Rules and Regulations

Federal Register

Vol. 79, No. 15

Thursday, January 23, 2014

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DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

18 CFR Part 40

[Docket No. RM13–11–000; Order No. 794]

Frequency Response and Frequency Bias Setting Reliability Standard

AGENCY: Federal Energy Regulatory Commission.

ACTION: Final rule.

SUMMARY: Pursuant to section 215(d) of the Federal Power Act, the Federal Energy Regulatory Commission (Commission) approves Reliability Standard BAL–003–1 (Frequency Response and Frequency Bias Setting), submitted by the North American Electric Reliability Corporation (NERC), the Commission-certified Electric Reliability Organization. Reliability Standard BAL–003–1 defines the amount of frequency response needed from balancing authorities to maintain Interconnection frequency within predefined bounds and includes requirements for the measurement and provision of frequency response. In addition, the Commission directs NERC to submit certain reports to address concerns discussed in the final rule.

DATES: *Effective Date:* This rule will become effective March 24, 2014.

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SUPPLEMENTARY INFORMATION:

Order No. 794

Final Rule

Issued January 16, 2014

1. Pursuant to section 215(d) of the Federal Power Act (FPA),[1] the Commission approves Reliability Standard BAL–003–1 (Frequency Response and Frequency Bias Setting), submitted by the North American Electric Reliability Corporation (NERC), the Commission-certified Electric Reliability Organization (ERO). Reliability Standard BAL–003–1 defines the amount of frequency response needed from balancing authorities to maintain Interconnection frequency within defined bounds and includes requirements for the measurement and provision of frequency response.[2] We find that Reliability Standard BAL–003–1 addresses an existing gap in reliability and the Commission's directives set forth in Order No. 693.[3] Reliability Standard BAL–003–1 establishes a minimum Frequency Response Obligation[4] for each balancing authority; provides a uniform calculation of frequency response; establishes Frequency Bias Settings that set values closer to actual balancing authority frequency response; and encourages coordinated automatic generation control (AGC) operation.[5] These matters are not addressed in any currently-effective Reliability Standard. Therefore, pursuant to section 215(d) of the FPA, we approve Reliability Standard BAL–003–1.[6]

2. The Commission also approves four new or revised definitions to the NERC Glossary and NERC's implementation plan and, with two exceptions, the violation risk factors and violation severity levels, and NERC's request for retirement of currently-effective Reliability Standard BAL–003–0.1b.

3. While the Commission believes that the record supports approving Reliability Standard BAL–003–1, we have concerns about certain aspects of the Reliability Standard that warrant further consideration. Therefore, the Commission directs NERC to submit two reports, and to continue its ongoing annual analysis of certain aspects of BAL–003–1[7] to address concerns regarding specific provisions of the Reliability Standard and to determine the effectiveness of Reliability Standard BAL–003–1 in providing an adequate amount of frequency response. First, no later than 15 months after implementation of the Reliability Standard, NERC shall submit a report that addresses the results and recommendations of a light-load case study of the Eastern Interconnection, using actual turbine governor response data. Second, no later than 27 months after implementation of the Reliability Standard, NERC shall submit a report(s) addressing: (1) An evaluation of the use of the linear regression methodology to calculate frequency response; and (2) the availability of resources for applicable entities to meet the Frequency Response Obligation. Depending on the results and recommendations of these reports, which should provide insight on the effectiveness of the Reliability Standard in assuring that the necessary amount of Frequency Response is available in response to system events, further

[1] 16 U.S.C. 824o(d).

[2] NERC defines ''frequency response'' in the NERC Glossary of Terms Used in Reliability Standards (NERC Glossary) as follows:

Equipment: The ability of a system or elements of the system to react or respond to a change in system frequency. *System:* The sum of the change in demand, plus the change in generation, divided by the change in frequency, expressed in megawatts per 0.1 Hertz (MW/0.1 Hz).

[3] *See Mandatory Reliability Standards for the Bulk-Power System,* Order No. 693, FERC Stats. & Regs. ¶ 31,242 at P 375, *order on reh'g,* Order No. 693–A, 120 FERC ¶ 61,053 (2007).

[4] NERC defines Frequency Response Obligation as ''[t]he balancing authority's share of the required Frequency Response needed for the reliable operation of an Interconnection. This will be calculated as MW/0.1Hz.''

[5] NERC revises the definition of Frequency Bias Setting as ''[a] number, either fixed or variable, usually expressed in MW/0.1 Hz, included in a balancing authority's Area Control Error equation to account for the balancing authority's inverse Frequency Response contribution to the Interconnection, and discourage response withdrawal through secondary control systems.''

