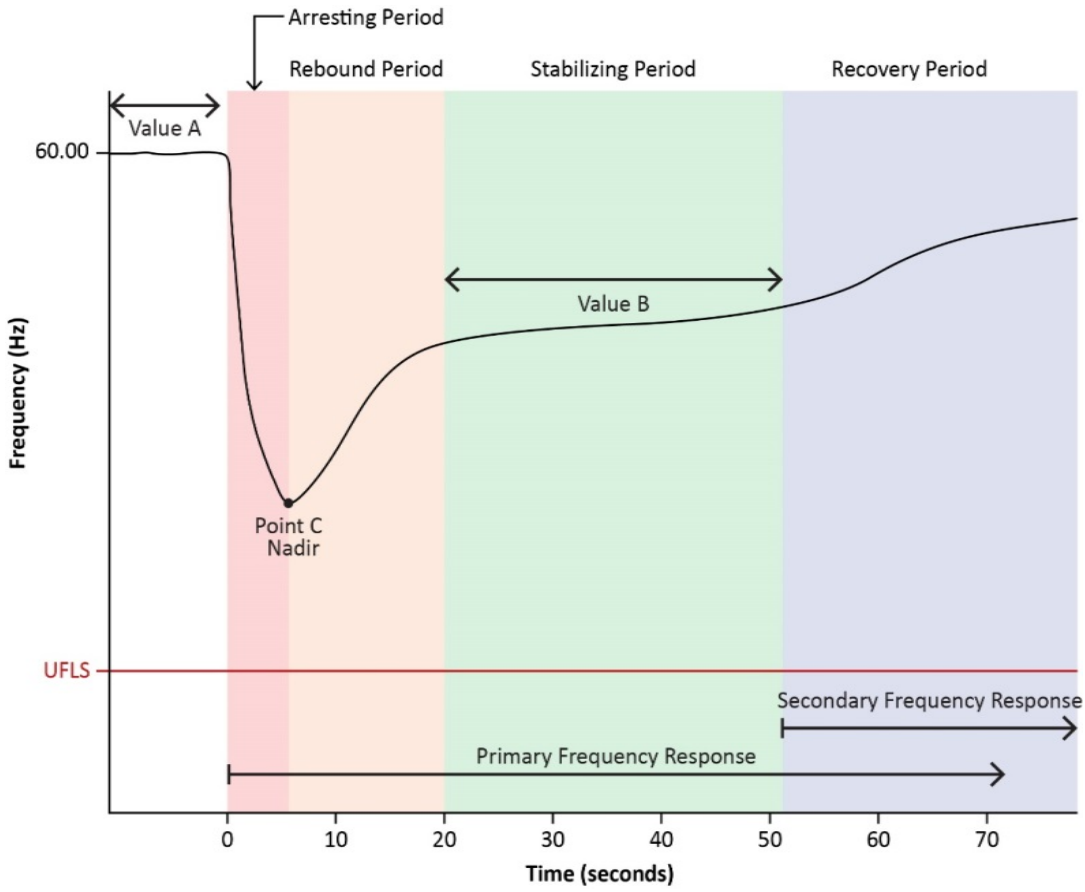
Figure 1 shows a frequency deviation due to a loss of generation resource and the methodology for calculating frequency response. The event starts at time t0. Value A is the average frequency from t-16 to t-2 seconds, Point C is the lowest frequency point observed in the first 12 seconds, and Value B is the

[9] This analysis does not speculate on why reporting entities carried more reserve than required. It only notes that excess reserves were carried.

[10] Please note that, although similar in title, *NERC's Essential Reliability Services (ERS) Measure 4* (page 8) is different from *NERC's State of Reliability Report, Metric M-4* (page 9).

average from t+20 to t+52 seconds. Point C' occurs when the frequency after 52 seconds falls below either the Point C (12 seconds) or average Value B (20–52 seconds), as illustrated below.

Figure 1—Frequency Deviation due to Loss of Generation Resource



Per the NERC State of Reliability Report, Metric M-4 has two parts of interest: 1) performance of the Western Interconnection to arrest the frequency decline after a loss of generation event to prevent activation of underfrequency load shedding (UFLS), and 2) performance of the Western Interconnection to stabilize quickly at a high enough frequency to successfully respond to a second frequency event, should one occur.[11]

- Arresting Period: In 2017, the Western Interconnection experienced an event in which the Point C nadir was 59.697 Hz, resulting in a Point C to UFLS margin of 0.197 Hz, the smallest margin since a 0.171-Hz event in 2014. The resource MW losses for these two events were 2,685 MW and 2,826 MW, respectively. This is more than double the mean resource MW loss for each year and larger than the Resource Contingency Criteria of 2,626 MW, which is defined in the 2016

[11] NERC State of Reliability, June 2018, Appendix E: Frequency Response Statistics and Essential Reliability Services, DADS Metric 4: Performance—Demand Response Events by Month—Dispatched vs. Realized, page 112. https://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/NERC_2018_SOR_06202018_Final.pdf

Frequency Response Annual Analysis and used to calculate 2017 IFRO. Over the 2013–2017 operating years, the Western Interconnection trend was neither statistically improving nor declining. This indicates that the BAL-002-WECC-2a field test did not adversely impact Western Interconnection arresting period frequency performance.

- Stabilizing Period: The mean frequency response in 2017 of 1,836 MW/0.1 Hz was the highest of all years evaluated in this report. The Western Interconnection had no events in 2017 in which its interconnection frequency response measure (IFRM) was below its IFRO, including the event noted above, wherein the Point C nadir to UFLS margin was less than 0.200 Hz. Frequency response over the 2013–2017 operating years indicated that the Western Interconnection experienced significant improvement during the stabilizing period. This indicates that the BAL-002-WECC-2a field test did not adversely impact Western Interconnection stabilizing period frequency performance.

Figure 2—Table 2.1 from NERC 2018 State of Reliability Report, June 2018

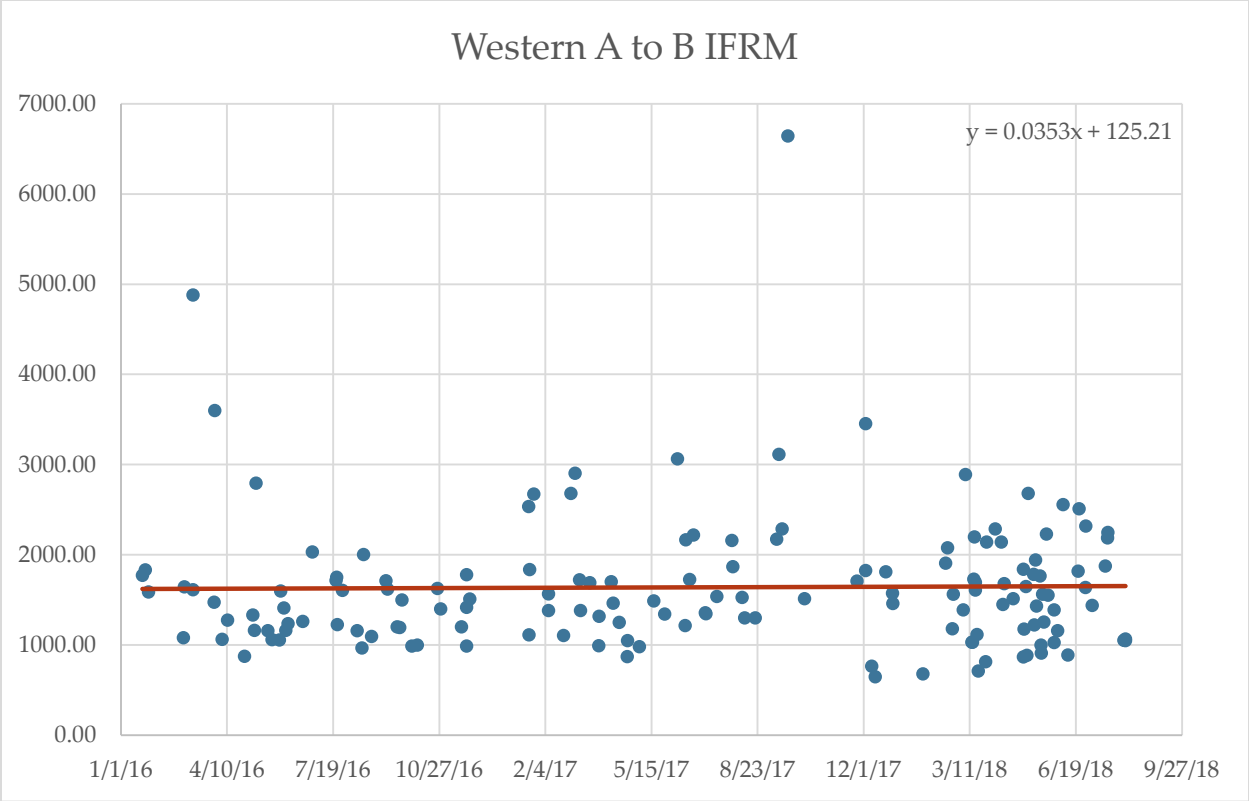
Table 2.1: Interconnection Performance Summary Statistics

Interconnection	2017 OY Largest Resource Loss		2017 OY Lowest A-B IFRM Performance		2013–2017 OY Arresting Period Performance Trend	2013–2017 OY Stabilizing Period Performance Trend
	MW Loss	UFLS Margin (Hz)	MW Loss	UFLS Margin (Hz)		
Eastern	1,661	0.453	511	0.472	Improving	No Change
Texas	1,219	0.433	369	0.603	Improving	Improving
Quebec	954	0.873	314	1.199	Improving	No Change
Western	2,776	0.210	383	0.450	No Change	Improving

Below is a summary of Western Interconnection frequency performance metrics:

1. A to B frequency response shows the effectiveness of primary frequency response in stabilizing frequency after a large frequency excursion. This measure is the conventional means of calculating Frequency Response as the ratio of net MW lost to the difference between Point A and Point B frequency values.

Figure 3—A to B IFRM



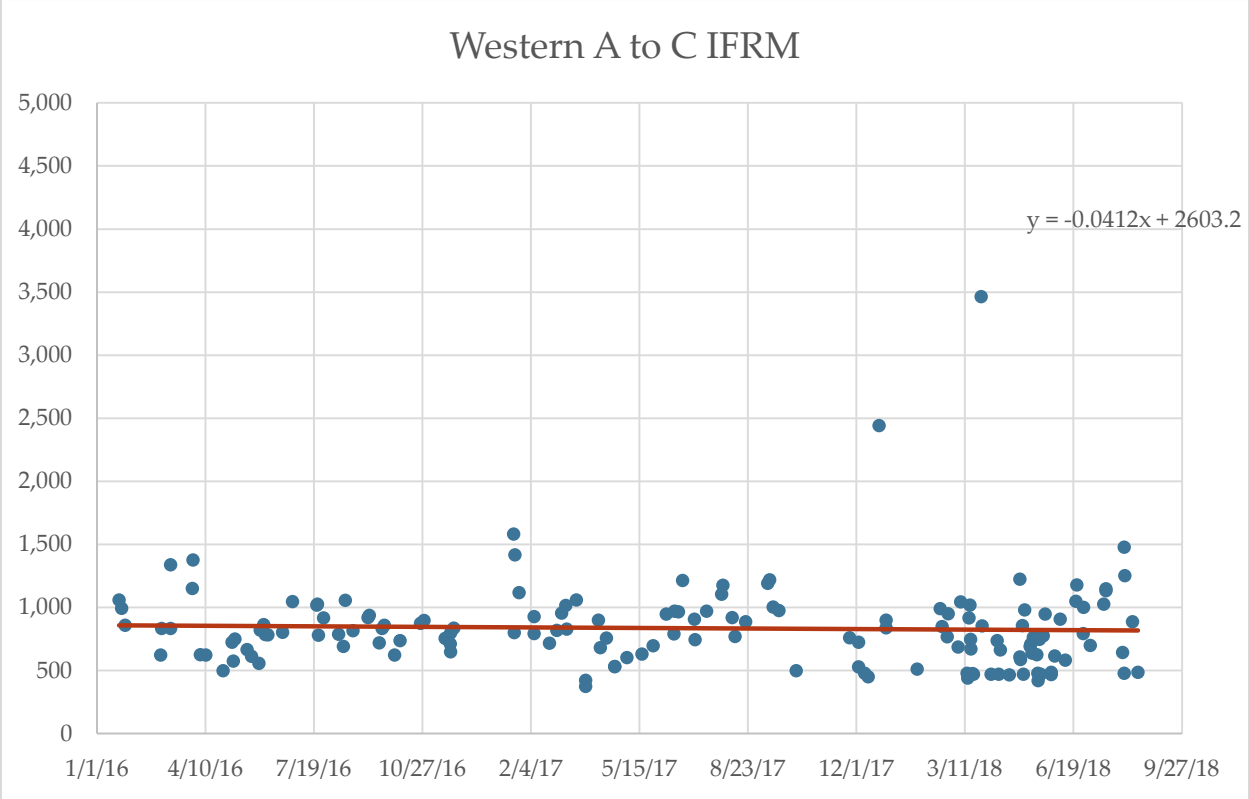
An increasing trend indicates that frequency response is improving. The Western Interconnection A to C metric shows no degradation.

For Example:

- 60.0 Hz pre-event (A frequency), Loss of 1,000 MW, 59.9 Hz primary frequency response (B frequency)
  - A to B Measure = 1,000 MW/0.1 HZ
- 60.0 Hz pre-event (A frequency), Loss of 1,500 MW, 59.9 Hz primary frequency response (B frequency)
  - A to B Measure = 1,500 MW/0.1 HZ
  - A to B measure increases, showing that larger loss of resource results in same post-event disturbance
- 60.0 Hz pre-event (A frequency), Loss of 1,000 MW, 59.92 Hz primary frequency response (B frequency)
  - A to B Measure = 1,250 MW/0.1 HZ
  - A to B measure increases, showing that the same loss in resource results in higher post-event (primary frequency response measure)

2. A to C frequency response shows the impacts of inertial response, load response (load damping), and initial governor response. Governor response is triggered immediately after frequency exceeds a pre-set deadband; however, depending on generator technology, full governor response may require up to 30 seconds to be fully deployed. This measure is calculated as the ratio of net megawatts lost to the difference between Point A and Point C frequency values.

Figure 4—A to C IFRM



An increasing trend indicates that frequency response is improving. The Western Interconnection A to C metric shows no degradation.

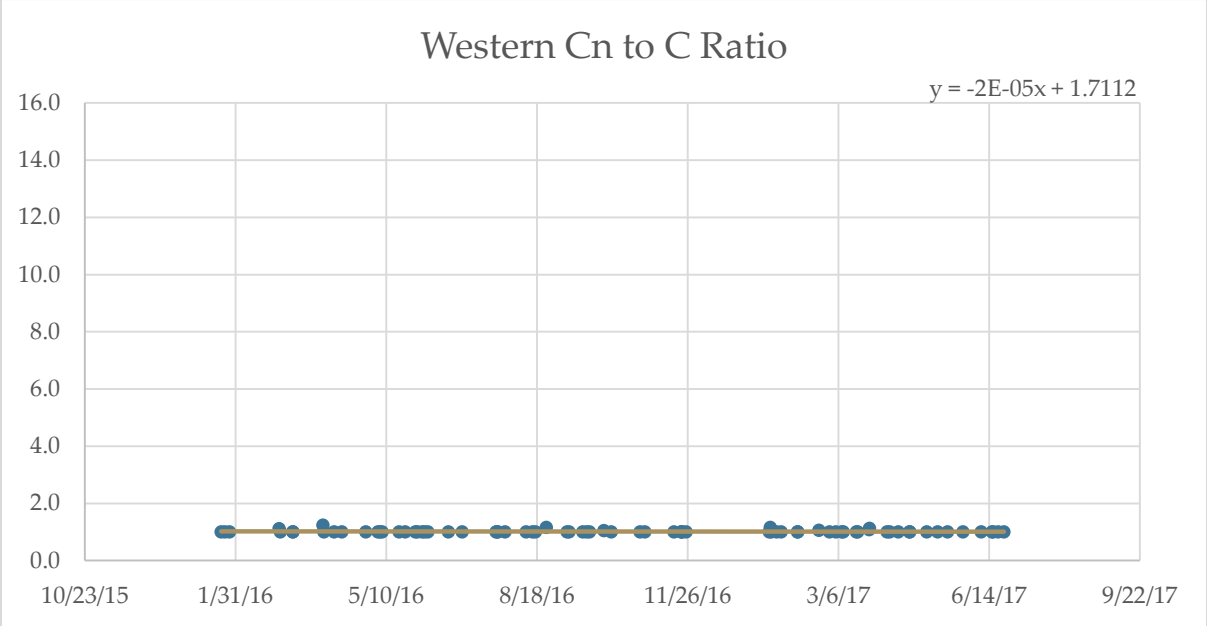
For Example:

- 60.0 Hz pre-event (A frequency), Loss of 1000 MW, 59.85 Hz lowest frequency (C frequency)
  - A to C Measure = 667 MW/0.1 HZ
- 60.0 Hz pre-event (A frequency), Loss of 1500 MW, 59.85 Hz lowest frequency (C frequency)
  - A to C Measure = 1000 MW/0.1 HZ
  - A to C measure increases, representing that larger loss of resource results in same post event disturbance

- 60.0 Hz pre-event (A frequency), Loss of 1000 MW, 59.90 Hz lowest frequency (C frequency)
  - A to C Measure = 1000 MW/0.1 HZ
  - A to C measure increases, representing that the same loss in resource results in higher post event (primary frequency response measure)

3. Cn to C is the ratio between the absolute frequency minimum (Point Cn) caused by governor withdrawal and the initial nadir (Point C). This metric measures withdrawal of primary frequency response. A response greater than 1.0 indicates withdrawal. A declining trend is an indication of improving primary frequency response. The Western Interconnection has shown no indications of response withdrawal.

