NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

December 15, 2023

VIA ELECTRONIC FILING

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Re: Compliance Filing, Response to Order No. 876

Dear Ms. Bose:

The North American Electric Reliability Corporation ("NERC") and the Western Electricity Coordinating Council hereby submit the Compliance Filing in Response to Order No. 876.

The anonymized data is contained in a separate file.

Respectfully submitted,

/s/ Lauren Perotti
Lauren Perotti

Assistant General Counsel
North American Electric Reliability Corporation

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North American Electric Reliability Corporation	**)** **)**	**Docket No. RM19-20-000**

COMPLIANCE FILING OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION AND WESTERN ELECTRICITY COORDINATING COUNCIL IN RESPONSE TO ORDER NO. 876

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December 15, 2023

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ATTACHMENTS

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I. INTRODUCTION

On April 15, 2021, the Federal Energy Regulatory Commission's ("FERC" or "Commission") approved regional Reliability Standard BAL-002-WECC-3 (Contingency Reserve).[1] Regional Reliability Standard BAL-002-WECC-3 retired Requirement R2 of previous versions of the standard, which required Balancing Authorities ("BA") and Reserve Sharing Groups ("RSG") to carry one half of their Contingency Reserve as Operating Reserve-Spinning. In its Order approving the regional standard, the Commission stated that it believed it is appropriate to monitor the potential impacts of retiring Requirement R2 to ensure that this action does not adversely impact the adequacy of contingency reserves in the Western Interconnection. The Commission therefore directed the North American Electric Reliability Corporation ("NERC") and the Western Electricity Coordinating Council ("WECC") to submit an informational filing 30 months following implementation of regional Reliability Standard BAL-002-WECC-3 containing certain data and analysis identified in the order.

This filing, including the attached BAL-002-WECC-3 Data Analysis Report (**Attachment 1**) and data collected (**Attachment 2**), serve as NERC and WECC's compliance filing in response

[1] *WECC Regional Reliability Standard BAL-002-WECC-3 (Contingency Reserve*), Order No. 876, 175 FERC ¶ 61,037 (2021) ("Order No. 876").

to the Commission's directive to determine the effects of BAL-002-WECC-3 implementation and removal of Requirement R2 from the prior version on the adequacy of contingency reserves in the Western Interconnection. As discussed more fully herein, based on the data collected, no significant impacts were observed that would indicate a decline in reliability due to the retirement of Requirement R2.

II. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to the following:[2]

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III. REQUIREMENT R2 ANALYSIS

Regional Reliability Standard BAL-002-WECC-3 retired Requirement R2 from the previous version. Requirement R2 required BAs and RSGs to carry one half of their Contingency Reserve as Operating Reserve-Spinning. Requirement R2 was retired because it was redundant with the continent-wide Reliability Standard BAL-003-1.1 (Frequency Response and Frequency Bias Setting), Requirement R1.[3] While approving the regional standard, the Commission determined that monitoring was appropriate to ensure the retirement of Requirement R2 did not

[2] Persons to be included in Commission's official service list. The Petitioners respectfully request a waiver of Rule 203 of the Commission's regulations, 18 C.F.R. § 385.203 (2023), to allow the inclusion of more than two persons on the service list in this proceeding.

[3] Order 876 at P 2.

adversely impact the adequacy of contingency reserves in the Western Interconnection.[4] Therefore, the Commission directed NERC to submit an informational filing 30 months following implementation of regional Reliability Standard BAL-002-WECC-3 that addresses the adequacy of contingency reserves in the Western Interconnection.

As directed by the Commission, WECC collected U.S. entity data from each applicable RSG and BA for two years starting on July 1, 2021 through June 30, 2023. This data includes information for Reportable Balancing Contingency Events ("RBCE"), instances of a loss of resources 700 MW or greater, and the hourly amount of Contingency Reserves and Operating Reserves-Spinning for each BA.

Based on the data collected, no significant impacts were observed that would indicate a decline in reliability due to the retirement of Requirement R2. The data did show one instance where an entity did not meet the required BAL-002-2 Requirement R1 Part 1.1 performance as calculated by CR Form 1. Based on the information provided, the entity had adequate reserves and was able to recover its Reporting Area Control Error ("Reporting ACE") once it began deployment of its Contingency Reserves. This event created negligible impacts to the reliability of the Western Interconnection and was due to an underlying issue that masked the event from being recognized as an actual event and not due to the retirement of Requirement R2.

Please see **Attachments 1 and 2** for the raw data collected and a complete analysis of the contingency reserves for the subject period.

[4] *Id*. at P 3.

