

130 FERC ¶ 61,218
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Jon Wellinghoff, Chairman;
Marc Spitzer, Philip D. Moeller,
and John R. Norris.

Mandatory Reliability Standards for the Bulk Power
System

Docket No. RM06-16-010

ORDER SETTING DEADLINE FOR COMPLIANCE

(Issued March 18, 2010)

1. In Order No. 693,¹ issued in March 2007, the Commission, *inter alia*, approved the North American Electric Reliability Corporation's (NERC) Resource and Demand Balancing (BAL) Reliability Standards, including BAL-003-0, which addresses frequency response and bias.² In addition, the Commission directed NERC to develop certain modifications to the Reliability Standards, pursuant to NERC's Reliability Standards Development Process, including (1) a determination of the appropriate periodicity of frequency response surveys necessary to ensure that Requirement R2 and other requirements of the Reliability Standard are being met, and (2) a modification to BAL-003-0 that defines the necessary amount of frequency response needed for reliable operation for each balancing authority with methods of obtaining and measuring that the frequency response is achieved.³
2. In a December 2, 2009 informational filing, NERC indicated that it was revising its Standard Authorization Request (SAR) to obtain the necessary data before drafting a

¹ *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242, *order on reh'g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

² See http://www.nerc.com/files/BAL-003-0_1b.pdf. The terms Frequency Response and Frequency Bias are defined in the NERC Glossary of Terms Used in Reliability Standards. http://www.nerc.com/docs/standards/rs/Glossary_2009April20.pdf.

³ Order No. 693, FERC Stats. & Regs. ¶ 31,242 at P 375.

revised frequency response standard in its Standards Development Project No. 2007-12.⁴ NERC did not provide a revised deadline for expected completion of this process or submission of a revised standard.⁵ While the Commission, in Order No. 693, did not set a deadline for submitting modifications to BAL-003-0, we note that almost three years have passed since the issuance of the directive in Order No. 693. Accordingly, pursuant to section 39.5(g) of the Commission's regulations,⁶ the Commission directs NERC to submit a modification to BAL-003-0 that is responsive to the Commission's directive in Order No. 693 within six months from the date of issuance of this order.

I. Background

A. Section 215 of the Federal Power Act

3. Section 215 of the Federal Power Act (FPA) requires a Commission-certified Electric Reliability Organization (ERO) to develop mandatory and enforceable Reliability Standards, which are subject to Commission review and approval. Once approved, the Reliability Standards may be enforced by the ERO, subject to Commission oversight, or by the Commission independently.⁷

4. Pursuant to section 215 of the FPA, the Commission certified NERC as the ERO.⁸ On April 4, 2006, NERC submitted a petition seeking approval of 107 proposed

⁴ NERC Informational Filing of 2010 Development Plan Pursuant to Section 310 of the NERC Rules of Procedure at 14 (December 2, 2009 Informational Filing), Docket Nos. RM06-16-000, *et al.* On June 30, 2007, NERC issued a revised SAR intended to result in a standard that would allow it to collect data needed to accurately model existing frequency response (Project 2007-12). In order to expedite the process, NERC stated in the December 2, 2009 Informational Filing that it would obtain the necessary data for Project 2007-12 through a formal data request, negating the need to draft a data collection standard. December 2, 2009 Informational Filing at 14.

⁵ NERC provided a target completion date for Project 2007-12 (the collection of data necessary to model frequency response) of the second quarter of 2010. December 2, 2009 Informational Filing, Reliability Standards Development Plan, Vol. 2 at 120.

⁶ 18 C.F.R. § 39.5(g) (2009).

⁷ *See* 16 U.S.C. § 824o(e)(3) (2006).

⁸ *North American Electric Reliability Corp.*, 116 FERC ¶ 61,062, *order on reh'g & compliance*, 117 FERC ¶ 61,126 (2006), *aff'd sub nom. Alcoa, Inc. v. FERC*, 564 F.3d 1342 (D.C. Cir. 2009).

Reliability Standards, including BAL-003-0.⁹ On March 16, 2007, the Commission issued Order No. 693 approving 83 of these 107 Reliability Standards and directing other actions related to 56 of the approved Reliability Standards, including modifications to Reliability Standards BAL-003-0.