Figure 5—Cn to C Ratio



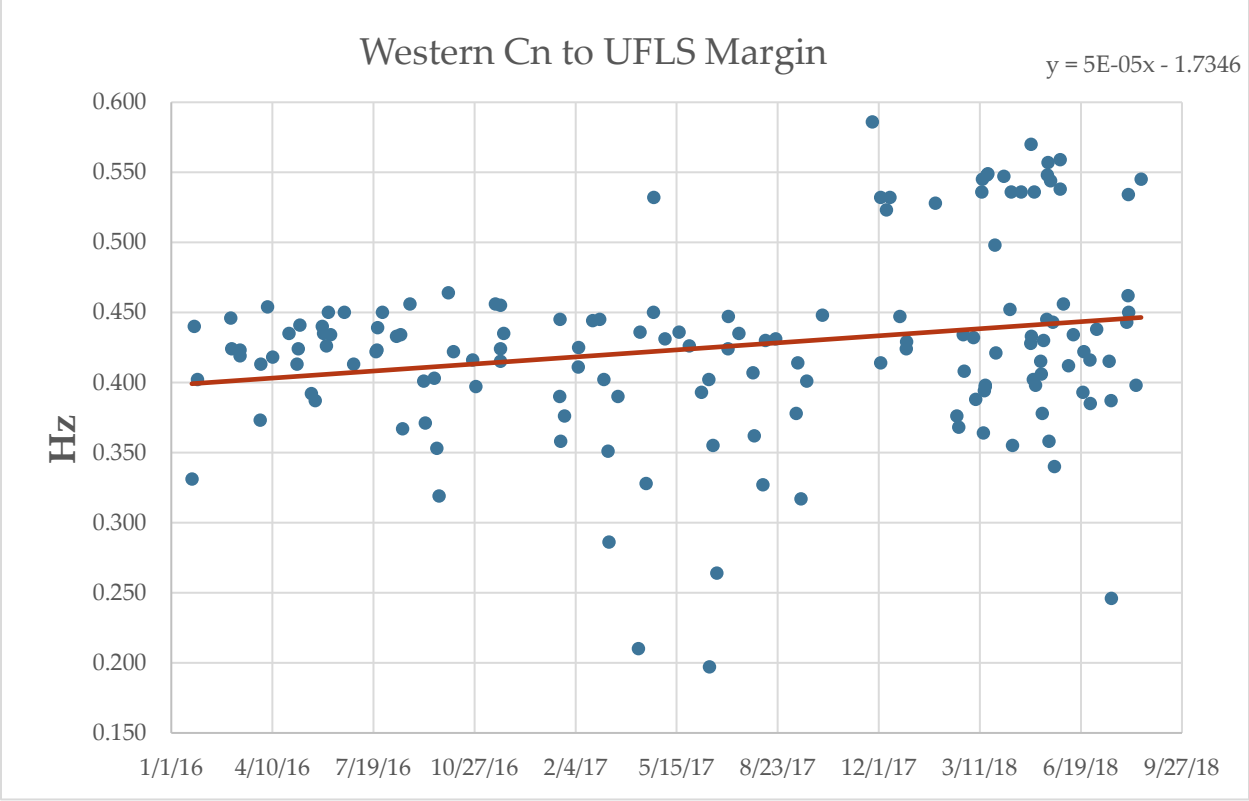
When this white paper was drafted, Cn data was only publicly available through August 2017. However, in addition to trended data, the NERC Frequency Response Annual Analysis, published November 2018, also shows that the Western Interconnection continues to experience no frequency response withdrawal during the BAL-002-WECC-2a field test.

Figure 6—Table 2.2 from NERC 2018 Frequency Response Annual Analysis, November 2018

Table 2.2: Statistical Analysis of the Adjustment for C' Nadir (BC'_{adj})						
Interconnection	Number of Events Analyzed	C' Lower than B	C' Lower than C	Mean Difference	Standard Deviation	BC'ADJ (95% Quantile)
Eastern	112	66	34	0.005	0.003	0.006
Western	86	45	0	N/A	N/A	N/A
ERCOT	143	61	2	N/A	N/A	N/A
Québec	135	31	12	-0.019	0.028	-0.004

4. Cn to UFLS ratio measures the margin between the frequency nadir and the first step in UFLS.

Figure 7—Cn to UFLS margin



The trend does show a statistical increase in UFLS margin. It should also be noted that the magnitude of the resource loss has a direct impact on Interconnection performance calculation as measured by IFRMs and Point C to UFLS margins. During 2017 and 2018, there were three events in which the

resource loss was 2,776 MW, 2,685 MW, and 2741 MW; more than double the mean resource MW loss for each year and larger than the defined Resource Contingency Criteria of 2,626 MW.[12]

One event occurred on April 6, 2017, 11:00 p.m. PDT when the field test was not in effect and the other two events on June 16, 2017, at 5:14 a.m. PDT and July 18, 2018, at 5:30 p.m. PDT when the field test was in effect. All events, however, had comparable results and significant UFLS margin before and after the field test. Also, all three events had an IFRM that exceeded the IFRO.

Per the WECC Off-Nominal Frequency Load Shedding Plan (UFLSP), load shedding occurs sequentially in five blocks with a minimum separation of 0.1 Hz between steps. UFLS entities taking part in the UFLS plan (aka, Coordinated Plan) are required to shed their first block of load as soon as frequency has declined to 59.5 Hz.[13]

[12] See the 2017 Frequency Response Annual Analysis https://www.nerc.com/comm/OC/Documents/2017_FRAA_Final_20171113.pdf#search=2017%20Frequency%20Response%20Annual%20Analysis

[13] "UFLS Entities participating in the Coordinated Plan are required to shed their first block of load as soon as frequency has declined to 59.5 Hz, with additional minimum requirements for further load shedding steps" (as set forth in the accompanying table)." WECC Off-Nominal Frequency Load Shedding Plan, Coordinated Plans, P. 1a, page 8, December 5, 2012.

WECC receives data used in its analyses from a wide variety of sources. WECC strives to source its data from reliable entities and undertakes reasonable efforts to validate the accuracy of the data used. WECC believes the data contained herein and used in its analyses is accurate and reliable. However, WECC disclaims any and all representations, guarantees, warranties, and liability for the information contained herein and any use thereof. Persons who use and rely on the information contained herein do so at their own risk.

Attachment E7
Posting 2 - Redline
WECC-0115 Contingency Reserve
Request to Retire Requirement R2

Field Test Results
BAL-002-WECC-~~2~~2a
Retirement of Requirement R2

WECC-0115 BAL-002-WECC-~~2~~2a
Request to Retire Requirement R2
Standard Drafting Team

~~January 14~~March 5, 2019

155 North 400 West, Suite 200
Salt Lake City, Utah 84103-1114

Executive Summary[1]

After conducting a field test from May 1, 2017 through April 30, 2018, the WECC ~~concluded there would be no detrimental impact to the reliability of the Western Interconnection if~~ -0115 BAL-002-WECC-~~2~~2a, Contingency Reserve, Request to Retire Requirement R2 ~~were to be~~Drafting Team (DT) concluded that if Requirement R2 is retired~~.~~, it is unlikely to result in any detrimental impact to reliability.

On May 6, 2015, WECC received Standard Authorization Request (SAR) WECC -0115 BAL-002-WECC -~~2~~2a Contingency Reserve, Request to Retire Requirement R2 (R2) requesting retirement of R2 and its associated compliance elements ~~(WECC BAL).~~ The SAR asserted that on April 1, 2016, R2 would become redundant to BAL-003-1.1 Frequency Response and Frequency Bias Settings, Requirement R1 ~~(NERC BAL).~~

From May 1, 2017 through April 30, 2018, WECC conducted a NERC-approved field test to determine the impact on reliability in the event R2 was retired.[2] A compliance waiver for R2 was granted beginning on May 1, 2017 and concluding on May 1, 2019.

To enable WECC to monitor the reliability impacts of the field test, as a condition to participation in the field test, and to meet conditions specified by NERC in approving WECC's request for a field test, WECC required United States entities to provide specified information regarding the quantity of reserve carried during the field test period. As seen in the following sections, that data showed no detrimental impact to reliability in the event R2 is retired.

Project WECC-0115 will not be balloted until this report is presented for review to the appropriate WECC Ballot Pool and the NERC requirements of the NERC Rules of Procedure, 6.3 Communication and Coordination for All Types of Field Tests and Data Analyses have been met by NERC.

[1] This document was updated to WECC's newest template when Posting 2 was finalized. This document can be reviewed in its original format at https://www.wecc.org/Reliability/WECC-0115%20Posting%202%20BAL-002-WECC-2%20Request%20to%20Retire%20R2%20-%20Redlined%20in%20Response%20to%20Comments%203-1-2019.docx. Its updated format is presented with this filing as WECC-0115 BAL-002-WECC3 – Contingency Reserve – Attachment E6 – Posting 2 Clean.

[2] The field test was approved by NERC in late March 2017 and conducted per NERC Standards Processes Manual, Section 6.2, Field Tests and Data Analysis for Validation of Requirement.

Table of Contents

Introduction

On May 6, 2015, WECC received Standard Authorization Request (SAR) WECC-0115 BAL-002-WECC-~~2~~2a, Contingency Reserve requesting retirement of Requirement R2 (R2) of that standard. The SAR was deemed complete the same day. The SAR asserted that on April 1, 2016, Requirement R2 would become redundant to ~~NERC~~ BAL-003-1.1, Requirement R1, Frequency Response and Frequency Bias Setting ~~(NERC BAL)~~.

On June 23, 2015, the WECC Standards Committee (WSC) approved the SAR after a favorable vetting by the WECC Operating Committee Steering Committee (OC; June 9, 2015) and the Joint Guidance Committee (JGC; May 27, 2015).

From October 22 through December 8, 2015, the project was posted once for comment, during which stakeholders were asked a single question:

> Do you agree that WECC Regional Standard BAL-002-WECC-2[3], Contingency Reserve, Requirement R2 should be retired as of the effective date of NERC Standard BAL-003-1[4] (BAL-003), Frequency Response and Frequency Bias Setting, Requirement R1?

Three entities responded to the Posting and were in favor of retirement.[5] After discussion with WECC staff[6], the DT and WECC staff were in accord that a field trial should be pursued to evaluate the impact of retiring R2.

A NERC-approved field test was conducted from May 1, 2017 through April 30, 2018. The data from that field test formed the foundation of this paper and was posted for comment, appearing as Posting 2 of this project. Posting 2 received three comments, one in favor of retirement and two suggesting caution.

Field Test Description

Data Source and Description

[3] Over the course of this project, the BAL-002-WECC-2 designation changed to BAL-002-WECC-2a on January 24, 2017 (FERC Docket No. RD17-3-000. The BAL-003-1 designation changed to BAL-003-1.1 on November 13, 2015, in FERC Docket RD15-6-000.

[4] BAL-003-1, Frequency Response and Frequency Bias Setting is approved by the Federal Energy Regulatory Commission (March 24, 2014) and has an enforcement date of April 1, 2016.

[5] Xcel Energy, Bonneville Power Administration, and the Western Electricity Coordinating Council (WECC)

[6] Mr. Steven Rueckert, WECC Director of Standards and Mr. Phil O'Donnell, WECC Manager, Operations and Planning Audits and Investigations

The field test data was requested from each Balancing Authority and each Reserve Sharing Group subject to ~~Requirement~~ R2 ~~of the BAL~~. Data was received by WECC through an existing online WECC portal for receipt of such reports.

The data ~~requested~~request included the following information:

1) For any reportable Disturbance Control Standard (DCS) event, the date and time of the event, the required amount of Contingency Reserves at the time of the event, the actual amount of Operating Reserves – Spinning at the time of the event, and the actual DCS performance.[7]

2) For all instances of a loss of resources 700 MW or greater, whether it is a reportable DCS event or not, the date and time of the event, the name of the resource(s), and the total MW loss.

Objective

The field test was designed to determine whether retirement of R2 would have any negative impact on grid reliability. To make that determination, the test examined the impact on Disturbance Control Standard (DCS[8]) performance and frequency response within the Western Interconnection.

Overview

The first metric, DCS performance, monitored the performance of each Reserve Sharing Group (RSG) and each Balancing Authority (BA) that was *not* a member of an RSG, for every reportable DCS event, to determine whether any of the participants were unable to meet the DCS recovery period for a DCS event. Additional information was requested from the participants to provide information to calculate the ratio for required contingency reserve to Operating Reserve-Spinning for each qualified event.

The second metric watched system performance for any loss of resources greater than 700 MW and watched for any negative impact on frequency response.[9] Information for this metric was collected by using the same information that is used by NERC to collect information to perform analysis on interconnection frequency response analysis for the NERC State of Reliability and Frequency Response Annual Analysis reports.

[7] During the field test, data collection only the DCS responsible entity was required to provide data during DCS events. Entities that did not have a reportable DCS event were not requested to provide data.

[8] "The reliability standard that sets the time limit following a Disturbance within which a Balancing Authority must return its Area Control Error to within a specified range." NERC Glossary of Terms Used in Reliability Standards (Glossary)

[9] The DT noted that the WECC Interconnection Frequency Response Obligation (IFRO) is roughly -840 MW per 0.1 HZ. The 700 MW loss was chosen as a more conservative number than the IFRO and represents a value suitably large to cause a significant frequency excursion. For illustrative purposes only see Frequency Response Analysis Tool, Dmitry Kosterev, Bonneville Power Administration, 2014. https://www.wecc.org/Reliability/Frequency%20Response%20Analysis%20-%20Dmitry%20Kosterev.pdf

Field Test Analysis and Results

BAL-002-WECC-~~2~~2a, Requirement R2 was originally intended to accomplish two purposes: 1) aid in frequency recovery (through governor action) for large generation loss events across the Western Interconnection, and 2) provide a part of the Contingency Reserves (on-~~-~~line generation minus 10-minute response) for generation trip events within the BA or RSG, if the party is an RSG member. With the implementation of new standards and an evolution of generation resources in the Western Interconnection the rational of the ~~Standards Authorization Request~~SAR was based on the presumptions that BAL-002-WECC-~~2~~2a, Requirement R2 became redundant as of the April 1, 2016 effective date of BAL-003-1.1 Frequency Response and Frequency Bias Setting, and that with its retirement neither interconnection frequency performance metrics nor Disturbance Control Standards (DCS) performance would degrade.

With the implementation of ~~NERC~~ BAL-003-01.1, frequency ~~responsive reserve~~response became a measurable quantity, and the field test provided entities a compliance waiver for WECC BAL-002-WECC-~~2~~2a Requirement R2, thus decoupling DCS and frequency response. Entities were ultimately responsible to ensure both reliability performance metrics were met. Based on ~~the~~that rational, the data captured from the field test ~~will is~~was used in conjunction with interconnection frequency response performance data to assess any impact to individual DCS performance as well as overall interconnection frequency performance.

Data Description

Data received as part of the field test covered ~~sixty-six~~66 DCS events. During each of those events, entities were required to provide data to help assess DCS performance including: Contingency Reserve Obligation, Required Spin (assuming no compliance waiver), Actual Spin, and whether ~~ACE~~Area Control Error recovery was met to successfully pass the DCS event. Reference "DCS Event Field Test Data" below for the data set collected.