IV. CONCLUSION

NERC and WECC respectively request that the Commission accept this compliance filing and associated report and data, as shown in **Attachments 1 and 2** to this filing, in satisfaction of its directive issued in Order 876.

Respectfully submitted,

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Dated: December 15, 2023

CERTIFICATE OF SERVICE

I hereby certify that I have served a copy of the foregoing document upon all parties listed on the official service list compiled by the Secretary in the above-referenced proceeding.

Dated at Washington, D.C. this 15th day of December, 2023.

/s/ Alain Rigaud

Alain Rigaud
Associate Counsel for North American
Electric Reliability Corporation

ATTACHMENT 1

WECC-0115 BAL-002-WECC Request to Retire R2 – 2023 Field Test Results

WECC

BAL-002-WECC-3 Data Analysis Report

December 12, 2023

Executive Summary

On April 15, 2021, the Federal Energy Regulatory Commission (FERC) approved Regional Reliability Standard (RRS) BAL-002-WECC-3.[1] This RRS retired Requirement R2 from the previous version of the RRS which required Balancing Authority(ies) (BA) and Reserve Sharing Group(s) (RSG) to carry one half of their Contingency Reserve as Operating Reserve-Spinning. As part of this approval, the commission directed NERC and WECC to submit an informational filing 30 months following implementation of the RRS. The purpose of the filing is to address the adequacy of Contingency Reserve in the Western Interconnection.

As requested by FERC, WECC collected U.S. entity data from each applicable RSG and BA for two years starting on July 1, 2021, through June 30, 2023. This data includes information for reportable Disturbance Control Standard (DCS) events, instances of a loss of resources 700 MW or greater, and the hourly amount of Contingency and Spinning Reserves for each BA.

Based on the data collected, no significant impacts were observed that would indicate a decline in reliability due to the retirement of Requirement R2. The data did show one instance where an entity did not meet the required DCS performance. Based on the information provided, the entity had more than enough reserves and was able to recover its Automatic Control Error (ACE) but failed to do it within the required recovery period. This was due to an underlying issue that masked the event from being recognized as an actual event and not due to the retirement of Requirement R2.

[1] *WECC Regional Reliability Standard BAL-002-WECC-3 (Contingency Reserve*), Order No. 876, 175 FERC P 61,037 (2021) https://ferc.gov/sites/default/files/2021-04/RM19-20-000-041521.pdf.

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Introduction

On April 15, 2021, FERC approved the Regional Reliability Standard (RRS) BAL-002-WECC-3, Contingency Reserve. This standard retired Requirement R2 from the previous version of the RRS which required Balancing Authorities (BA) and Reserve Sharing Groups (RSG) to carry one half of their Contingency Reserve as Operating Reserve-Spinning. As part of this approval, the commission directed NERC and WECC to submit an informational filing 30 months following implementation of the standard. The purpose of the filing is to monitor the potential reliability impacts of retiring Requirement R2.

Data Source and Description

As requested by FERC, WECC collected U.S. entity data from each applicable RSG and BA for two years starting on July 1, 2021, through June 30, 2023. The specific data requested by FERC is in paragraphs 21 and 22 of the final ruling.

Paragraph 21:

"… (1) for any reportable balancing contingency event, the date, time and 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; (2) for events involving a loss of 700 MW or greater, whether it is a reportable balancing contingency event or not, the date and time of the event, the name of the resource(s), and the total MW; (3) the amount of spinning reserve above or below 50 percent during non-event times on an hourly basis for twenty-four months following implementation; and (4) supporting data for NERC's frequency response metric (Metric M-4) as it pertains to the Western Interconnection."

Paragraph 22:

"… (1) the DCS performance - as described in request (1) in the paragraph above - on an individual balancing authority basis; and (2) the hourly amount of contingency reserve and the fraction of that contingency reserve that is classified as spinning for each hour by balancing authority (not reserve sharing group)."

DCS Performance

Overview

The DCS performance data was collected for each BA to monitor the performance of each RSG and each BA that is not a member of an RSG, to determine whether any were unable to meet the DCS recovery period for a DCS event.

At the individual BA level, a total of 176 DCS events were reported. Each BA provided data including the date and time of the event, required amount of Contingency Reserve, actual amount of Operating Reserves-Spinning, and the DCS performance. See Attachment 2 for the dataset collected.