B. Frequency Response

5. The interconnected Bulk-Power System is planned to operate at an operating frequency of 60 Hertz. Frequency excursions, which are deviations from the scheduled operating frequency, are the result of imbalances between load and resources due to generation loss (disturbances) and load variations. The magnitude of the frequency excursions (over frequency or under frequency) depend on the net frequency response of each interconnection,¹⁰ which is a measure of the amount of MW imbalance that will cause a defined amount of frequency excursion.

6. The frequency response largely depends on the types of generation and the dispatch levels of the generation chosen by the balancing authorities. Therefore, the frequency response is not a constant but changes depending on the choices of the balancing authorities within an interconnection.¹¹ For the system to remain stable, the balancing authorities must have generation that will automatically increase net MW production to arrest a frequency decline or automatically decrease net MW production to arrest a frequency increase.¹² This change in MW production must occur within a few seconds and before the frequency excursion exceeds the frequency related ratings of generation facilities. Without adequate frequency response, the interconnection will

⁹ See *Petition of the North American Electric Reliability Council and North American Electric Reliability Corporation for Approval of Reliability Standards*, Docket No. RM06-16-000 (April 4, 2006).

¹⁰ The defined interconnections are Eastern, Western and the Electric Reliability Council of Texas (ERCOT).

¹¹ Average frequency response in the three interconnections varies, as does frequency response for each during different times of the day and year. For example, as allowed by the approved regional difference in BAL-001-0, ERCOT has a minimum average frequency response that is close to 1 percent of its peak load for a 0.1 Hz frequency change.

¹² The majority of that response is provided by on-line generation. However, demand response that automatically reduces load as soon as the frequency reaches its set point within a second can also be a source of frequency response to arrest a frequency decline.

become unstable leading to blackouts. Frequency response is a critical indication of how resilient the entire interconnection is to loss of generation or load. If the frequency response of an interconnection is close to zero, even relatively small losses in generation (e.g., losses below the single largest contingency) or normal load variations can result in instability and cascading blackouts.

7. The facilities within the Bulk-Power System, especially conventional generating units, have been designed to withstand limited frequency variations. In each region within the interconnections, under frequency load shedding (UFLS)¹³ is designed to respond to generation loss assuming some magnitude of frequency response. As stated above, if there is more generation than load, the frequency will increase depending on the amount of frequency response capability. With a small magnitude frequency response, the frequency would increase above 60 Hz similar to what was experienced during the 2003 Blackout in the Western New York area.¹⁴ The end result of a generation loss during a time of low frequency response can be activation of more UFLS than needed to arrest the frequency excursion, resulting in over-generation that in turn can result in generation tripping on over frequency which would lead to large scale instability and cascading outages. It is imperative to avoid this type of frequency oscillation after initial disturbances occur in order to maintain reliable operation.

C. Reliability Standard BAL-003-0

8. Reliability Standard BAL-003-0 has the stated purpose of providing a consistent method for calculating the frequency bias component of area control error.¹⁵ Requirement R1 provides that each balancing authority must review its frequency bias settings by January 1 of each year and recalculate its setting to reflect any change in the

¹³ Under Frequency Load Shedding is defined in the NERC Glossary of Terms. (http://www.nerc.com/docs/standards/rs/Glossary_2009April20.pdf)

¹⁴ See U.S.-Canada Power System Outage Task Force, *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations*, at 99.

¹⁵ The NERC Glossary defines “area control error” as “the instantaneous difference between a Balancing Authority’s net actual and scheduled interchange, taking into account the effects of Frequency Bias and correction for meter error.”

frequency response of the balancing authority area.¹⁶ Requirement R2 provides that each balancing authority must establish and maintain a frequency bias setting that is as close as practical to, or greater than, the balancing authority's amount of frequency response.