[6] In a related action, the Commission is approving regional Reliability Standard BAL–001–TRE–01 containing provisions for assuring frequency response in the ERCOT Interconnection. *See* Docket No. RD13–12–000, *North American Electric Reliability Corporation,* 146 FERC ¶ 61,025.

[7] On December 30, 2013, NERC submitted an informational filing, titled ''Annual Analysis of Frequency Response.'' NERC states that the informational filing updates the statistical analyses and calculations contained in the 2012 Frequency Response Initiative Report, attached to NERC's Petition as Exhibit F (Frequency Response Initiative Report).

refinements to the standard may be warranted. Moreover, if data indicate that sufficient resources are not available for applicable entities to meet their Frequency Response Obligation, NERC should provide that information, together with appropriate recommendations for mitigation, as this information becomes available.

4. The Commission finds NERC's December 30, 2013 ''Annual Analysis of Frequency Response'' helpful and notes NERC's statement that it intends to continue this work. Specifically, in its 2013 annual analysis, NERC states that the informational filing analyzes the impact of Remedial Action Schemes that trip more than 2,400 MW on the calculation of the Interconnection Frequency Response Obligation (IFRO) for the Western Interconnection, adjustment factors for calculating IFROs and trends in primary frequency response sustainability or withdrawal throughout frequency events. The Commission expects NERC to continue to evaluate these aspects of frequency response and include them in future annual analyses.

I. Background

A. Section 215 of the FPA

5. Section 215(c) of the FPA requires a Commission-certified Electric Reliability Organization (ERO) to develop mandatory and enforceable Reliability Standards that are subject to Commission review and approval. Once approved, the Reliability Standards may be enforced by NERC, subject to Commission oversight, or by the Commission independently.[8]

B. Frequency Response and Frequency Bias Setting

6. Sufficient frequency response is necessary to stabilize frequency within an Interconnection immediately following the sudden loss of generation or load. NERC explains that ''[s]ystem frequency reflects the instantaneous balance between generation and load. Reliable operation of a power system depends on maintaining frequency within predetermined boundaries above and below a scheduled value, which is 60 Hertz (Hz) in North America.'' [9] Most frequency response is provided by the automatic and autonomous actions of turbine-governors, with some response being provided by changes in demand due to changes in frequency. Failure to maintain frequency can disrupt the operation of equipment and initiate disconnection of power plant equipment to prevent equipment from being damaged, which could lead to wide-spread blackouts.

7. Frequency response is provided in two stages, referred to as primary frequency response and secondary frequency response.

8. Primary frequency response and control involves the autonomous, automatic, and rapid action of a generator, or other resource, to change its output (within seconds) to rapidly dampen large changes in frequency. The ability of a power system to withstand a sudden loss of generation or load depends on the presence and adequacy of resources capable of providing rapid incremental power changes to counterbalance the disturbance and arrest a frequency deviation.

9. Secondary frequency response, also known as automatic generation control (AGC), is produced from either manual or automated dispatch from a centralized control system.[10] It is intended to balance generation, interchange and demand by managing the response of available resources within minutes as opposed to primary frequency response, which manages response within seconds. Frequency bias is an input used in the calculation of a balancing authority's area control error (ACE) to account for the power changes associated with primary frequency response. However, frequency bias is not the same as frequency response. Frequency Bias Setting is a secondary control setting of the AGC system, not a primary control parameter, and changes in the Frequency Bias Setting of a balancing authority do not change the primary frequency response. The Frequency Bias Setting is used in AGC to prevent premature withdrawal of generator primary frequency response following a disturbance as long as frequency is off its nominal value.[11]

C. NERC Reliability Standard BAL–003–0

10. On March 16, 2007, in Order No. 693, the Commission approved 83 of 107 Reliability Standards pursuant to FPA section 215(d), including currently-effective Reliability Standard BAL–003–0. In addition, pursuant to section 215(d)(5) of the FPA, the Commission directed NERC, among other things, to develop modifications to BAL–003–0 to address certain issues identified by the Commission. Specifically, the Commission directed NERC to:

develop a modification to BAL–003–0 through the Reliability Standards development process that: (1) includes Levels of Non-Compliance; (2) determines 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 and (3) 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.[12]

II. NERC Petition and Reliability Standard BAL–003–1

A. NERC Petition

11. On March 29, 2013, NERC submitted its petition seeking the Commission's approval of Reliability Standard BAL–003–1, four new or modified definitions for inclusion in the NERC Glossary, violation risk factors and violation severity levels, an implementation plan for the proposed standard, and retirement of currently-effective BAL–003–0.1b.[13]

12. The petition states that in 2010 NERC began a frequency response initiative to perform an in-depth analysis of Interconnection-wide frequency response ''to achieve a better understanding of the factors influencing frequency response across North America.'' [14] According to NERC, one of the basic objectives of the frequency response initiative included increasing coordinated communication and outreach on the issue, including webinars, and NERC alerts.[15] NERC states that it developed several reports that provide the conclusions and recommendations resulting from the frequency response initiative, which NERC includes as exhibits to its petition.[16] Further, NERC states that a detailed explanation of the development, testing, and implementation of Reliability Standard BAL–003–1 is provided in the Frequency Response Standard Background Document, included as Exhibit D to the petition.