DCS Event Field Test Data

Entity #	Reported MW Loss	DCS Event	Contingency (Cont) Reserve Obligation	Required Spin	Actual Spin	Pass(x)	Cont/Spin (Pre-Contingency Value)
Entity 3	530	Yes	585	293	878	x	150.09%
Entity 3	480	Yes	585	293	1165	x	199.15%
Entity 5	341	Yes	2624	1312	5595	x	213.22%
Entity 5	309	Yes	2528	1264	4095	x	161.99%
Entity 5	310	Yes	2830	1415	4428	x	156.47%
Entity 5	294	Yes	2992	1496	4010	x	134.02%
Entity 5	480	Yes	2349	1174.5	4360	x	185.61%
Entity 5	375	Yes	3068	1534	4986	x	162.52%

Entity 5	393	Yes	3106	1553	3989	x	128.43%
Entity 5	587	Yes	2373	1187	4483	x	188.92%
Entity 5	628	Yes	3124	1562	4201	x	134.48%
Entity 5	388	Yes	3211	1606	4217	x	131.33%
Entity 5	838	Yes	2988	1494	4223	x	141.33%
Entity 5	353	Yes	3234	1617	4658	x	144.03%
Entity 2	655	Yes	656	328	552	x	84.26%
Entity 5	356	Yes	3646	1823	5956	x	163.36%
Entity 5	619	Yes	3732	1866	6193	x	165.94%
Entity 2	430	Yes	468	234	417	x	89.11%
Entity 5	513	Yes	3514	1757	6063	x	172.54%
Entity 5	519	Yes	2823	1412	6001	x	212.58%
Entity 5	748	Yes	3688	1844	6271	x	170.04%
Entity 5	630	Yes	3024	1512	6680	x	220.90%
Entity 2	**442**	**Yes**	**538**	**269**	**231**	**x**	**42.97%**
Entity 5	506	Yes	3610	1805	6703	x	185.68%
Entity 5	760	Yes	3742	1871	6133	x	163.90%
Entity 5	522	Yes	3612	1806	5698	x	157.75%
Entity 5	1061	Yes	3791	1896	6799	x	179.35%
Entity 5	411	Yes	2964	1482	5358	x	180.77%
Entity 5	1882	Yes	2497	1249	4952	x	198.32%
Entity 5	486	Yes	3536	1768	5855	x	165.58%
Entity 5	475	Yes	3422	1711	6647	x	194.24%
Entity 5	723	Yes	3006	1503	8401	x	279.47%
Entity 5	796	Yes	3293	1647	5844	x	177.47%
Entity 5	492	Yes	3174	1587	5111	x	161.03%
Entity 5	460	Yes	5129	2565	9318	x	181.67%
Entity 5	398	Yes	5614	2807	11920	x	212.33%
Entity 5	1150	Yes	5231	2616	13142	x	251.23%
Entity 5	1699	Yes	6028	3014	9288	x	154.08%
Entity 5	786	Yes	5874	2937	9350	x	159.18%
Entity 5	479	Yes	5155	2578	14798	x	287.06%
Entity 3	538	Yes	585	293	1329	x	227.23%
Entity 5	714	Yes	5869	2935	11056	x	188.38%
Entity 5	656	Yes	6090	3045	14291	x	234.66%
Entity 5	760	Yes	5517	2759	8679	x	157.31%
Entity 3	790	Yes	790	395	1607	x	203.42%
Entity 2	496	Yes	573	286	379	x	66.15%
Entity 5	1046	Yes	8090	4045	12613	x	155.91%
Entity 5	493	Yes	7099	3550	12659	x	178.32%
Entity 5	651	Yes	3351	1676	5962	x	177.92%
Entity 1	388	Yes	1040	520	979	x	94.13%
Entity 4	851	Yes	2181	1091	1091	x	50.02%

Entity 1	970	Yes	1037	519	1151	x	110.99%
Entity 4	1059	Yes	1175	588	600	x	51.06%
Entity 3	582	Yes	790	395	924	x	116.96%
Entity 2	**800**	**Yes**	**565**	**283**	**234**	**x**	**41.44%**
Entity 1	471	Yes	1040	520	1359	x	130.67%
Entity 1	699	Yes	1041	521	1426	x	136.98%
Entity 4	**817**	**Yes**	**1543**	**772**	**768**	**x**	**49.77%**
Entity 5	1026	Yes	2832	1416	6038	x	213.21%
Entity 5	850	Yes	2741	1371	6543	x	238.71%
Entity 5	660	Yes	2691	1346	5911	x	219.66%
Entity 1	500	Yes	1040	520	1589	x	152.79%
Entity 5	506	Yes	3206	1603	5893	x	183.81%
Entity 5	707	Yes	3056	1528	5952	x	194.76%
Entity 1	322	Yes	1020	510	1454	x	142.55%
Entity 4	866	Yes	1186	593	672	x	56.66%

All ~~sixty-six~~66 events were passed successfully demonstrating a 100~~%~~ percent pass rate and signaling no degradation to DCS performance. With the BAL-002-WECC-~~2~~2a R2 compliance waiver in effect, entities carried and deployed sufficient reserves necessary for post disturbance ACE recovery. Additionally, Spinning Reserve exceeding the required 50~~%~~ percent was carried during all but three events. Of the remaining 63 events, on average the entity was carrying 166.38~~%~~ percent Spinning Reserve as opposed 50~~%~~ percent Spinning Reserve required by the standard. In the remaining three events, the entities carried an average of 5.3~~%~~ percent less Spinning Reserve than mandated. ~~It can only be speculation as to why entities were carrying greater than 50% Spinning Reserve during events (Regulation, load ramping, renewable generation variability, Frequency Response).~~[10]

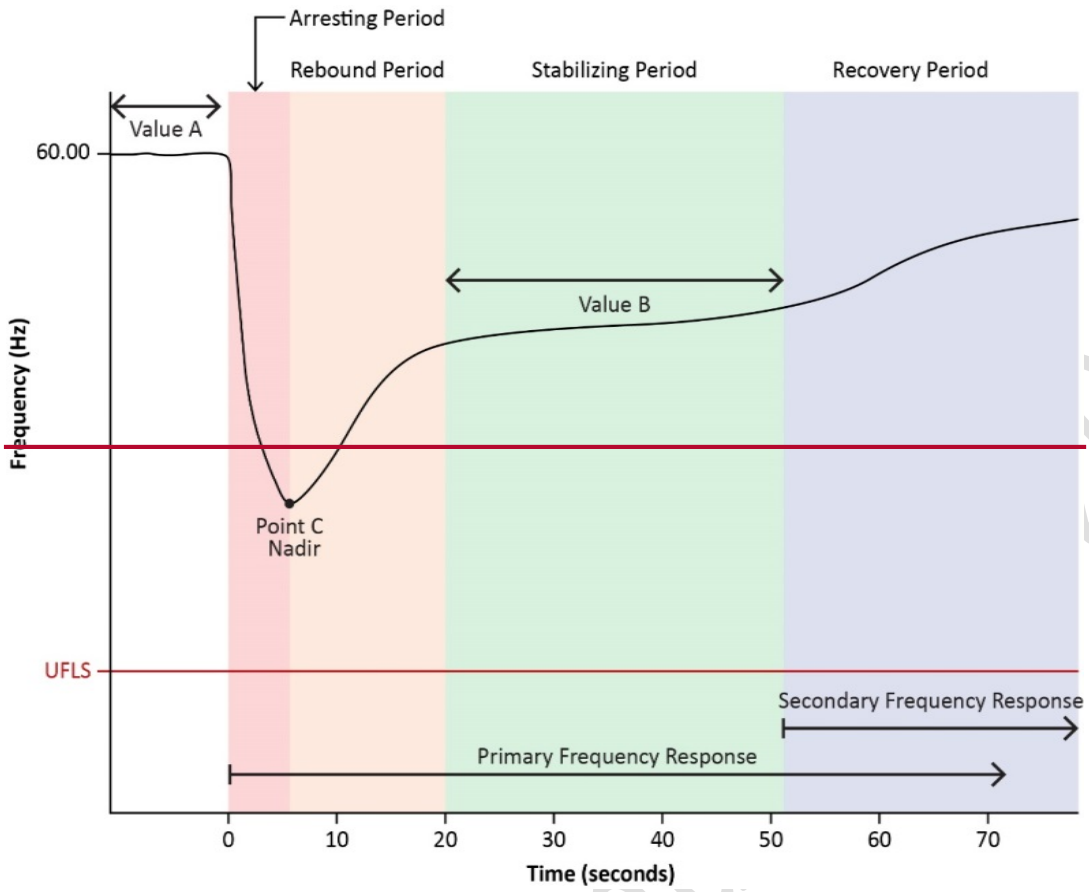
Western Interconnection frequency performance was assessed to further determine the impact of the field test on the Interconnection. Frequency performance data was collected for the 32 events having a verified resource loss of more than 700 MW.

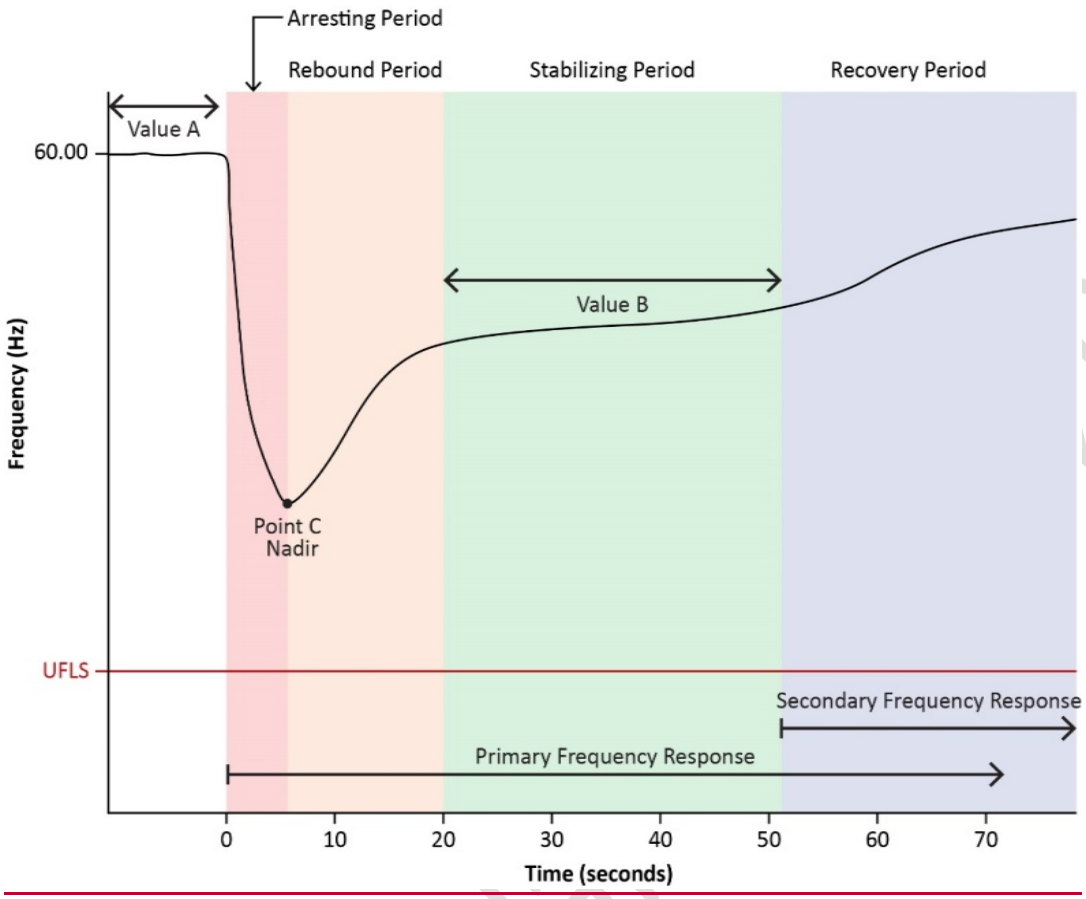
According to NERC, Essential Reliability Services (ERS) Measure 4 is a comprehensive set of frequency response measures at all relevant time frames: Point A to C frequency response in MW/0.1 Hz, Point A to B frequency response in MW/0.1 Hz (similar to Adequate ~~level~~Level of Reliability (ALR) -12), C:B Ratio, C:C' Ratio as well as three time-based measures (t0 to tC, tC to tC', t0 to tC'), capturing speed of frequency response and response withdrawal.[11] The figure illustrates a frequency deviation due to a loss of generation resource and the methodology for calculating frequency response. The event starts at time t0. Value A is the average frequency from t-16 to t-2 seconds, Point C is the lowest frequency

[10] This analysis does not speculate on why reporting entities carried more reserve than required. It only notes the empirical fact that reserves in excess were indeed carried.

[11] Please note that although similar in title, *NERC's Essential Reliability Services (ERS) Measure 4* (white paper page 5) is not the same as *NERC's State of Reliability Report, Metric M-4* (page 6).

point observed in the first 12 seconds and Value B is the average from t+20 to t+52 seconds. Point C' occurs when the frequency after 52 seconds falls below either the Point C (12 seconds) or average Value B (20 – 52 seconds), as illustrated below.





Per the NERC State of Reliability Report, Metric M-4 has two components of primary interest: 1) performance of the Western Interconnection to arrest the frequency decline after a loss of generation event to prevent activation of Under Frequency Load Shedding, and 2) performance of the Western Interconnection to stabilize quickly at a high enough frequency to successfully respond to a second frequency event, should one occur.[12]

- Arresting Period: In 2017, the Western Interconnection experienced an event where the Point C nadir was 59.697 Hz, resulting in a Point C to UFLS margin of 0.197 Hz, the smallest margin since a 0.171 Hz event in 2014. The resource MW loss for these two events were 2,685 MW and 2,826 MW, respectively, more than double the mean resource MW loss for each year and larger Resource Contingency Criteria of 2,626 MW defined in the 2016 Frequency Response Annual Analysis and used to calculate 2017 Interconnection Frequency Response Obligation (IFRO). Over the 2013–2017 operating years, the Western Interconnection trend was neither

[12] NERC Sate of Reliability, June 2018, Appendix E: Frequency Response Statistics and Essential Reliability Services, DADS Metric 4: Performance—Demand Response Events by Month—Dispatched vs. Realized, page 112. https://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/NERC_2018_SOR_06202018_Final.pdf

statistically improving nor declining. This indicates that the BAL-002-WECC-~~2~~2a field test did not adversely impact Western Interconnection arresting period frequency performance.

- Stabilizing period: The mean frequency response in 2017 of 1,836 MW / 0.1 Hz was the highest of all years evaluated in this report. The WI had no events in 2017 where its IFRM was below its IFRO, including the event noted above where the Point C nadir to UFLS margin was less than 0.200 Hz. Frequency response over the 2013–2017 operating years indicated that the Western Interconnection experienced statistically significant improvement during the stabilizing period. This indicates that the BAL-002-WECC-~~2~~2a field test did not adversely impact western interconnection stabilizing period frequency performance

Table 2.1 provides a summary of the Interconnection performance statistics discussed above.