9. In the notice of proposed rulemaking (NOPR) that preceded Order No. 693,¹⁷ the Commission proposed to approve Reliability Standard BAL-003-0 as mandatory and enforceable. The Commission requested comments on whether ... "a requirement should be added for balancing authorities to calculate the frequency response necessary for reliability in each of the Interconnections and identify a method of obtaining that frequency response from a combination of generation and load resources."¹⁸

10. Further, while the Commission had proposed in the NOPR to direct that Measure M1 of BAL-003-0 include an annual survey of frequency response characteristics, the final rule stated that "on further consideration The Commission believes that the frequency of these surveys should be based on the data requirements that will assist the ERO to determine if the balancing authorities are providing adequate and equitable frequency response to disturbances on the Bulk-Power System."¹⁹ Accordingly, the Commission directed the ERO to determine "the appropriate periodicity of frequency response surveys necessary to ensure that Requirement R2 and other requirements of the Reliability Standard are being met, and to modify Measure M1 based on that determination."²⁰

11. In Order No. 693, the Commission concluded that "the minimum frequency response needed for Reliable Operation should be defined and methods of obtaining the frequency response identified."²¹ Accordingly, in Order No. 693 the Commission approved Reliability Standard BAL-003-0 as mandatory and enforceable and directed the ERO to develop a modification to BAL-003-0 through the Reliability Standards

¹⁶ The NERC Glossary defines "frequency bias setting" as "a value, usually expressed in MW/0.1 Hz, set into a Balancing Authority ACE algorithm that allows the Balancing Authority to contribute its frequency response to the Interconnection."

¹⁷ *Mandatory Reliability Standards for the Bulk Power System*, Notice of Proposed Rulemaking, FERC Stats. & Regs. ¶ 32,608 (2006) (NOPR).

¹⁸ NOPR at P 175.

¹⁹ Order No. 693, FERC Stats. & Regs. ¶ 31,242 at P 369.

²⁰ *Id.* P 375.

²¹ *Id.* P 372.

development process that: "... defines the necessary amount of Frequency Response needed for Reliable Operation for each balancing authority with methods of obtaining and measuring that the frequency response is achieved."²²

12. In Order No. 693, the Commission noted comments opposed to additional requirements for balancing authorities to calculate the frequency response necessary for reliability in each of the Interconnections. Rather than supporting the commenters' contentions, the Commission found that these comments underscored its concerns regarding a mismatch between the frequency bias and frequency response.²³ The Commission also addressed comments that Requirement R2 states that the frequency bias setting should be as close as practical to, or greater than, the balancing authority's frequency response. Specifically, the Commission stated:

As the Commission noted in the NOPR and in our response to FirstEnergy, Requirement R2 of this Reliability Standard states that "[e]ach Balancing Authority shall establish and maintain a Frequency Bias Setting that is as close as practical to, or greater than, the Balancing Authority's Frequency Response." The Commission believes that the achievement of this Requirement is fundamental to the tie line bias control schemes that have been in use to assist in balancing generation and load in the Interconnections for many years.²⁴

13. Further, in Order No. 693 the Commission concluded:

We understand that the present Reliability Standard sets the required frequency response of the balancing authorities to be approximately one percent or greater by requiring that the frequency bias shall not be less than one percent and that the frequency bias be as close as practical to, or greater than, the actual frequency response.²⁵

BAL-003-0 Requirement R5 and R5.1 provide the minimum frequency bias values for specific types of balancing authorities. Specifically, Requirement R5 provides:

²² *Id.* P 375.

²³ *Id.* P 372.

²⁴ *Id.* P 373.

²⁵ *Id.*

Balancing Authorities that serve native load shall have a monthly average Frequency Bias Setting that is at least 1% of the Balancing Authority's estimated yearly peak demand per 0.1Hz change.²⁶

II. Discussion

14. Pursuant to section 39.5(g) of the Commission's regulations, the Commission directs NERC to submit, within six months from the date of issuance of this order, a modification to BAL-003-0 that complies with the Commission's directives as set forth in Order No. 693:²⁷

(1) Determine an appropriate periodicity of frequency response surveys necessary to ensure that Requirement R2 and other requirements of the Reliability Standard are being met.²⁸

²⁶ Requirement R5.1 provides that "Balancing Authorities that do not serve native load shall have a monthly average Frequency Bias Setting that is at least 1% of its estimated maximum generation level in the coming year per 0.1Hz change."