General Analysis

Each DCS event with its associated data was reviewed to determine any impacts on the interconnection. Of the 176 DCS events, all but one event passed the DCS recovery period. Based on the information provided for the single event that did not pass the DCS performance, the BA did provide information that sufficient reserves were available to maintain reliable operation. Upon investigation, the BA identified an underlying issue that masked the event from being recognized as an actual event. However, this mistake was not realized until about nine minutes into the event when the BA started its recovery procedures. Although the BA's Reporting Area Control Error (Reporting ACE) did recover, it was unable to do so within what remained of the 15-minute Contingency Event Recover Period.

Regarding the number of DCS events, the 176 events is higher than what was reported in the NERC filing.[2] However, the number of DCS events by applicable entity (e.g., RSG) was lower within the Western Interconnection. As several BAs are members of an RSG, some DCS events were reported more than once[3] to fulfill the request to provide this information on a BA basis and not by the applicable RSG.

This difference in reporting also affects the ratio of Contingency Reserves to Operating Reserves-Spinning as the previous report was reported by RSG and not BA. As the required Contingency Reserves vary for each BA that is a member of an RSG, analysis was done based on the RSGs and BAs who were not members of an RSG. Overall, Operating Reserves - Spinning were more than 50% for all events.

Conclusion

Based on the information provided, combined with the context for the event that did not pass the DCS recovery period, there continues to be no degradation in the interconnection performance to carry enough reserves to recover from a DCS event.

[2] Petition for Approval of BAL-002-WECC-3 with Exhibits.pdf (nerc.com), Exhibit C.

[3] E.g., If a single DCS event occurred within an RSG that included three BAs, the event would be reported by each BA, counting the single event three times for this report.

Frequency Response Performance

Overview

Frequency response performance was evaluated for any loss of resources greater than 700 MW and for any adverse impact on frequency response. 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 (FRAA)[4].

Per the NERC State of Reliability Report[5], there are two main 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.

During the arresting period, the goal is to arrest the frequency decline for credible contingencies before the activation of UFLS. The calculation for the interconnection frequency response obligation under BAL-003 is based on arresting the Point C nadir before the first step of UFLS for resource contingencies at or above the UFLS for the Interconnection. Measuring and tracking the margin between the first step UFLS set point and the Point C nadir is an important indicator of risk for each interconnection.[6] During the stabilizing period, the goal is to stabilize system frequency following a disturbance primarily due to generator governor action.

General Analysis

Western Interconnection frequency performance was assessed to determine the impact on the interconnection. Frequency performance data was collected for 43 events that were reported as having a verified resource loss of more than 700 MW. According to Figure 1, in the Western Interconnection, the arresting and stabilizing periods remain stable.

[4] https://www.nerc.com/comm/OC/Documents/2022_FRAA_Draft_Report.pdf

[5] https://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/NERC_SOR_2023_Technical_Assessment.pdf

[6] Point C or nadir is the maximum deviation due to loss of resource. See Frequency Control Reference Document Prepared by the NERC Resources Subcommittee, May 11, 2021.

Table 4.1: 2022 Frequency Response Performance Statistics for Stabilizing Period						
	2022 Operating Year Stabilizing Period Performance					
	Mean $IFRM_{A-B}$ (MW/0.1Hz)	Median $IFRM_{A-B}$ (MW/0.1Hz)	Lowest $IFRM_{A-B}$ (MW/0.1Hz)	Maximum $IFRM_{A-B}$ (MW/0.1Hz)	Number of Events	2018–2022 OY Trend
Eastern	2,648	2,423	1,594	5,342	46	Stable
Texas	1,287	1,163	511	2,955	32	Improving
Québec	1,009	859	512	2,331	22	Stable
Western	1,934	1,763	1,114	4,917	30	Stable

Table 4.2: 2022 Frequency Response Performance Statistics for Arresting Period						
	2022 Operating Year Arresting Period Performance					
	Mean $IFRM_{A-C}$ (MW/0.1Hz)	Median $IFRM_{A-C}$ (MW/0.1Hz)	Lowest $IFRM_{A-C}$ (MW/0.1Hz)	Mean UFLS Margin (Hz)	Lowest UFLS Margin (Hz)	2018–2022 $IFRM_{A-C}$ OY Trend
Eastern	2,050	1,921	1,202	0.455	0.419	Stable
Texas	575	532	305	0.584	0.486	Improving
Québec	157	148	95	1.121	0.938	Stable
Western	886	846	535	0.413	0.330	Stable

Figure 1—Table 4.1 and 4.2 from the NERC 2022 State of Reliability Report, June 2023

As Figure 1 shows the results for 2022, the following information is a summary of the Western Interconnection frequency performance metrics since 2016.

1. The 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 megawatts lost to the difference between Point A and Point B frequency values. As the trend indicates, primary frequency response is stable in the Western Interconnection.