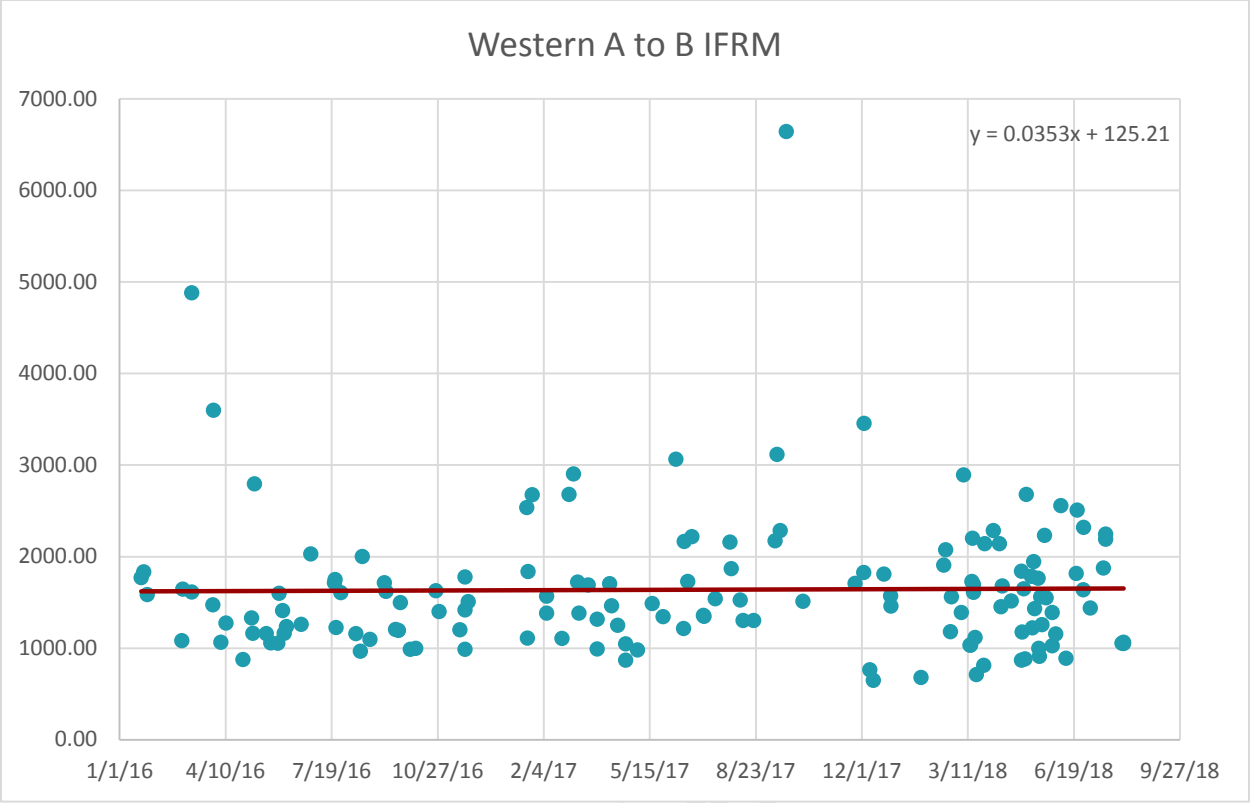
Table 2.1: Interconnection Performance Summary Statistics

Interconnection	2017 OY Largest Resource Loss		2017 OY Lowest A-B IFRM Performance		2013–2017 OY Arresting Period Performance Trend	2013–2017 OY Stabilizing Period Performance Trend
	MW Loss	UFLS Margin (Hz)	MW Loss	UFLS Margin (Hz)		
Eastern	1,661	0.453	511	0.472	Improving	No Change
Texas	1,219	0.433	369	0.603	Improving	Improving
Quebec	954	0.873	314	1.199	Improving	No Change
Western	2,776	0.210	383	0.450	No Change	Improving

**NERC 2018 State of Reliability Report published June 2018*

Below is a summary of Western Interconnection frequency performance metrics:

1) A to B frequency response captures the effectiveness of primary frequency response in stabilizing frequency following a large frequency excursion. This Measure is the conventional means of calculating Frequency Response as the ratio of net MW lost to the difference between Point A and Point B frequency values.



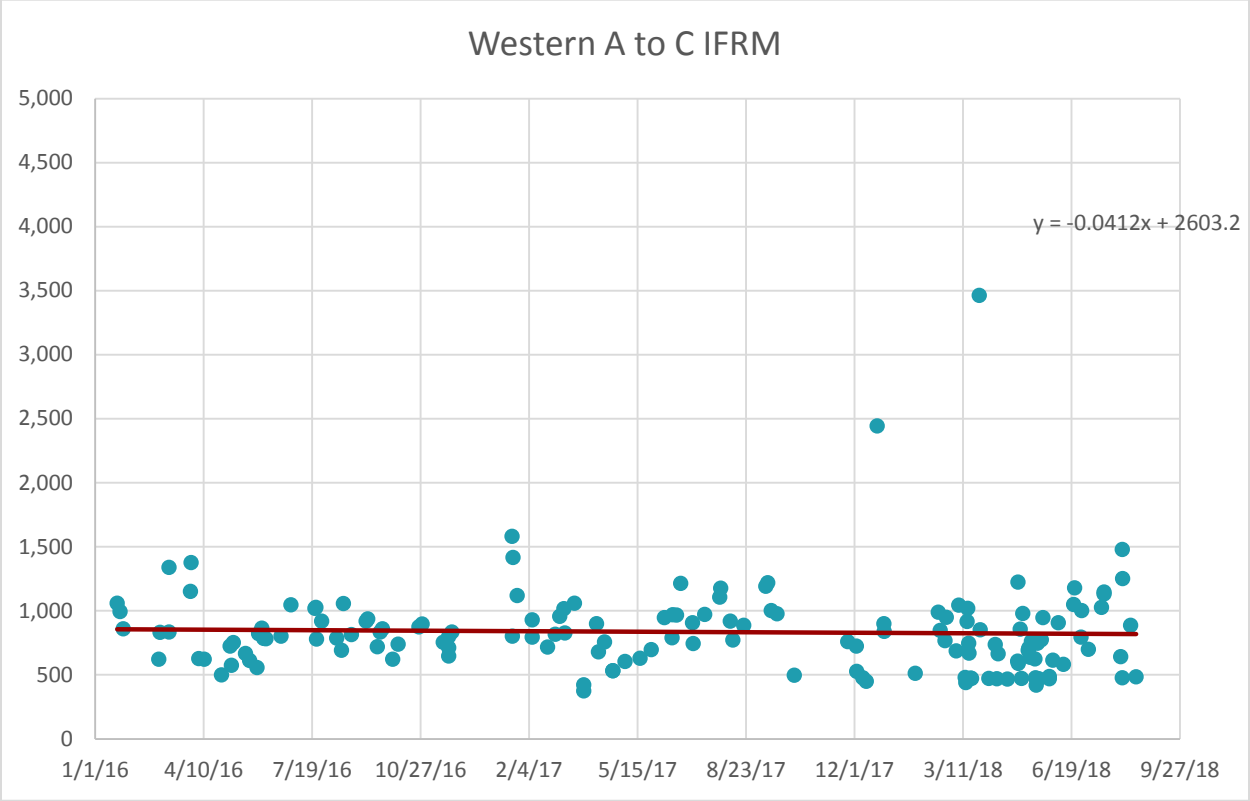
An increasing trend over time indicates that frequency response is improving. -The Western Interconnection A to C metric shows no degradation.

For Example:

- 60.0 Hz pre-event (A frequency), Loss of 1000 MW, 59.9 Hz primary frequency response (B frequency)
  - A to B Measure = 1000 MW/0.1 HZ
- 60.0 Hz pre-event (A frequency), Loss of 1500 MW, 59.9 Hz primary frequency response (B frequency)
  - A to B Measure = 1500 MW/0.1 HZ
  - A to B measure increases, representing that larger loss of resource results in same post event disturbance
- 60.0 Hz pre-event (A frequency), Loss of 1000 MW, 59.92 Hz primary frequency response (B frequency)
  - A to B Measure = 1250 MW/0.1 HZ
  - A to B measure increases, representing that the same loss in resource results in higher post event (primary frequency response measure)

2) A to C frequency response captures the impacts of inertial response, load response (load damping) and initial governor response (governor response is triggered immediately after

frequency exceeds a pre-set deadband; however, depending on generator technology, full governor response may require up to 30 seconds to be fully deployed). This Measure is calculated as the ratio of net megawatts lost to the difference between Point A and Point C frequency values.

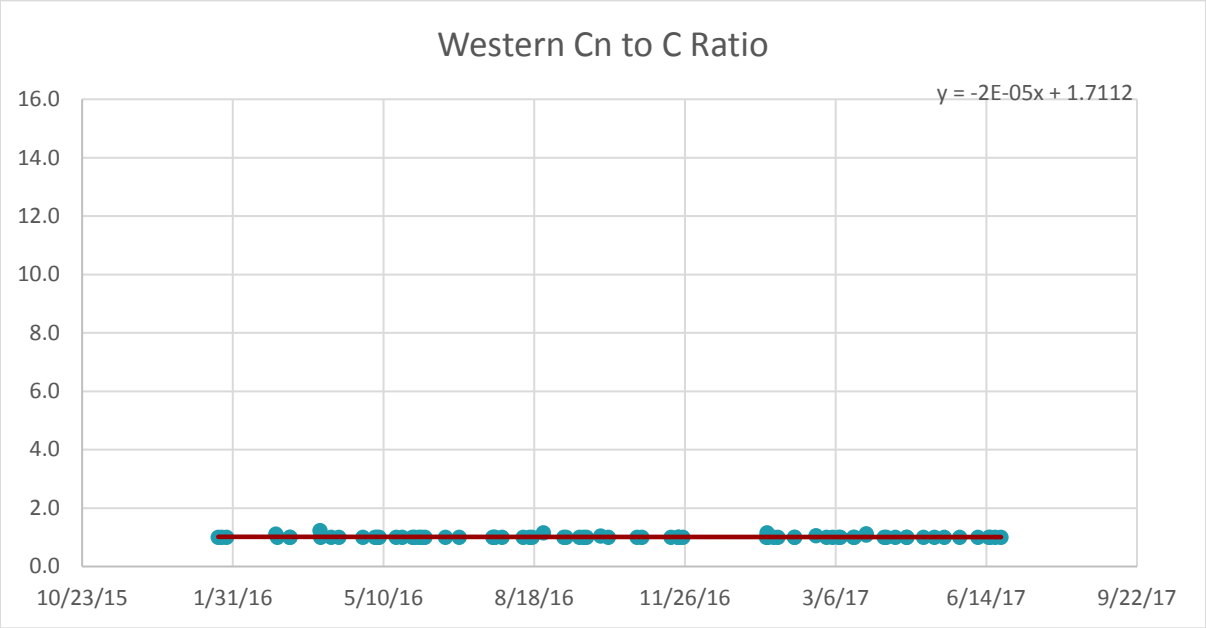


An increasing trend over time indicates that frequency response is improving. The Western Interconnection A to C metric shows no degradation.

- Generic Example:
  - 60.0 Hz pre-event (A frequency), Loss of 1000 MW, 59.85 Hz lowest frequency (C frequency)
    - A to C Measure = 667 MW/0.1 HZ
  - 60.0 Hz pre-event (A frequency), Loss of 1500 MW, 59.85 Hz lowest frequency (C frequency)
    - A to C Measure = 1000 MW/0.1 HZ
    - A to C measure increases, representing that larger loss of resource results in same post event disturbance
  - 60.0 Hz pre-event (A frequency), Loss of 1000 MW, 59.90 Hz lowest frequency (C frequency)
    - A to C Measure = 1000 MW/0.1 HZ

- A to C measure increases, representing that the same loss in resource results in higher post event (primary frequency response measure)

3) Cn to C is the ratio between the absolute frequency minimum (Point Cn) caused by governor withdrawal and the initial nadir (Point C). This metric measures withdrawal of primary frequency response. A response greater than 1.0 indicates withdrawal. A declining trend is an indication of improving primary frequency response. The Western Interconnection has shown no indications of response withdrawal.



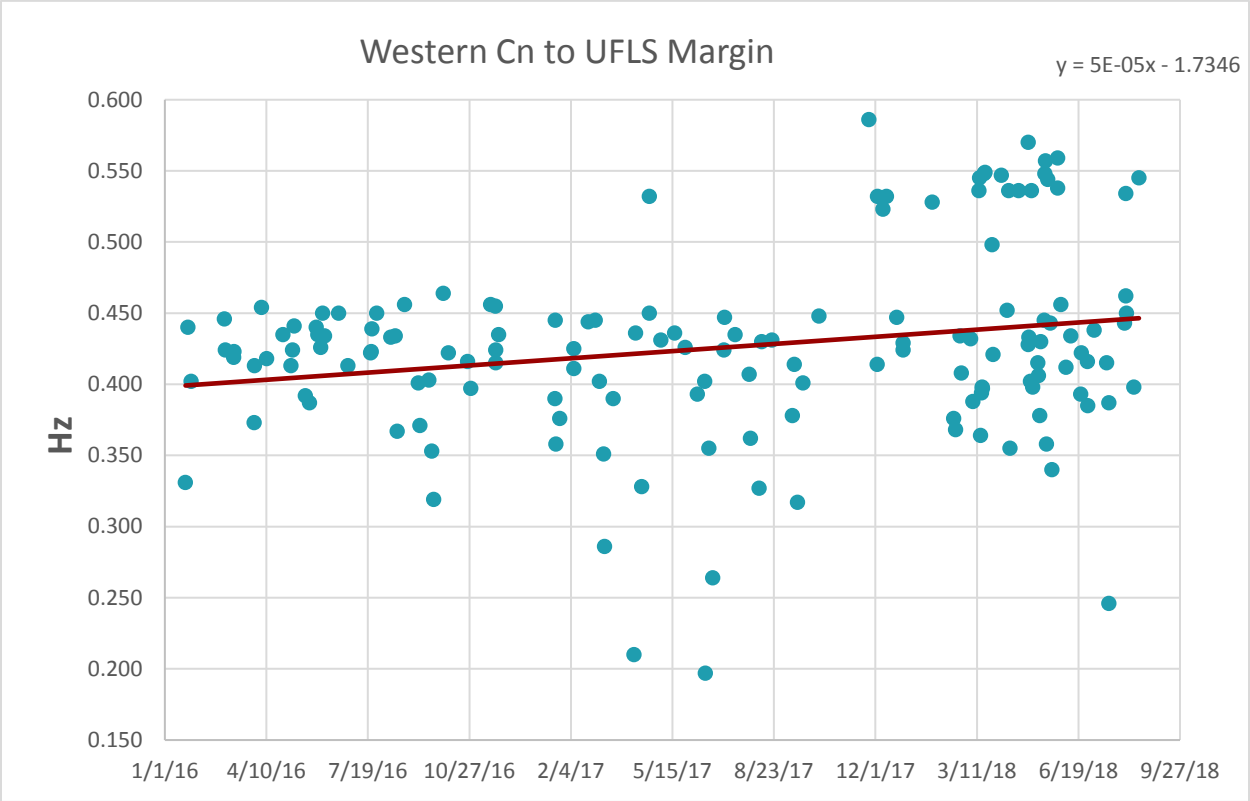
~~At the time of the drafting~~When this white paper was drafted, Cn data was only publicly available through August 2017. However, in addition to trended data, the NERC Frequency Response Annual Analysis published November 2018 also demonstrates the Western Interconnection ~~has continued~~continues to ~~not~~ experience no frequency response withdraw during the time of the BAL-002-WECC-~~2~~2a Field Test.

Table 2.2: Statistical Analysis of the Adjustment for C' Nadir (BC'_{adj})

Interconnection	Number of Events Analyzed	C' Lower than B	C' Lower than C	Mean Difference	Standard Deviation	BC'ADJ (95% Quantile)
Eastern	112	66	34	0.005	0.003	0.006
Western	86	45	0	N/A	N/A	N/A
ERCOT	143	61	2	N/A	N/A	N/A
Québec	135	31	12	-0.019	0.028	-0.004

**NERC 2018 Frequency Response Annual Analysis published November 2018*

4) Cn to USLF ratio measures the margin between the frequency nadir and the first step in Under Frequency Load Shed (UFLS).



The trend does show a statistical increase in UFLS margin. It should also be noted that the magnitude of the resource loss has a direct impact on Interconnection performance calculation as measured by IFRMs and Point C to UFLS margins. During 2017 and 2018, there were three events where the resource loss was 2,776 MW, 2,685 MW and 2741 MW, more than double the mean resource MW loss for each year and larger than the defined Resource Contingency Criteria of 2,626 MW.[13]

One event occurred on April 6, 2017, 11:00 p.m. (Pacific) when the field test was not in effect and the other two events on June 16, 2017 at 5:14 a.m. (Pacific) and July 18, 2018 at 5:30 p.m. (Pacific) when the field test was in effect; however, all events had comparable results and significant UFLS margin before and after the field test. Additionally, all three events had an interconnection frequency response measure (IFRM) that exceeded the interconnection frequency response obligation (IFRO~~))~~.

[13] See The 2017 Frequency Response Annual Analysis. https://www.nerc.com/comm/OC/Documents/2017_FRAA_Final_20171113.pdf#search=2017%20Frequency%20Response%20Annual%20Analysis

Per the WECC Off Nominal Frequency Load Shedding Plan (UFLSP), load shedding occurs sequentially in five blocks with a minimum separation between steps of 0.1 Hz. UFLS entities participating in the UFLS plan (AKA: Coordinated Plan) are required to shed their first block of load as soon as frequency has declined to 59.5 Hz.[14]

Disclaimer

WECC receives data used in its analyses from a wide variety of sources. WECC strives to source its data from reliable entities and undertakes reasonable efforts to validate the accuracy of the data used. WECC believes the data contained herein and used in its analyses is accurate and reliable. However, WECC disclaims any and all representations, guarantees, warranties, and liability for the information contained herein and any use thereof. Persons who use and rely on the information contained herein do so at their own risk.