²⁷ We remind NERC that the Commission has enumerated factors that we will consider when evaluating a Reliability Standard. *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, FERC Stats. & Regs. ¶ 31,204 at PP 320-338, *order on reh'g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006). The Commission stated that proposed Reliability Standards should, among other things, be based on actual data and lessons learned from past operating incidents, where appropriate. *Id.* P 324. For example, the lessons learned might include that a major event could have larger repercussions if adequate frequency response is not present on the system when the event occurs. *See e.g.*, the examples highlighted in a recent NERC OC/PC/CIPC Joint Session Presentations - Overview of Frequency Response Initiative, Robert W. Cummings, Mar. 16-17, 2010 (http://www.nerc.com/filez/oc_pc_cipc_min.html).

²⁸ As previously noted: "the Commission believes that the frequency of these surveys should be based on the data requirements that will assist the ERO to determine if the balancing authorities are providing adequate and equitable frequency response to disturbances on the Bulk-Power System." *See* P 10, *infra*.

- (2) Define the necessary amount of frequency response needed for reliable operation for each balancing authority with methods of obtaining and measuring that the frequency response is achieved.²⁹
15. The Commission's Order No. 693 directives regarding BAL-003-0 were grounded in the concern that balancing authorities maintain the necessary amount and sources of frequency response needed at all times for reliable operation. Failure to maintain the necessary amount of frequency response can have severe consequences, including disruption of the operation of customers' equipment, damage to electric generators, and blackouts.
16. This issue is not new to the industry. The need to keep some level of frequency response existed in prior NERC policies and procedures.³⁰ In addition, as included in the development record for Order No. 693, NERC provided Policy 1 – Generation Control and Performance, section C (Policy 1C) which addresses frequency response and bias.³¹
17. NERC has established a project (Project No. 2007-12) to develop the modifications to BAL-003-0 directed by the Commission in Order No. 693. While NERC has initiated a SAR to obtain information regarding frequency response, almost three years have passed since the Commission's issuance of Order No. 693, and the NERC standards drafting team has not proposed modifications to Reliability Standard BAL-003-0 in response to the Commission's directive. Recently, the NERC Standards

²⁹ In February of 2010, NERC released an industry advisory regarding interconnection frequency response as a reliability risk. In this release, NERC includes typical frequency response graphs for the three interconnections (Eastern, Western, and ERCOT) showing the response for the loss of different amounts of generation. NERC Industry Advisory, February 11, 2010. NERC also mentioned the trend of declining average frequency response between 1993 and 2007 in the Eastern interconnection. While the average frequency response values are informative, it is the probable ranges of the amount of frequency response that are important in determining reliable operation at all times.

³⁰ Procedure for Determining Balancing Authority Frequency Bias stating "Each balancing authority must be able to demonstrate to the Resources Subcommittee (or its successor), its reliability authority, or its Compliance Monitor that its Frequency Bias Setting closely matches or is greater than its system response," where "system response" is referring to the system frequency response.
(http://www.nerc.com/docs/standards/sar/Supporting_Documents.pdf)

³¹ NERC Version 0 Reliability Standards Development Record, Translation_of_Operating_Policies.pdf.

Committee identified Project 2007-12 as a “high priority” project for 2010.³² The NERC Standards Committee comments prioritizing Project 2007-12 further support the Commission’s concerns regarding frequency response.³³

18. Accordingly, to assure that NERC proceeds expeditiously, the Commission is setting a compliance deadline of six months from the date of issuance of this order for the development of modifications to Reliability Standard BAL-003-0 that comply with the Commission’s directives as set forth in Order No. 693 to define the appropriate periodicity of frequency response surveys necessary to ensure that Requirement R2 and other requirements of the Reliability Standard are being met and the necessary amount of frequency response needed for reliable operation.

The Commission orders:

NERC is hereby directed to submit a modification to Reliability Standard BAL-003-0 that complies with the Commission’s directives in Order No. 693, within six months from the date of issuance of this order, as discussed in the body of this order.

By the Commission.

(S E A L)

Kimberly D. Bose,
Secretary.

³² See NERC Standards Committee Agenda, Attachment 2a (February 25, 2010), identifying “high priority projects for 2010.” The agenda minutes are available on the NERC website at <http://www.nerc.com/filez/scmin.html>.

³³ These comments identify frequency response as a near-term threat to reliability. NERC Standards Committee Agenda, February 25, 2010, Attachment 2a (and supporting comments).