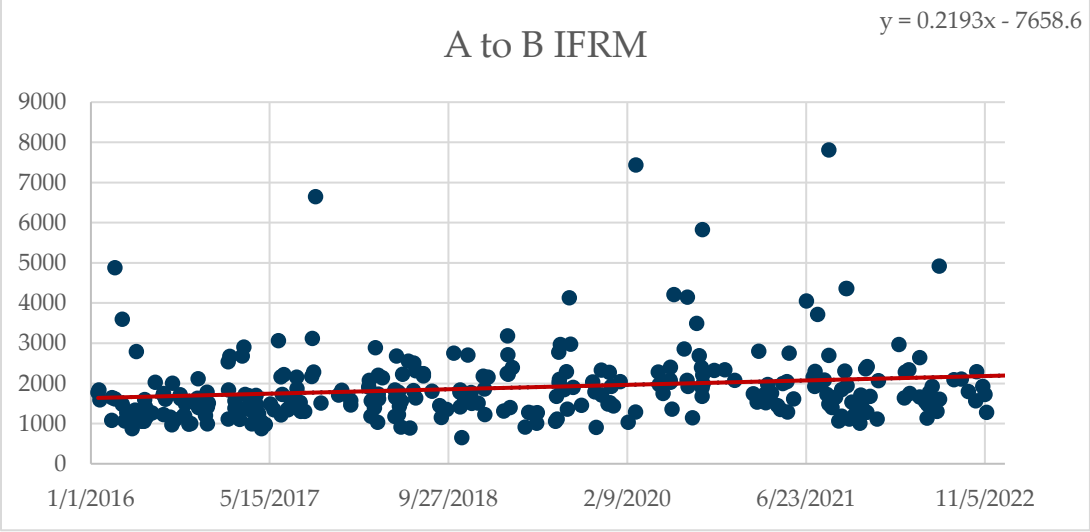

Figure 2—A to B IFRM

2. The 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 preset 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. As the trend indicates, there has been no negative impact on inertial response to the interconnection.

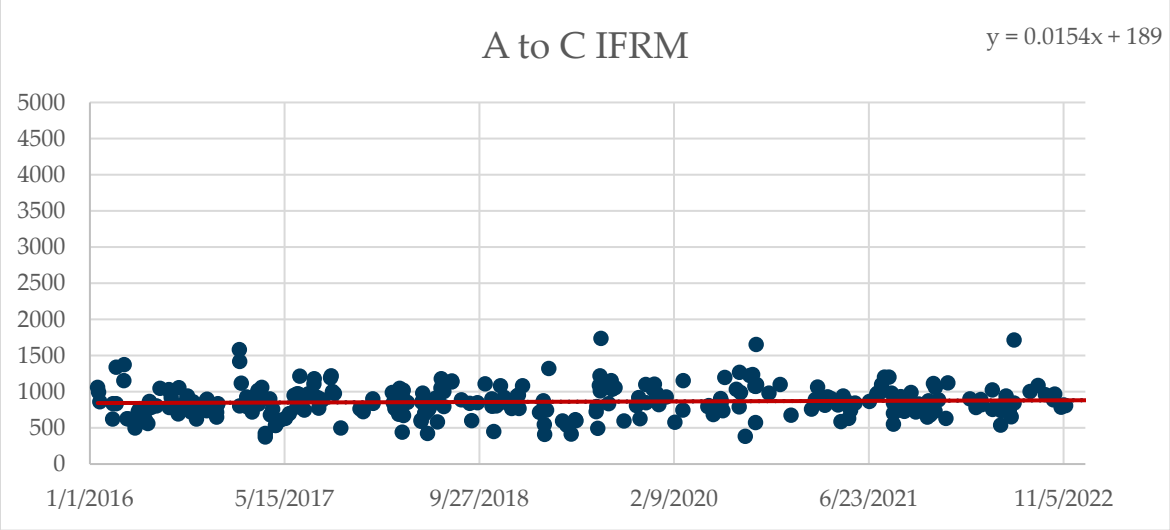

Figure 3—A to C IFRM

3. The Cn to C is the ratio between the absolute frequency minimum (Point Cn) caused by governor withdrawal and the initial nadir (Point C), which is identified within the first 20 seconds after the initiating event. A Point Cn value may exist if frequency falls below the original Point C nadir or Value B after the end of the 20–52 second Stabilizing Period. As a declining trend indicates improving primary frequency response, the Western Interconnection continues to experience no frequency response withdrawal during this period.