[14] "UFLS Entities participating in the Coordinated Plan are required to shed their first block of load as soon as frequency has declined to 59.5 Hz, with additional minimum requirements for further load shedding steps" (as set forth in the accompanying table)." WECC Off-Nominal Frequency Load Shedding Plan, Coordinated Plans, P. 1a, page 8, December 5, 2012.

Electric Reliability and Security for the West

Attachment E8
Posting 1 Response to Comments
WECC-0115 Contingency Reserve
Request to Retire Requirement R2

Posting 1[1]

The WECC-0115 BAL-002-WECC-2, Request to Retire Requirement R2 Drafting Team (DT) thanks everyone who submitted comments on the proposed documents.

Posting

This project was posted for a 45-day public comment period from October 22 through December 8, 2015.

WECC distributed the notice for the posting on October 22, 2015. The DT asked stakeholders to provide feedback on the proposed document through a standardized electronic template. WECC received comments from three companies as shown in the following table.

Location of Comments

All comments received on the project can be viewed in their original format on the WECC-0115 project page under the "Submit and Review Comments" accordion.

Changes in Response to Comment

After consideration of comments received, the DT took the following action:

No changes were made to the Posting 1 document.

After direct discussion with WECC staff commenters (Mr. Steven Rueckert and Mr. Phil O'Donnell), the drafting team and WECC staff were in accord that a field trial should be pursued to evaluate the impact of retirement of BAL-002-WECC-2, Requirement R2.

Effective Date

The effective date for this project is to be coincident with the effective date of BAL-003-1, Frequency Response and Frequency Bias Setting, Requirement R1.

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[1] This document has been updated to WECC's most recent document template. It can be viewed in its original format at https://www.wecc.org/Reliability/WECC-0115%20Posting%201%20BAL-002-WECC-2%20Retire%20R2%20-%20Response%20to%20Comments%2010-22%20through%2012-8-2015.docx.

BAL-003-1, Frequency Response and Frequency Bias Setting is approved by the Federal Energy Regulatory Commission (March 24, 2014) and has an enforcement date of April 1, 2016.

Action Plan

On December 17, 2015, the WECC-0115 DT agreed by majority vote to pursue a field trial to determine the potential effects of retiring BAL-002-WECC-2, Requirement R2. Mr. W. Shannon Black, WECC Consultant, will draft and circulate the proposed trial for internal comment by the drafting team as well as WECC Standards, Operations, and Compliance departments. The team will reconvene on January 7, 2016, from 10:00 a.m. to 12:00 p.m. with the goal of finalizing the field trial proposal for presentation to the NERC.

Contacts and Appeals

If you feel your comment has been omitted or overlooked, please contact W. Shannon Black, WECC Consultant, at (503) 307-5782. In addition, there is a WECC Reliability Standards appeals process.

Commenter		Organization
1	William Franklin	Xcel Energy
2	Aaron Paulson	On Behalf of the Bonneville Power Administration
3	Steven Ashbaker Steven Rueckert Phil O'Donnell	Western Electricity Coordinating Council (WECC)

Index to Questions, Comments, and Responses

Question

1. The drafting team welcomes comments on all aspects of the document.

1. The drafting team welcomes comments on all aspects of the document.

Summary Consideration: See summary in the preamble of this document.	
Commenter	**Comment**
William Franklin, Xcel Energy	Public Service Company of Colorado supports retirement of BAL-002-WECC-2, Contingency Reserve, Requirement R2 as of the effective date of BAL-003, Frequency Response and Frequency Bias Setting, Requirement R1. Lacking a better approach R2 served the Region well over the past years and decades but it is now time to retire it. R2 was intended to accomplish two purposes; aid in frequency recovery (through governor action) for large generation loss events across the WECC, and provide a part of the contingency reserves (on line generation-10-minute response) for generation trip events within the BA or RSG if party is a member. However spinning reserve in R2 is somewhat vague and has no performance-based compliance metric. R2 is functionally replaced by BAL-003 for frequency recovery. BAL-003 will serve this first purpose in a more straight forward manner; response time, responsibility and compliance metric are each well-defined and geared specifically to help the interconnection recover frequency in a reliable manner. With regard to the second purpose, local loss of generation, BAL-002-WECC-2, without R2, will not be diluted. It will continue to require the same total amount of contingency reserves, only the somewhat vague requirement of carrying a 10-minute, 50 percent spinning reserve as part of the overall contingency reserve will have been appropriately removed. With no reduction in reliability retirement of R2 will remove sources of possible confusion, and unsupportable overlap between R2 and BAL-003. Thanks for the opportunity to comment.
Response	
The drafting team thanks Xcel for its comments and its continued support in the standards development process.	

Summary Consideration: See summary in the preamble of this document.	
Commenter	**Comment**
Bonneville Power Administration	**Comments on retirement of WECC BAL-002 R2** **Answer to Survey:** BPA strongly supports that the requirement of WECC Regional Standard BAL-002-WECC-2, Contingency Reserve, Requirement R2, should be retired as of the effective date of NERC Standard BAL-003-1 (BAL-003), Requirement R1. BAL-003-1, Frequency Response and Frequency Bias Setting is approved by the Federal Energy Regulatory Commission (March 24, 2014) and has an enforcement date of April 1, 2016. **Comments:** With the retirement of WECC BAL-002 R2, and the adoption of NERC BAL-003-01, frequency responsive reserve becomes a measurable quantity and no longer needs to be covered within a 50% spinning reserve requirement. BAL-003-01 is a more applicable standard for measuring frequency response and meets the original intent of WECC BAL-002 R2, which was put in place because; it was, "in the absence of a frequency response standard…capable of arresting a frequency excursion." (WECC-0115 Posting 1). With this in mind, BPA would like to provide some further thoughts on the decision to retire WECC BAL-002 R2. 1. Outside of the technical aspects of frequency response, a key reason to have the BAL-002 R2 standard retired as of the effective date of NERC Standard BAL-003-01 relates to comments made in WECC-0115 Posting 1, that states "Retention of both WECC BAL Requirement R2 as well as BAL-003 Requirement R1 could lead to confusion and the needless procurement of additional reserve, thereby increasing costs without benefit." BPA agrees fully that multiple requirements to hold spinning reserve and also meet FRO requirements, double up on the BA requirement to meet the same goal.

Summary Consideration: See summary in the preamble of this document.	
Commenter	**Comment**
	2. BPA agrees that BAL-003-01 FRM is a better indicator of frequency response than a 50% spin requirement. While BAL-003-001 provides a measure for frequency response, it places no requirement on capacity that needs to be held by a BA in order to meet the standard. This needs to be determined by the BA planners/operators themselves, using their knowledge of equipment capability. Without other operational changes (adjusting plant controls, governor tuning), a BA would need to maintain its current level of spinning reserves to statistically maintain its historical measures of frequency response in the short term. Without other changes (i.e. tuning to plant controls, governors, additional units) the lessening of spinning reserve amounts would likely lessen statistical measures of frequency response in WECC. With this in mind, BPA sees that NERC BAL-003-01 is a better driver for BA's to study their actual online frequency response capability, than WECC BAL-002 R2. 3. The WECC standard was a good stop-gap for frequency response with the absence of a NERC frequency response standard. However, spinning reserve does not have a one-to-one correlation to frequency response. A good example of this is a situation where a BA is carrying spinning reserves on only a few generating units. The spinning reserve requirement is met; however, the BA does not have as much frequency response as if the spinning reserve was carried on a greater number of responsive units. In order to create a more accurate estimate of frequency response capacity online, BPA is studying: the number of units online, the max capacity of those units, current generation of those units, governor droop, actual tests of unit performance, and how much of governor response is met in the 20-52 second measurement window defined in NERC BAL-003-01.

Summary Consideration: See summary in the preamble of this document.	
Commenter	**Comment**
	4. One more point BPA would like to make regarding comments in WECC-0115 Posting 1, is in regards to the statement that, "*Requirement R2, Section 2.2 can be retired because it is already addressed in Requirement R2, Section 2.1. Section 2.1 requires the applicable entity to carry reserve 'that is immediately and automatically responsive to frequency.' Section 2.2 requires the applicable entity to carry reserves 'capable of fully responding within ten minutes.' Section 2.1's immediate response-time renders the Section 2.2 ten-minute response time moot. The drafting team notes the language is a carryover from the MORC and should be updated through retirement.*" BPA would like to point out that it is not a strong argument to say that "Requirement R2, Section 2.2 can be retired because it is already addressed in Requirement R2, Section 2.1," because section 2.1 is going to be retired as well. BPA suggests that since Section 2.2 is a sub-requirement of R2, with R2 retired then 2.2 would stand by itself and would make the statement that 'Reserve must be capable of fully responding within 10 minutes.' This 10-minute response is already covered in Requirement R1, 1.4.
Response	
The DT appreciates BPA's support in the retirement of the Requirement. The DT also appreciates BPA's continued involvement in the standards development process.	

Summary Consideration: See summary in the preamble of this document.	
Commenter	**Comment**
WECC Staff Steve Ashbaker: WECC, ashbaker@wecc.biz Phil O'Donnell: WECC, podonnell@wecc.biz	Thank you for the opportunity to provide comments on the proposed retirement of BAL-002-WECC-2, Requirement R2. We are concerned that the project to retire BAL-002-WECC-2, Requirement R2 may be moving forward too fast, without the proper evaluations being made prior to retirement. It is our understanding that BAL-003 and Frequency Response are characteristics of the first few seconds after a disturbance

Summary Consideration: See summary in the preamble of this document.	
Commenter	**Comment**
Steve Rueckert: WECC, steve@wecc.biz	and are based on available on-line reserves, the associated inertia of the on-line generation and the frequency dependency of the load on line at the time. Contrarily, BAL-002 and BAL-002-WECC-2 address contingency reserves, which are used to restore ACE within 15 minutes of a disturbance. There is no indication that a Frequency Response Measure (FRM) that complies with the Requirements of BAL-003 will ensure ACE will be restored in accordance with the requirements of BAL-002 unless the amount of Responsive Reserves required to comply with BAL-003 was equal to or greater than the disturbance. BAL-003 was required due to the systematic retirement of heavy thermal and large hydro and the replacement with various types of low inertia and no inertia resources. We recognize that BAL-002-WECC-2 requires only half of the total amount of contingency reserves to be online and responsive to frequency, so that alone is not enough to ensure compliance with the DCS requirement, and that it requires operator intervention to meet DCS. However, we suspect that Requirement R2 of BAL-002-WECC-2 is one of the major contributors to WECC's relatively good frequency response when compared to the Eastern Interconnection. We question at this point how a Frequency Response Sharing Group (FRSG) or Balancing Authority that is not part of a FRSG will know how much on-line, responsive resources they will need to meet the Requirements of BAL-003. We have some concern that due to the monitoring process for BAL-003 and entity may find out too late that they are going to be non-compliant. For the reasons above we suggest a more cautious approach to the potential retirement of BAL-002-WECC-2, Requirement R2 and offer two options for consideration. The first option is that we do not retire BAL-002-WECC-2, Requirement R2 until at least one year beyond the effective date of BAL-003. This

Summary Consideration: See summary in the preamble of this document.	
Commenter	**Comment**
	would allow us to determine if the requirement is too demanding, which would be demonstrated by responsible entities greatly exceeding FRM compliance. If that were the case, we could feel comfortable retiring Requirement R2. The second option would be for WECC to seek a waiver of BAL-002-WECC-2, Requirement R2 for at least a year so that we can conduct a field trial to ensure that not keeping BAL-002-WECC-2, Requirement R2 effective will not lead to a substantial decrease in frequency response in the West. Thank you for your consideration.
Response	
WECC commenters (Mr. Steven Rueckert and Mr. Phil O'Donnell) were in attendance at the drafting team meeting during which these comments were addressed. After a thorough discussion of the above issues both the drafting team and the commenters were in accord that the concerns raised could be addressed by pursuing a field trial to examine system performance in the absence of BAL-002-WECC-2, Requirement R2. The drafting team discussed the outline for the proposed trial and will target finalization of the proposal when they reconvene. The proposal will be vetted with WECC Standards (Rueckert), Operations (Ashbaker), and Compliance (O'Donnell). The primary WECC liaison is proposed to be Mr. Tim Reynolds in his role as WECC staff liaison for the WECC Performance Work Group under the WECC Operating Committee. Commenters agreed that each of the sub-issues raised in their comments need not be addressed in lieu of pursuing the proposed field trial.	

Posting 2[1]

The WECC-0115 BAL-002-WECC-2a, Contingency Reserve, Request to Retire Requirement R2 Drafting Team (DT) thanks everyone who submitted comments on the proposed document.

Posting

This project was posted for a 30-day public comment period from January 18 through February 18, 2019.

WECC distributed the notice for the posting on January 14, 2019. The DT asked stakeholders to provide feedback on the proposed document through a standardized electronic template. Three comments were received on this posting.

Location of Comments

All comments received on the project can be viewed in their original format on the WECC-0115 project page under the "Submit and Review" accordion.

Changes in Response to Comment

After considering all comments received, the DT opted for the following changes:

The opening sentence of the executive summary is to read as follows:

> After conducting a field test from May 1, 2017, through April 30, 2018, the WECC-0115 BAL-002-WECC-2a, Contingency Reserve, Request to Retire Requirement R2 Drafting Team (DT) concluded that if Requirement R2 is retired, *it is unlikely to result in any detrimental impact to reliability.* (Emphasis added.)

The following sentence was added to the closing comment of the Introduction:

[1] This document can be reviewed in its original format at https://www.wecc.org/Reliability/WECC-0115%20Posting%202%20BAL-002-WECC-2%20Request%20to%20Retire%20R2%20-%20Tech%20Editor%20Approved.docx.

> The data from that field test formed the foundation of this paper and was posted for comment, appearing as Posting 2 of this project. Posting 2 received three comments, one in favor of retirement and two suggesting caution.

The following footnote regarding why the 700-MW threshold was used was added to the Overview:

> The DT noted that the WECC Interconnection Frequency Response Obligation (IFRO) is roughly -840 MW per 0.1 HZ. The 700 MW loss was chosen as a more conservative number than the IFRO and represents a value suitably large to cause a significant frequency excursion. For illustrative purposes only see Frequency Response Analysis Tool, Dmitry Kosterev, Bonneville Power Administration, 2014. https://www.wecc.org/Reliability/Frequency%20Response%20Analysis%20-%20Dmitry%20Kosterev.pdf

The following footnote was added to the DCS Field Test section to highlight the DT's lack of speculation as to why the field test showed additional reserves carried or whether future results will be the same:

> This analysis does not speculate on why reporting entities carried more reserve than required. It only notes the empirical fact that reserves in excess were indeed carried.

The following footnote was added to the DCS Field Test section to highlight the difference between to similar terms:

> Please note that although similar in title, *NERC's Essential Reliability Services (ERS) Measure 4* (white paper page 5) is not the same as *NERC's State of Reliability Report, Metric M-4* (page 6).

Although the following style changes were made, this document is still pending full review by the WECC technical editor. Changes made include:

- References updated from BAL-002-WECC-2 to BAL-002-WECC-2a, along with use of the full reference in lieu of abbreviation.
- References updated from BAL-003-1 to BAL-003-1.1, along with use of the full reference in lieu of abbreviation.

Minority View

The DT opted not to include speculation as to why more reserves were carried than anticipated nor to speculate as to whether future performance would replicate those amounts.

The DT disagreed with Powerex that retirement of Requirement R2: 1) was premature given the present status of BAL-003-1.1 and 2) would make BAL-002-WECC-2a less stringent.

The DT maintains that retirement of Requirement R2 is warranted because the requirement is redundant to BAL-003-1.1. In its Posting 1, Response to Comments, the DT provided a detailed explanation regarding this issue.

Effective Date

The effective date for this project is to be coincident with the effective date of BAL-003-1.1, Frequency Response and Frequency Bias Setting, Requirement R1.

BAL-003-1.1, Frequency Response and Frequency Bias Setting is approved by the Federal Energy Regulatory Commission (March 24, 2014) and has an enforcement date of April 1, 2016.

Justification of Effective Date

The reliability-related substance of WECC-0115 BAL-002-WECC-2a Contingency Reserve, Requirement R2 is contained in BAL-003-1.1 Frequency Response and Frequency Bias, Requirement R1.

Because the reliability task is addressed in BAL-003-1.1 Requirement R1, BAL-002-WECC-2a Requirement R2 is redundant and can be retired.

Impact on Other Standards

As to other existing and proposed standards, the drafting team notes that some confusion may arise as to how the retirement of WECC-0115 BAL-002-WECC-2a, Requirement R2 may interplay with the existing BAL-002-1, Disturbance Control Performance standard. BAL-002-1, Requirement R2.3 requires the applicable entity (the Regional Reliability Organization *or* the Reserve Sharing group) to "specify its Contingency Reserve policies, including … (R2.3) … the permissible mix of Operating Reserve – Spinning and Operating Reserve—Supplemental that may be included in Contingency Reserve." Arguably, BAL-002-WECC-2a Requirement R2 meets this requirement.

The drafting team disagrees that retention of BAL-002-WECC-2a Requirement R2 is the only means of compliance with BAL-002-1. At a high level, since BAL-002-1 has no Measure for the associated Requirement R2, how compliance might be met is unclear. Further, since the only Measure provided requires that the Balancing Authority *or* the Reserve Sharing group "shall calculate and report compliance with the Disturbance Control Standard," there is a disconnect between the required performance (have a policy) and the required Measure (perform a calculation).

Consideration of Early Compliance

The DT sees no concerns with early compliance.

Action Plan

On February 28, 2019, the WECC-0115 BAL-002-WECC-2a, Contingency Reserve, Request to Retire Requirement R2 Drafting Team agreed by majority vote to forward the project to the WECC Standards Committee (WSC) with a request for ballot. If approved, this project will retire Requirement R2 of that standard on the premise that R2 is redundant to BAL-003-1.1 Frequency Response and Frequency Bias Setting, Requirement R1.

A NERC-approved field test examining the potential impact on reliability if BAL-002-WECC-2a Requirement R2 is retired was conducted from May 1, 2017, through April 30, 2018. The drafting team examined the field test data including Disturbance Control Standard (DCS) performance and frequency response within the Western Interconnection concluding that adequate reserve was available throughout the period of the field test.

During the field test, a NERC-approved compliance waiver for Requirement R2 was in place. An extension of that waiver has been requested to run through May 1, 2020. A response to that request is pending.

The full project is available for review on the WECC website at the WECC-0115 homepage.

Contacts and Appeals

If you feel your comment has been omitted or overlooked, please contact W. Shannon Black, WECC Consultant, at (503) 307-5782. In addition, there is a WECC Reliability Standards appeals process.

Commenter		Organization
1	Andrea Jessup	Bonneville Power Administration
2	Connor Curson	Powerex Corporation
3	Adrian Andreoiu	BC Hydro

Index to Questions, Comments, and Responses

Question

1. The drafting team welcomes comments on all aspects of the document.

1. The drafting team welcomes comments on all aspects of the document.

Summary Consideration: See summary in the preamble of this document.	
Commenter	**Comment**
Andrea Jessup, Bonneville Power Administration	BPA supports the retirement of BAL-002-WECC-2. With the implementation of BAL-003 the spinning reserve requirement of BAL-002-WECC -2 has been shown to be an inappropriate and redundant measure of frequency response. A frequency responsive resource needs both capability and headroom to provide frequency response. Although BAL-002-WECC -2 states that the spinning reserve must be frequency responsive, it does not measure that frequency response nor recognize that frequency response is measured in MW/tenths of a Hertz, not MW's (e.g., a unit could say it provides a certain amount of spin, but actually provides much less frequency response when following governor droop).
Response	
The drafting team appreciates Bonneville Power Administration's longstanding commitment to the WECC Standards and Criteria development process.	
Commenter	**Comment**
Connor Curson, Powerex Corp.	Powerex appreciates the opportunity to submit comments on WECC's recently published White Paper, "Field Test Results BAL-002-WECC-2 Retirement of Requirement R2" (January 14, 2019). The White Paper, and the field test reported within the White Paper, was produced in response to a Standard Authorization Request (SAR) for retirement of BAL-002-WECC-2 R2. The SAR asserted that BAL-002-WECC-2 R2 would become redundant to BAL-003-1 Frequency Response and Frequency Bias Settings, Requirement R1. In response, the WECC conducted a NERC-approved field test to determine the impact on reliability in the event BAL-002-WECC-2 R2 was retired. The paper notes that the results of the field test indicate that "there would be no detrimental impact to the reliability of the Western Interconnection if BAL-002-WECC-2, Contingency Reserve, Requirement R2 were to be retired." Powerex respectively submits that the WECC should be cautious in making such an unequivocal statement based on the field test results.

	Powerex does not dispute that the field test demonstrated that entities carried and deployed sufficient reserves necessary for post disturbance ACE recovery with the BAL-002-WECC-2 R2 compliance waiver in effect across the field trial. However, in Powerex's view, the field test does not demonstrate that BAL-003-1 R1, as currently written, would render BAL-002-WECC-2 R2 redundant. This is due to the differences in how the two requirements are drafted: BAL-002-WECC-2 R2 is a *prescriptive* requirement that applies equally to all entities and is applicable in all hours, whereas BAL-003-1 R1 is an *after-the-fact* check that determines compliance based on an entity's performance during its *median* event of the year. Under BAL-003-1 R1, an entity could potentially carry less Frequency Response than its Frequency Response Obligation ("FRO") for more than 40% of the hours of the year, effectively leaning on other WECC entities, and still be in compliance with the standard. If enough entities are acting in a similar manner during a tail event (say, Q2, high wind), there may not be sufficient Frequency Response to avoid Under-Frequency Load-Shedding. BAL-002-WECC-2 R2 provides a floor on the amount of unloaded, synchronized generation (Spinning Reserve) that entities must carry in every hour. The White Paper doesn't quantify the risk to Frequency Response in the Western Interconnection of removing that floor. It therefore seems premature to move forward with a plan to retire BAL-002-WECC-2 R2 until a field test could demonstrate that the above noted risk is insignificant, or, that BAL-003-1 can be revised to include a focus on real-time Frequency Response such that having the extra protection of a baseline Spinning Reserve requirement is no longer required. Finally, Powerex notes that NERC regularly seeks demonstration that a replacement or retirement of a reliability standard results in a more *stringent* standard, not a *relaxation* of standards. While Powerex agrees in general that there should not be an unnecessary duplication of standards or regulations, in this instance Powerex does not believe unnecessary duplication exists. Thank you for consideration of our comments and we look forward to engaging on this topic in future meetings.

Response

The drafting team appreciates Powerex' observations and has changed the opening (and corresponding) sentence of the executive summary as follows:

> "After conducting a field test from May 1, 2017, through April 30, 2018, the WECC-0115 BAL-002-WECC-2a, Contingency Reserve, Request to Retire Requirement R2 Drafting Team (DT) concluded that if Requirement R2 is retired, *it is unlikely to result in any detrimental impact to reliability."* Emphasis added.

More Stringent

Generally, FERC will approve a Regional Reliability Standard (RRS) if the content of the RRS is either more stringent than its NERC counterpart, or the RRS covers an area not addressed in the NERC, continent-wide standard.

In June 2007, FERC approved WECC's BAL-STD-002-0, Operating Reserves (BAL-002-WECC-2a's predecessor), noting two specific attributes that made that standard more stringent than its NERC counterparts (NERC BAL-002 series of standards[2]).

> "The Commission stated that regional Reliability Standard BAL-STD-002-0 was more stringent than the NERC Reliability Standard BAL-002-0 because the WECC regional Reliability Standard required: (1) a more stringent minimum reserve requirement; and (2) restoration of contingency reserves within 60 minutes, as opposed to the 90-minute restoration period required by the NERC Reliability Standard BAL-002-0.1."[3]

More specifically, FERC found that WECC's *calculation* of minimum contingency reserves and its 60-minute restoration period were more stringent than that of NERC.[4] These two FERC-identified

[2] Since the 2005 inception of the NERC BAL-002, Disturbance Control Performance series of standards, the purpose of that NERC series has been to ensure that applicable entities could access and use sufficient Contingency Reserves to balance resources and demand until Interconnection frequency returned to normal after a disturbance. BAL-002-1, Disturbance Control Standard required applicable entities to have access to and operate Contingency Reserves, specify reserve policies, activate sufficient reserves to meet Disturbance Control Standard (DCS), and replace those reserves as needed. Successive versions of NERC's BAL-002 series added the concept of preparing for responding to Most Severe Single Contingency within a given period. BAL-002-2—Disturbance Control Standard—Contingency Reserve for Recovery from a Balancing Contingency Event, Version 2 (FERC Order approved BAL-002-2. Docket No. RM16-7-000) and Version 3 (Revisions to address two FERC directives from Order No. 835, FERC Order approving BAL-002-3. Docket No. RD18-7-000).

[3] FERC Order No. 789, C. WECC Regional Reliability Standard BAL-STD-002-0, Docket No. RM13-13-000.

[4] Loc. Cit. See *1. Restoration Period for Contingency Reserve*, paragraph 9 and *2. Calculation of Minimum Contingency Reserve*, paragraph 10.

attributes are retained in BAL-002-WECC-2, Requirements R1, R3, and R4, wherein those Requirements state:

- "R1. Each [BA/RSG] shall maintain a minimum amount…"
- "R3. Each [Sink BA/RSG] shall maintain an amount…"
- "R4. Each [Source BA/RSG] shall maintain an amount…"

By contrast, Requirement R2 does not require maintenance of a specific amount of reserve; rather, R2 specifies the type or quality of reserve that must be carried. [5] This is a stated fraction of the amount of reserve required in Requirement R1. Thus, retirement of Requirement R2 has no impact on the calculation of the amount of reserves nor does it impact the 60-minute restoration period. As such, Requirement R2 can be retired without BAL-002-WECC-2 becoming less stringent.

Redundancy

As to the issue of redundancy, the WECC-0115 DT addressed this issue in detail in its Posting 1 Response to Comments.[6] Further, the DT believes retirement of Requirement R2 meets the spirit of FERC's "P81 Order."[7]

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[5] In FERC's November 2013 order approving BAL-002-WECC-2, Contingency Reserve, FERC noted "The regional Reliability Standard applies to balancing authorities and reserve sharing groups in the WECC Region and *is meant to specify the quantity and types of contingency reserve required* to ensure reliability under normal and abnormal conditions." FERC Order 789, Summary (Emphasis added).

[6] WECC-0115 BAL-002-WECC-2, Contingency Reserve Drafting Team, Request to Retire Requirement R2, Posting 1 for 45-day Comment, October 23 through December 8, 2015, pages 2–4.

https://www.wecc.biz/Reliability/WECC-0115%20Posting%201%20BAL-002-WECC-2%20Request%20to%20Retire%20R2%20-%2010-23-2015%20through%2012-8-2015.docx

[7] Paragraph 81 ("P 81") of the FFT Order reads:

"The Commission notes that NERC's FFT initiative is predicated on the view that many violations of requirements currently included in Reliability Standards pose lesser risk to the Bulk-Power System. If so, some current requirements likely provide little protection for Bulk-Power System reliability or may be redundant. The Commission is interested in obtaining views on whether such requirements could be removed from the Reliability Standards with little effect on reliability and an increase in efficiency of the ERO compliance program. If NERC believes that specific Reliability Standards or specific requirements within certain Standards should be revised or removed, we invite NERC to make specific proposals to the Commission identifying the Standards or requirements and setting forth in detail the technical basis for its belief. In addition, or in the alternative, we invite NERC, the Regional Entities and other interested entities to propose appropriate mechanisms to identify and remove from the Commission approved Reliability Standards unnecessary or redundant requirements. We will not impose a deadline on when these comments should be submitted, but ask that to the extent such comments are submitted NERC, the Regional Entities, and interested entities coordinate to submit their respective comments concurrently." North American Electric Reliability Corporation, 138 FERC ¶ 61,193 at P 81 (2012) ("FFT Order").

Retaining Requirement R2 offers little to no added benefit to reliability because the intent of R2 was to ensure that reserve assets have specific response attributes. These are the same attributes called for in BAL-003-1.1.[8]

Commenter	Comment
Adrian Andreoiu and Tony Nguyen, BC Hydro	BC Hydro greatly appreciates the drafting team's efforts to conduct the field test and compile the results, and offers the following comments on the January 14, 2019 version of the "Field Test Results BAL-002-WECC-2 Retirement of Requirement R2" report. The first paragraph of the Executive Summary (page 1) states that "WECC concluded there would be no detrimental impact to the reliability of the Western Interconnection if BAL-002-WECC-2, Contingency Reserve, Requirement R2 were to be retired." BC Hydro recommends that this sentence be re-worded to account for the fact that the observed DCS recovery performance was recorded where, for 63 out of 66 events, the actual Spinning Reserves carried by the responsible entities were far greater than the 50% requirement. Without a clear comparison with the status prior to the Field Test, in terms of actual Spinning Reserves being carried, it seems that there is not enough support for such an unequivocal statement. A well-placed phrase such as "it appears that…" or "unlikely to cause…" might be more appropriate. In the Overview section (page 2) it may be helpful to clearly express that data used for demonstrating impacts on Frequency Response cover a period wider than the Field Test period for which the impacts on DCS Recovery is observed. As drafted, readers will have to look into details of each frequency response analysis graph to realize that fact. The statement in the last paragraph on page 2, "With the implementation of NERC BAL-003-01, frequency responsive reserve became a measurable quantity," should be clarified that only the

[8] In its order remanding BAL-002-WECC-1, FERC called for WECC to broaden the specified criteria of the equipment used to meet the requirement so that a broader range of reserve assets might be included. FERC Order 740, paragraphs 60–62, Docket No. RM09-15-000. FERC Order 789, paragraph 48.

	Frequency Response is measured for BAL-003-1, not Frequency Responsive Reserve. BC Hydro recommends expanding the last sentence of the first paragraph on page 5 into a separate paragraph to further substantiate whether the drafting team has reasons to believe that even after the retirement of the requirement R2 of BAL-002-WECC-2 the entities will continue to carry high level of Spinning Reserve, potentially by operating their system in manners that satisfy other objectives, be it environmental, economic or reliability standard compliance (particularly if a direct link to BAL-003-1 R1 can be made). BC Hydro suggests revising the last paragraph on page 5 to indicate that the ALR-12 Metric has been renamed to Metric M-4. This Metric M-4 is one of the metrics monitored by the NERC Performance Analysis Subcommittee (PAS) and is different than ERS Measure 4. If this paragraph about ERS Measure 4 is to be retained, some background info should be included to explain the difference between Metric M-4 and ERS Measure 4 to avoid confusion. It may not be necessary to retain this paragraph since it appears that all of the analysis that followed were extracted from the NERC Frequency Response Annual Analysis and NERC State of Reliability Reports and were performed for Metric M-4. If that is confirmed, BC Hydro suggests removing this entire paragraph to avoid confusion. Thank you for the opportunity to comment.

Response

The DT agrees that there are rarely certainties in future-looking analysis. As such, the tenor of the conclusion has been redrafted. Please see the above response to Powerex.

As to adding an explanation regarding why excess reserves were carried during any specific period or by any specific entity, or whether future results will be the same as the history field test, the DT would only be speculating as to the past and future motives of each entity. Thus, the DT opted not to venture a guess in its analysis. That said, there is a near certainty that some hydro-based entities will always carry large amounts of reserve due to the nature of the asset, such as water behind the dam.

As to modification of the second full paragraph of page five regarding Essential Reliability Services (ERS) Measure 4, the DT opted to retain the paragraph as it illuminates the analysis and illustrations that follow thereafter. The following footnote was added to aid in clarity:

"Please note that although similar in title, *NERC's Essential Reliability Services (ERS) Measure 4* (white paper page 5) is not the same as *NERC's State of Reliability Report, Metric M-4* (page 6)."

As to editorial modification of the Overview section to include greater detail, the DT opted not to adopt the suggestion, concluding the draft as presented sufficiently conveyed the message.

In the first sentence of page five, the word "reserve" was deleted from the phrase "frequency response reserve." The resulting sentence is as follows:

"With the implementation of NERC BAL-003-01.1, frequency response ~~reserve~~ became a measurable quantity, and the field test provided entities a compliance waiver for WECC BAL-002-WECC-2a Requirement R2, thus decoupling DCS and frequency response."

Minority Issues

Posting 1

In Posting 1, there were no minority issues; however, after direct discussion with WECC staff (Mr. Steven Rueckert and Mr. Phil O'Donnell), the drafting team (DT) concluded that a field trial should be pursued to evaluate the effects of retiring BAL-002-WECC-2a, Requirement R2.[1] After conducting the field test, the drafting team concluded that retirement of BAL-002-WECC-2a Contingency Reserve, Requirement R2 "is unlikely to result in any detrimental impact to reliability."[2]

Posting 2

In Posting 2, the DT opted not to include speculation as to why more reserves were carried than anticipated, nor to speculate as to whether future performance would replicate those amounts.