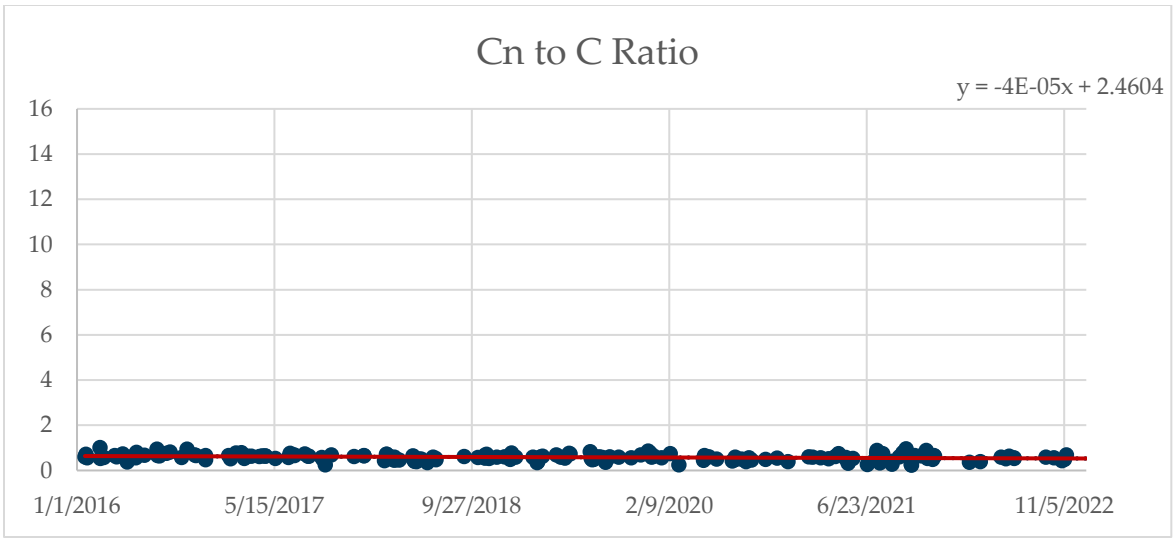

Figure 4—Cn to C Ratio

4. The Cn to UFLS ratio measures the margin between the frequency nadir and the first step in UFLS. The current trend shows a stable measurement in the UFLS margin.

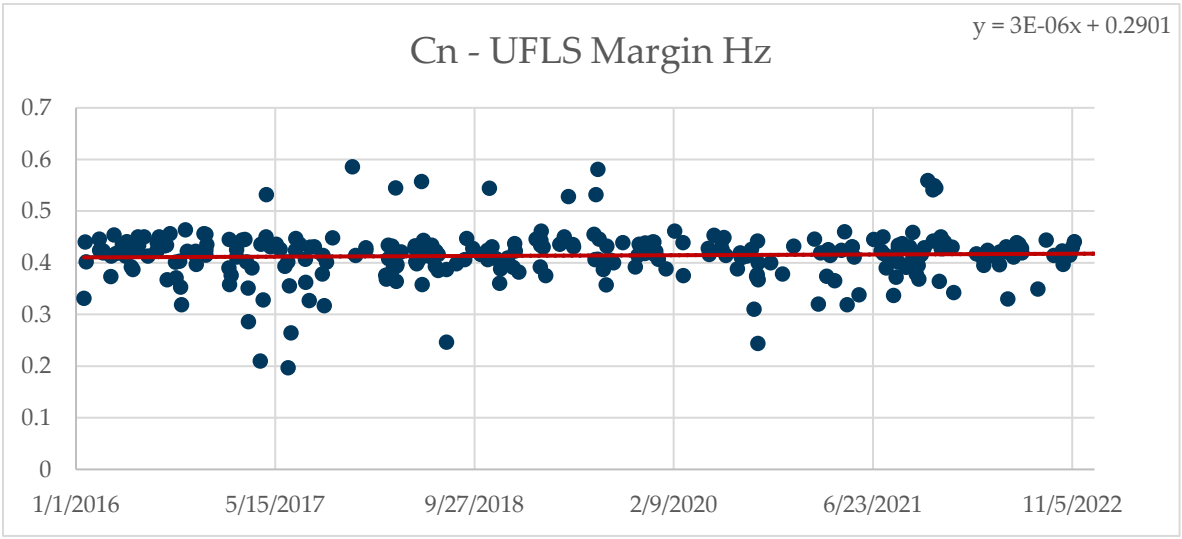

Figure 5—Cn to UFLS margin

Conclusion

Based on the information provided, there continues to be no degradation in the interconnection frequency response performance.

ATTACHMENT 2

BAL-002-WECC Data