The DT disagreed with Powerex that retirement of BAL-002-WECC-2a, Requirement R2 was premature given the present status of BAL-003-1.1. The DT maintained that retirement of Requirement R2 is warranted because the requirement is redundant to BAL-003-1.1. In its Posting 1, Response to Comments, the DT gave a detailed explanation regarding this issue.

Balloting Comments

During balloting, British Columbia Hydro and Power Authority abstained from ballot but gave the following narrative, echoing the Posting 2 minority position held by Powerex:

> BAL-002-WECC-2 R2 requirement to carry spinning reserves in all hours could provide improved frequency response. The retirement of this requirement may result in Western

[1] The naming nomenclature changed during development from BAL-002-WECC-2, BAL-002-WECC-2a, and will change to BAL-002-WECC-3 if approved.

[2] Field Test Results, BAL-002-WECC-2 Retirement of Requirement R2, Executive Summary. See also Exhibit C and Attachment E8. These documents can be reviewed in their original format on the WECC-0115 project page located at https://www.wecc.org/Standards/Pages/WECC-0115.aspx.

entities' diminished frequency response performance that may not be alleviated by the current BAL-003-1.1 standard, which is under review and development under NERC Standards Development Project 2017-01.

BC Hydro recommends that the retirement of this requirement be coordinated with the revision of the BAL-003-1.1 Frequency Response and Frequency Bias Setting.

Electric Reliability and Security for the West

Attachment E11

Ballot Pool Members

WECC-0115 BAL-002-WECC-3

Contingency Reserve

Request to Retire R2

Ballot Pool Members

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	British Columbia Hydro & Power Authority	Electric Generators	Abstain	BAL-002-WECC-2 R2 requirement to carry spinning reserves in all hours could provide improved frequency response. The retirement of this requirement may result in Western entities' diminished frequency response performance that may not be alleviated by the current BAL-003-1.1 standard, which is under review and development under NERC Standards Development Project 2017-01. BC Hydro recommends that the retirement of this requirement be coordinated with the revision of the BAL-003-1.1 Frequency Response and Frequency Bias Setting.	Adrian Andreoiu

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	British Columbia Hydro & Power Authority	Transmission Dependent Utilities (TDU)	Abstain	BAL-002-WECC-2 R2 requirement to carry spinning reserves in all hours could provide improved frequency response. The retirement of this requirement may result in Western entities' diminished frequency response performance that may not be alleviated by the current BAL-003-1.1 standard, which is under review and development under NERC Standards Development Project 2017-01. BC Hydro recommends that the retirement of this requirement be coordinated with the revision of the BAL-003-1.1 Frequency Response and Frequency Bias Setting.	Adrian Andreoiu
WECC-0115	British Columbia Hydro & Power Authority	Transmission Owners	Abstain	BAL-002-WECC-2 R2 requirement to carry spinning reserves in all hours could provide improved frequency response. The retirement of this requirement may result in Western entities' diminished frequency response performance that may not be alleviated by the current BAL-003-1.1 standard, which is under review and development under NERC Standards Development Project 2017-01. BC Hydro recommends that the retirement of this requirement be coordinated with the revision of the BAL-003-1.1 Frequency Response and Frequency Bias Setting.	Adrian Andreoiu

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	British Columbia Hydro & Power Authority	Load-Serving Entities (LSE)	Abstain	BAL-002-WECC-2 R2 requirement to carry spinning reserves in all hours could provide improved frequency response. The retirement of this requirement may result in Western entities' diminished frequency response performance that may not be alleviated by the current BAL-003-1.1 standard, which is under review and development under NERC Standards Development Project 2017-01. BC Hydro recommends that the retirement of this requirement be coordinated with the revision of the BAL-003-1.1 Frequency Response and Frequency Bias Setting.	Adrian Andreoiu
WECC-0115	Southern California Edison Company	Load-Serving Entities (LSE)	Abstain	No comments.	Romel Aquino
WECC-0115	Tacoma Power	Transmission Dependent Utilities (TDU)	Yes	0	John Nierenberg
WECC-0115	Seattle City Light	Transmission Dependent Utilities (TDU)	Yes	0	Hao Li
WECC-0115	Tacoma Power	Electric Generators	Yes	0	Karen Hedlund
WECC-0115	Platte River Power Authority	Transmission Owners	Yes	0	Matthew Thompson
WECC-0115	Tacoma Power	Load-Serving Entities (LSE)	Yes	0	Twila Hofer
WECC-0115	Bonneville Power Administration	Transmission Owners	Yes	0	Kammy Rogers-Holliday

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	Bonneville Power Administration	Load-Serving Entities (LSE)	Yes	0	Rebecca Berdahl
WECC-0115	Western Area Power Administration	Electricity Brokers, Aggregators, and Marketers	Yes	0	Timothy Vigil
WECC-0115	Bonneville Power Administration	Electricity Brokers, Aggregators, and Marketers	Yes	0	Andrew Meyers
WECC-0115	California Independent System Operator	Regional Transmission Organizations (RTOs) and Independent System Operators (ISO)	Yes	0	Richard Vine
WECC-0115	Puget Sound Energy, Inc.	Electric Generators	Yes	0	Theresa Rakowsky
WECC-0115	Puget Sound Energy, Inc.	Load-Serving Entities (LSE)	Yes	0	Theresa Rakowsky
WECC-0115	Puget Sound Energy, Inc.	Transmission Owners	Yes	0	Theresa Rakowsky
WECC-0115	Los Angeles Department of Water and Power	Transmission Owners	Yes	0	Pjoy Chua
WECC-0115	Los Angeles Department of Water and Power	Load-Serving Entities (LSE)	Yes	0	Pjoy Chua
WECC-0115	Los Angeles Department of Water and Power	Electricity Brokers, Aggregators, and Marketers	Yes	0	Pjoy Chua

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	Los Angeles Department of Water and Power	Electric Generators	Yes	0	Pjoy Chua
WECC-0115	Arizona Public Service Company	Load-Serving Entities (LSE)	Yes	0	Vivian Vo
WECC-0115	Arizona Public Service Company	Electric Generators	Yes	0	Kelsi Rigby
WECC-0115	Arizona Public Service Company	Electricity Brokers, Aggregators, and Marketers	Yes	0	Chinedu Ochonogor
WECC-0115	Arizona Public Service Company	Transmission Owners	Yes	0	Michelle Amarantos
WECC-0115	Public Utility District No. 1 of Chelan County	Electric Generators	Yes	0	Meaghan Connell
WECC-0115	Public Utility District No. 1 of Chelan County	Transmission Owners	Yes	0	Meaghan Connell
WECC-0115	Public Utility District No. 1 of Chelan County	Load-Serving Entities (LSE)	Yes	0	Meaghan Connell
WECC-0115	Public Utility District No. 1 of Chelan County	Electricity Brokers, Aggregators, and Marketers	Yes	0	Meaghan Connell
WECC-0115	Puget Sound Energy, Inc.	Electric Generators	Yes	0	Eleanor Ewry
WECC-0115	Platte River Power Authority	Load-Serving Entities (LSE)	Yes	0	Jeff Landis

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	Platte River Power Authority	Electricity Brokers, Aggregators, and Marketers	Yes	support the retirement of BAL-002-WECC-2a, Requirement R2 on the premise that R2 is redundant to BAL-003-1.1 Frequency Response and Frequency Bias Setting. We are at the end of a 2 year field trial and have found no degradation in reliability in general and also none specific to BAL-002 or BAL-003 performance.	Sabrina Martz
WECC-0115	Platte River Power Authority	Electric Generators	Yes	0	Tyson Archie
WECC-0115	Idaho Power Company	Electricity Brokers, Aggregators, and Marketers	0	0	Laura Nelson
WECC-0115	Idaho Power Company	Load-Serving Entities (LSE)	0	0	Laura Nelson
WECC-0115	Idaho Power Company	Electric Generators	0	0	Laura Nelson
WECC-0115	Idaho Power Company	Transmission Owners	0	0	Laura Nelson

WECC

Electric Reliability and Security for the West

Attachment E12

Ballot Pool Results

WECC-0115 BAL-002-WECC-3

Contingency Reserve

Request to Retire R2

Ballot Name: WECC-0115 BAL-002-WECC-2a Contingency Reserve—Retirement of R2

Overview: This project proposed to retire BAL-002-WECC-2a, Requirement R2 on the premise that R2 is redundant to BAL-003-1.1 Frequency Response and Frequency Bias Setting. The drafting team's position is supported by a white paper located on the WECC-0115 project page at the Posted for Comment accordion. A NERC-approved field test examining the potential impact on reliability if R2 is retired was conducted from May 1, 2017, through April 30, 2018.

Ballot Pool Open:	03/11/2019	Ballot Pool Closed:	03/26/2019
Ballot Opened:	03/28/2019	Ballot Closed:	04/11/2019
Total Ballot Pool:	38	Total Votes:	34
Quorum:	89.5%	Weighted Votes:	100%
Ballot Results:	Pass		

Voting Sectors	Total in Ballot Pool	In-Pool Affiliates Excluded	Votes Non-Abstain	Sector Weight	Yes Votes	Weighted Segment Vote	No Votes	Abstain	Total Votes for Quorum	Did Not Vote
Transmission Owners	8		6	0.6	6	60.0%	0	1	7	1
Regional Transmission Organizations (RTO) and Independent System Operators (ISO)	1		1	0.1	1	10.0%	0	0	1	0
Load-Serving Entities (LSE)	10		7	0.7	7	70.0%	0	2	9	1
Transmission Dependent Utilities (TDU)	3		2	0.2	2	20.0%	0	1	3	0
Electric Generators	9		7	0.7	7	70.0%	0	1	8	1
Electricity Brokers, Aggregators, and Marketers	7		6	0.6	6	60.0%	0	0	6	1
Large Electricity End Users	0		0	0	0	0.0%	0	0	0	0
Small Electricity Users	0		0	0	0	0.0%	0	0	0	0
Federal, State, Provincial Regulatory, other Gov. Entities	0		0	0	0	0.0%	0	0	0	0
Regional Entities	0		0	0	0	0.0%	0	0	0	0
Totals	**38**	**0**	**29**	**2.9**	**29**	**100.0%**	**0**	**5**	**34**	**4**

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	British Columbia Hydro & Power Authority	Electric Generators	Abstain	BAL-002-WECC-2 R2 requirement to carry spinning reserves in all hours could provide improved frequency response. The retirement of this requirement may result in Western entities' diminished frequency response performance that may not be alleviated by the current BAL-003-1.1 standard, which is under review and development under NERC Standards Development Project 2017-01. BC Hydro recommends that the retirement of this requirement be coordinated with the revision of the BAL-003-1.1 Frequency Response and Frequency Bias Setting.	Adrian Andreoiu
WECC-0115	British Columbia Hydro & Power Authority	Transmission Dependent Utilities (TDU)	Abstain	BAL-002-WECC-2 R2 requirement to carry spinning reserves in all hours could provide improved frequency response. The retirement of this requirement may result in Western entities' diminished frequency response performance that may not be alleviated by the current BAL-003-1.1 standard, which is under review and development under NERC Standards Development Project 2017-01. BC Hydro recommends that the retirement of this requirement be coordinated with the revision of the BAL-003-1.1 Frequency Response and Frequency Bias Setting.	Adrian Andreoiu

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	British Columbia Hydro & Power Authority	Transmission Owners	Abstain	BAL-002-WECC-2 R2 requirement to carry spinning reserves in all hours could provide improved frequency response. The retirement of this requirement may result in Western entities' diminished frequency response performance that may not be alleviated by the current BAL-003-1.1 standard, which is under review and development under NERC Standards Development Project 2017-01. BC Hydro recommends that the retirement of this requirement be coordinated with the revision of the BAL-003-1.1 Frequency Response and Frequency Bias Setting.	Adrian Andreoiu
WECC-0115	British Columbia Hydro & Power Authority	Load-Serving Entities (LSE)	Abstain	BAL-002-WECC-2 R2 requirement to carry spinning reserves in all hours could provide improved frequency response. The retirement of this requirement may result in Western entities' diminished frequency response performance that may not be alleviated by the current BAL-003-1.1 standard, which is under review and development under NERC Standards Development Project 2017-01. BC Hydro recommends that the retirement of this requirement be coordinated with the revision of the BAL-003-1.1 Frequency Response and Frequency Bias Setting.	Adrian Andreoiu

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	Southern California Edison Company	Load-Serving Entities (LSE)	Abstain	No comments.	Romel Aquino
WECC-0115	Tacoma Power	Transmission Dependent Utilities (TDU)	Yes	0	John Nierenberg
WECC-0115	Seattle City Light	Transmission Dependent Utilities (TDU)	Yes	0	Hao Li
WECC-0115	Tacoma Power	Electric Generators	Yes	0	Karen Hedlund
WECC-0115	Platte River Power Authority	Transmission Owners	Yes	0	Matthew Thompson
WECC-0115	Tacoma Power	Load-Serving Entities (LSE)	Yes	0	Twila Hofer
WECC-0115	Bonneville Power Administration	Transmission Owners	Yes	0	Kammy Rogers-Holliday
WECC-0115	Bonneville Power Administration	Load-Serving Entities (LSE)	Yes	0	Rebecca Berdahl
WECC-0115	Western Area Power Administration	Electricity Brokers, Aggregators, and Marketers	Yes	0	Timothy Vigil
WECC-0115	Bonneville Power Administration	Electricity Brokers, Aggregators, and Marketers	Yes	0	Andrew Meyers
WECC-0115	California Independent System Operator	Regional Transmission Organizations (RTOs) and Independent System Operators (ISO)	Yes	0	Richard Vine

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	Puget Sound Energy, Inc.	Electric Generators	Yes	0	Theresa Rakowsky
WECC-0115	Puget Sound Energy, Inc.	Load-Serving Entities (LSE)	Yes	0	Theresa Rakowsky
WECC-0115	Puget Sound Energy, Inc.	Transmission Owners	Yes	0	Theresa Rakowsky
WECC-0115	Los Angeles Department of Water and Power	Transmission Owners	Yes	0	Pjoy Chua
WECC-0115	Los Angeles Department of Water and Power	Load-Serving Entities (LSE)	Yes	0	Pjoy Chua
WECC-0115	Los Angeles Department of Water and Power	Electricity Brokers, Aggregators, and Marketers	Yes	0	Pjoy Chua
WECC-0115	Los Angeles Department of Water and Power	Electric Generators	Yes	0	Pjoy Chua
WECC-0115	Arizona Public Service Company	Load-Serving Entities (LSE)	Yes	0	Vivian Vo
WECC-0115	Arizona Public Service Company	Electric Generators	Yes	0	Kelsi Rigby
WECC-0115	Arizona Public Service Company	Electricity Brokers, Aggregators, and Marketers	Yes	0	Chinedu Ochonogor
WECC-0115	Arizona Public Service Company	Transmission Owners	Yes	0	Michelle Amarantos
WECC-0115	Public Utility District No. 1 of Chelan County	Electric Generators	Yes	0	Meaghan Connell

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	Public Utility District No. 1 of Chelan County	Transmission Owners	Yes	0	Meaghan Connell
WECC-0115	Public Utility District No. 1 of Chelan County	Load-Serving Entities (LSE)	Yes	0	Meaghan Connell
WECC-0115	Public Utility District No. 1 of Chelan County	Electricity Brokers, Aggregators, and Marketers	Yes	0	Meaghan Connell
WECC-0115	Puget Sound Energy, Inc.	Electric Generators	Yes	0	Eleanor Ewry
WECC-0115	Platte River Power Authority	Load-Serving Entities (LSE)	Yes	0	Jeff Landis
WECC-0115	Platte River Power Authority	Electricity Brokers, Aggregators, and Marketers	Yes	support the retirement of BAL-002-WECC-2a, Requirement R2 on the premise that R2 is redundant to BAL-003-1.1 Frequency Response and Frequency Bias Setting. We are at the end of a 2 year field trial and have found no degradation in reliability in general and also none specific to BAL-002 or BAL-003 performance.	Sabrina Martz
WECC-0115	Platte River Power Authority	Electric Generators	Yes	0	Tyson Archie
WECC-0115	Idaho Power Company	Electricity Brokers, Aggregators, and Marketers	0	0	Laura Nelson
WECC-0115	Idaho Power Company	Load-Serving Entities (LSE)	0	0	Laura Nelson
WECC-0115	Idaho Power Company	Electric Generators	0	0	Laura Nelson

Project	Entity	Segment	Vote	Comment	Name
WECC-0115	Idaho Power Company	Transmission Owners	0	0	Laura Nelson

Electric Reliability and Security for the West

Attachment E13
Posting 1NERC Response to Comments
WECC-0115 BAL-002-WECC-3
Contingency Reserve
Request to Retire R2

Posting 1 NERC Response to Comments

The WECC-0115 BAL-002-WECC-2a,[1] Contingency Reserve Drafting Team (DT) thanks everyone who submitted comments on the proposed document. As all comments were in support of the project, no changes were made.

Posting

NERC posted the project for public comment from June 20, 2019, through August 5, 2019.

NERC distributed notice for the posting on June 20, 2019. NERC asked stakeholders to give feedback on the proposed document through a standardized electronic template. Four sets of responses were received, including comments from four different people from four companies representing five of the industry Segments.

Location of Comments

All comments received on the project can be viewed in their original format on the WECC-0115 project page under the "Submit and Review Comments" accordion.

Contacts and Appeals

If you feel your comment has been omitted or overlooked, please contact W. Shannon Black, WECC Consultant, at (503) 307-5782. In addition, there is a WECC Reliability Standards appeals process.

[1] The naming nomenclature changed during development from BAL-002-WECC-2, BAL-002-WECC-2a, and will change to BAL-002-WECC-3 if approved.

Respondents

Respondent		Organization
1	Aaron Cavanaugh	Bonneville Power Administration
2	Laurie Williams	PNM Resources— Public Service Company of New Mexico
3	Sandra Shaffer	Berkshire Hathaway—PacifiCorp
4	Richard Vine	California Independent System Operator

Index to Questions, Comments, and Responses

Question

1. Do you agree the development of BAL-002-WECC-3 met the "Open" criteria as outlined above? If "No," please explain in the comment area below:
2. Do you agree the development of BAL-002-WECC-3 met the "Inclusive" criteria as outlined above? If "No," please explain in the comment area below:
3. Do you agree the development of BAL-002-WECC-3 met the "Balanced" criteria as outlined above? If "No," please explain in the comment area below:
4. Do you agree the development of BAL-002-WECC-3 met the "Due Process" criteria as outlined above? If "No," please explain in the comment area below:
5. Do you agree the development of BAL-002-WECC-3 met the "Transparent" criteria as outlined above? If "No," please explain in the comment area below:

Comments and Responses

All commenters responded "yes" to all questions asked. No changes were made.

Respondent	Comment
Bonneville Power Administration	Yes
PNM	Yes
Berkshire Hathaway	Yes
California Independent System Operator	Yes

Electric Reliability and Security for the West

Attachment E14
WECC Standards Committee Roster
WECC-0115 BAL-002-WECC-3
Contingency Reserve
Request to Retire R2

WECC Standards Committee Roster

The following individuals are those assigned to the WECC Standards Committee as of June 18, 2019.

Sunitha Kothapalli, Puget Sound Energy ..... SVS 1 Transmission

Vacant ..... SVS 2 RTO/ISO[1]

Dana Cabbell, Southern California Edison ..... SVS 3 LSE[2]

Marty Hostler, Northern California Power Agency ..... SVS 4 TDU[3]

Gary Nolan, Arizona Public Service ..... SVS 5 Generators

Joe Tarantino, Sacramento Municipal Utility District ..... SVS 6 Broker/Aggregator/Marketers

Caitlin Liotiris, Utah Association of Energy Users ..... SVS 7 Large Electricity End Users

Crystal Musselman, Proven Compliance Solutions ..... SVS 8 Small Electricity Users

Davy Zhuang, British Columbia Utilities Commission ..... SVS 9 Gov. Entities

Steven Rueckert, WECC ..... SVS 10 Regional Entities

James Avery, Chair ..... Non-Affiliated Director

[1] Regional Transmission Organization/Independent System Operator
[2] Load-Serving Entity
[3] Transmission Dependent Utilities

Exhibit F

Drafting Team Roster

Electric Reliability and Security for the West

Exhibit F

Drafting Team Roster

WECC-0115 BAL-002-WECC-3

Contingency Reserve

Request to Retire R2

WECC-0115 Contingency Reserve Drafting Team Roster

On August 12, 2015, the WECC Standards Committee (WSC) appointed the initial WECC-0115 drafting team. Thereafter, the WECC-0115 Field Test was initiated spanning a lengthy period.

On October23, 2018, the WSC adjusted the DT roster adding/deleting drafting team members as indicated in the Candidate column. The action was taken per the WSC Charter, Section WSC Charter, Section 4. Actions Without a Meeting.

On November 27, 2018, the WSC assigned Mr. James Wells to replace Mr. Don Badley as DT chair. That action was taken per the November 27, 2018 Consent Agenda.

Candidate	Experience
Ali Miremadi CAISO	Ali Miremadi is the California Independent System Operator's (CAISO) Senior Operations Policy Advisor. He has been with the CAISO for over 17 years and was part of the CAISO start-up team back in 1997. Mr. Miremadi has held various positions within CAISO including leading the Operator Training program through transition to full compliance with NERC Standard PER-005, and design/oversight of the real time and near miss Root Cause Analysis Process. Mr. Miremadi designed the real-time Operations reliability metrics for daily review of CAISO operator performance. In his current assignment, Mr. Miremadi is responsible for the review and evaluation of North American Electric Reliability Corporation (NERC) proposed standards impacting CAISO Operations. He works directly with CAISO upper management coordinating the formulation of CAISO Operations positions on proposed NERC standards and prepares comments and filings at NERC or other regulatory agencies. Mr. Miremadi began his career at the California Public Utilities Commission (CPUC) where he spent most of his tenure working on investor owned utility Demand-side Management and Load Management programs. He was part of the CPUC team that worked on the restructuring of the electric utility industry.

Candidate	Experience
	Mr. Miremadi has a Bachelor of Science degree in Engineering and a Master of Arts degree in Management. He holds an active NERC System Operator Certification.
Bart McManus Bonneville Power Administration (Added October 23, 2018)	Mr. McManus received his Bachelor of Science degree in Electrical Engineering from the University of Washington and has been at Bonneville Power Authority Administration (BPA) since 1994. Mr. McManus was the lead programmer for the Automatic Generation Control (AGC) system for multiple years then became the lead for AGC and other Balancing Authority Area Operations in BPA. Mr. McManus began working on wind integration issues in 2006 and was team lead for AGC and wind integration for a few years. He is currently the AGC and wind integration subject matter engineer and the wind integration lead for BPA Transmission Operations. Mr. McManus was part of the North American Electric Reliability (NERC) Performance Work group that drafted the original Disturbance Control Performance Standard and was also on the drafting team for the original WECC regional Reliability Standard addressing reserves.
David Frederick Salt River Project (Inactive October 23, 2018)	Mr. Frederick served as the drafting team chair for WECC-0114 BAL-002-WECC-2, Contingency Reserve, Request for Interpretation Drafting Team and was a member of the WECC-0103 BAL-STD-002-0, Operating Reserves Drafting Team and the WECC-0083 BAL-002-WECC-1, Contingency Reserves Drafting Team. Mr. Frederick is a Cost/Plant/Power Production Analyst for Salt River Project. He has worked in merchant and reliability areas at SRP since 1999. Previously, he served as the Administrator of the Southwest Reserve Sharing Group. Mr. Frederick is a NERC-Certified Dispatcher in Balancing, Interchange, and Transmission Operations and holds a Bachelor of Science degree in Accountancy.
David Kirsch, Bonneville Power Administration (Inactive as of October 23, 2018)	Mr. Kirsch has 27 years of experience in the electric utility industry. He began his career in 1988 at PacifiCorp, in the Major Equipment Specifications, and Substation Design groups, which led to a Distribution Engineer position in PacifiCorp's Portland district. Mr. Kirsch joined BPA's workforce in 2001 as a Field Engineer in the Substation Protection and Control (SPC) group leading to assignment as an SPC District Engineer. In 2009, Mr. Kirsch transitioned to BPA's Transmission Technical Operations organization in the AGC workgroup where he served as part of the maintenance committee with the United States Army Corps of Engineers and the United States Bureau of Reclamation. In 2014, Mr. Kirsch was named Chair of the Technical Operations and Implementation

Candidate	Experience
	Subcommittee (TOIS) which coordinates controls and signals with for hydro projects. Mr. Kirsch is BPA's subject matter expert for several NERC Standards, including BAL-002-WECC-2, Contingency Reserve and is a member WECC's Performance Work Group.
Don Badley Northwest Power Pool (Inactive October 23, 2018 - Retired)	The following is a listing of Mr. Don Badley's experience related to NERC and WECC BAL standards: • Groups served on (past and present): North American Power Systems Interconnection Committee (NAPSIC) Performance Subcommittee, WECC Control Work Group, WECC Operating Practices Subcommittee, WECC Technical Operations Subcommittee, WECC Reserve Issues Task Force, NERC Functional Model Task Force, NERC Resources Subcommittee, NERC Frequency Task Force, NERC Frequency Responsive Reserve Standard Drafting Team, Reserve Task Force, and WECC Performance Work Group. • Groups chaired (past and present): NAPSIC Performance Subcommittee, WECC Performance Work Group, WECC Reserve Issues Task Force, NERC Control Criteria Task Force, NERC Resources Subcommittee. • Mr. Badley served on and chaired multiple groups within the Northwest Power Pool related to the BALs. Employment History Mr. Badley started working for Pacific Power & Light in 1963 and began his career with the Northwest Power Pool in 1975. Professional history Mr. Badley was affiliated with the IEEE and served in multiple positions including Oregon Section Chair and twice as the Northwest Area Chair (Alaska, Oregon, and Washington). Mr. Badley is a life member of IEEE.
James Wells Los Angeles Department of Water and Power (LADWP)	Mr. Wells has a Bachelor of Science and a Master of Science in Electrical Engineering from the University of Southern California, and is a licensed Professional Electrical Engineer in the State of California. Mr. Wells has nine years of utility work experience at Los Angeles Department of Water and Power, serving the first three years in Energy Reconciliation/After-the-Fact supporting developing and maintaining custom reporting tools and

Candidate	Experience
(Appointed chair on November 27, 2018.)	database applications for energy scheduling, marketing transactions, interchange control, transmission utilization, and loss accounting. Mr. Wells served six years in Operating Engineering/Grid Operations Support providing outage coordination support by facilitating and studying complex outages and providing real-time power system analysis in support of unplanned or abnormal system conditions. Mr. Wells serves as a technical engineering operations expert providing guidance and direction to multiple internal and external stakeholders on power system operation issues. Mr. Wells is the LADWP representative on multiple regional study groups including the Operating Study Subcommittee and the Pacific Southwest Interconnection Reliability Operating Limit Study group. Mr. Wells is a member of the WECC Performance Work group and is the author of the WECC-0115 Standards Authorization Request. .
Ken Otto Western Area Power Administration, Golden, and Loveland, CO (Inactive October 23, 2018 - Retired)	Mr. Ken Otto began his Federal career as a student engineer with Bonneville Power Administration in 1980, before joining Western Area Power Administration (WAPA) as a system protection engineer in 1983. Many of the policies and procedures he implemented during his tenure as the lead electrical engineer became standard WAPA policy. These include substation computerized controls, an electronic relay replacement program and collaboration with the Supervisory Controls and Data Acquisition Division to develop Supervisory Control And Data Acquisition standards. Mr. Otto was involved with the installation and commissioning of phase shifting transformers on the TOT2A Project, and the Kayenta Series Capacitor Project. When he accepted last position in the Colorado River Storage Project Management Center in October 2000, Mr. Otto took charge over the office's real-time merchant activities. Mr. Otto was instrumental in successfully integrating the Loveland Area Projects and Basin Electric merchant activities into the Energy Management & Marketing Office (Hoover). Mr. Otto developed software tools and procedures for scheduling and marketing WAPA's resources. Mr. Otto's last position was that of Supervisory Energy Management and Marketing specialist at Western's Energy Management and Marketing Office, in Montrose, Colorado. Mr. Otto serves on the WECC Operating Committee, and both the Seams Issues Subcommittee and Market Issues Subcommittee as well as various other subcommittees, task forces and drafting teams. Mr. Otto also represents Western

Candidate	Experience
	on the Western Systems Power Pool (WSPP) Executive Committee and Operating Committee. Mr. Otto received his Bachelor of Science degree in Electrical Engineering from the University of New Mexico and is a registered professional engineer.
Rick Lowther Salt River Project	Mr. Lowther has 38 years of experience in the electric utility Industry. He began his career at Houston Light & Power as a system planning engineer. Mr. Lowther spent 14 years working for an Energy Management System vendor. There, Mr. Lowther developed EMS applications and managed developers responsible for EMS applications such as Automatic Generation control (AGC), Interchange Scheduling, Thermal Unit Commitment, State Estimation, Optimal Power Flow and Contingency Analysis. For the last 19 years, Mr. Lowther has worked for Salt River Project (SRP). Initially, he led a team that provided EMS support and developed operational support applications. He was the lead designer and developer of the Southwest Reserve Sharing Group's first reserve sharing system and the Southwest Open Access Same-Time Information System site that was used by eight desert southwest utilities for transmission access sales until 2004. He was also the lead designer and developer of SRP's current interchange scheduling and accounting system. For the last seven years, Mr. Lowther worked in SRP's Balancing Authority and Transmission Operations area. In that role, he provides engineering support and training for generation and transmission dispatchers. He is currently SRP's subject matter expert for most NERC BAL and INT Standards and well as some TOP Standards. Mr. Lowther participates in several WECC subcommittees (Interchange Scheduling and Accounting Subcommittee), work groups (Performance Work Group (PWG), Electronic Scheduling Work Group, Data Exchange Work Group, EMS Work Group), and task forces (Unscheduled Flow Event Analysis Task Force). He currently chairs the PWG. Mr. Lowther received a Bachelor of Science in Electrical Engineering degree from the University of Houston.
Robert Johnson Rocky Mountain	Mr. Johnson served as the Rocky Mountain Reserve Group (RMRG) Administrator for more than 15 years, 20 plus years as Senior Engineer for WECC Members (PSColorado, WAPA), Member of numerous WECC and NERC

Candidate	Experience
Reserve Sharing Group	technical committees over my career. Presently the WECC Operating Committee (Transmission) representative for PSColorado/Xcel. Also, on the Operating Issues Work Group. Mr. Johnson has served on several drafting teams and is presently on the TOP-007 retirement team. Mr. Johnson has served as administrator for the Rocky Mountain Reserve Group and Senior Operations Engineer for PSCo from 1998 to present. He manages the generation reserve coordination, compliance monitoring and reporting, software development, and training for the Rocky Mountain Reserve Group and is involved in all aspects of administering the RMRG—10 Members covering Colorado and Wyoming. As senior Engineer for PSCo prepare advanced operational analysis to address operational issues and concerns covering a broad spectrum. Mr. Johnson is a voting Member of the: • WECC Operations Committee (OC) Colorado Coordinated Planning Group • WECC Operating Procedures Review Group, Foothills Planning Group • Rocky Mountain Operations Study Group. Mr. Johnson was previously a part of the NERC Compliance and Certification Committee, WECC Operating Capability Studies Group and NERC Standards Compliance Task Force. Over the course of his career, he has drafted multiple technical papers for the Institute of Electrical and Electronics Engineers. Manager and Supervisor in Resource and Transmission Planning; 1988-1998 Western Area Power Administration, Golden, and Loveland, CO Managed the operational, resource and transmission planning group for Western's RMR Region in the States of Colorado, Wyoming, and portions of Utah, New Mexico, Nebraska, and Montana and in a separate position supervised planning engineers evaluating projects for all of Western's Regions. Served on the NERC Planning Committee and numerous WECC technical committees.

Candidate	Experience
	Mr. Johnson served as Power System Engineer for the Bureau of Reclamation and Western Area Power (1971-1988) where he was involved in a wide variety of technical assignments.
John Tolo Tucson Electric Power	Mr. Tolo is currently employed by Tucson Electric Power as the director of system control and reliability. He has been in the utility business for 26 years. Mr. Tolo has held positions in power production and distribution, transmission, and generation operations. He has memberships in the NERC Resources Subcommittee, the WECC Performance Work Group, serves as vice chair of the WECC Operating Committee, chair of the WECC Joint Guidance Committee, and is a member of the BAL-004-WECC-01 and WECC-0068 BAL-004-WECC-02, Automatic Time Error Correction (ATEC) Drafting Team.

Exhibit G

VRF and VSL Justification

Electric Reliability and Security for the West

Exhibit G

VRF and VSL Justification

WECC-0115 BAL-002-WECC-3

Contingency Reserve

Request to Retire R2

Violation Risk Factors & Violation Severity Levels

Violation Risk Factors and Violation Severity Levels were previously approved by FERC. No changes are proposed other than updating the format of the associated components.