13. NERC requests approval of the implementation plan for proposed BAL–003–1, under which: (1) Requirement R2, Requirement R3 and Requirement

[8] 16 U.S.C. 824o(e).

[9] NERC Petition at 3.

[10] NERC Petition at 11. Additional background information about the engineering concepts that pertain to frequency response is discussed in the Frequency Response Background Document, NERC Petition, Exh. D.

[11] NERC Petition at 11.

[12] Order No. 693, FERC Stats. & Regs. ¶ 31,242 at P 375.

[13] Reliability Standard BAL–003–1 is not attached to this Final Rule. The complete text of Reliability Standard BAL–003–1 is available on the Commission's eLibrary document retrieval system in Docket No. RM13–11–000 and is posted on the ERO's Web site, *available at:* http://www.nerc.com.

[14] NERC Petition at 11–12.

[15] *Id.* at 12.

[16] *See* Frequency Response Initiative Report, Exh. G (Status of Recommendations), and Exh. H (Supplemental Report).

R4 would become effective the first day of the first calendar quarter that is twelve months following the effective date of this Final Rule; and (2) Requirement R1 would become effective the first day of the first calendar quarter that is twenty-four months following the effective date of this Final Rule. NERC proposes the retirement of existing Reliability Standard BAL–003–0.1b at midnight of the day immediately prior to the effective date of Requirements R2, Requirement R3 and Requirement R4 of the Reliability Standard. NERC requests approval of three new definitions and the revised definition of Frequency Bias Setting effective the first day of the first calendar quarter that is twelve months following the effective date of a Final Rule in this docket.[17]

B. Reliability Standard BAL–003–1 and NERC Explanation of Provisions

14. NERC states that the purpose of the Reliability Standard is to ensure an adequate amount of Frequency Response and also ensure that ''a Balancing Authority's Frequency Bias Setting is accurately calculated to match its actual Frequency Response.'' The Reliability Standard also is intended ''to provide consistent methods for measuring Frequency Response and determining the Frequency Bias Setting.'' [18] The Reliability Standard consists of four requirements, and is applicable to balancing authorities and Frequency Response Sharing Groups.[19]

15. Requirement R1 requires that each balancing authority or Frequency Response Sharing Group achieve an annual Frequency Response Measure [20] that is ''equal to or more negative than its Frequency Response Obligation'' needed to ensure sufficient Frequency Response. Specifically, Requirement R1 states:

> 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.

NERC explains that Requirement R1 has the primary objective of ''determin[ing] whether a Balancing Authority has sufficient Frequency Response for reliable operations.'' [21] According to NERC, Requirement R1 achieves this objective ''via FRS [Frequency Response Survey] Form 1 and the process in Attachment A that provides the method for determining the Interconnections' necessary amount of Frequency Response and allocating it to the balancing authorities.'' [22] NERC asserts that Requirement R1 and Attachment A satisfy the Commission's directive in Order No. 693 to ''determine the appropriate periodicity of frequency response surveys necessary to ensure that Requirement R2 and other requirements of the Reliability Standard are met. . . .'' [23]

16. Requirement R2 states that:

> Each Balancing Authority that is a member of a multiple Balancing Authority Interconnection and is not receiving Overlap Regulation Service [24] and uses a fixed Frequency Bias Setting shall implement the Frequency Bias Setting determined in accordance with Attachment A, as validated by the ERO, into its Area Control Error (ACE) calculation during the implementation period specified by the ERO and shall use this Frequency Bias Setting until directed to change by the ERO.

NERC explains that setting the frequency bias to better approximate the balancing authority's natural response characteristic will improve the quality of ACE control and general AGC system control response. NERC states that the ERO, in coordination with the regions of each Interconnection, will annually review Frequency Bias Setting data submitted by the balancing authorities.

17. Requirement R3 states that:

> Each Balancing Authority that is a member of a multiple Balancing Authority Interconnection and is not receiving Overlap Regulation Service and is utilizing a variable Frequency Bias Setting shall maintain a Frequency Bias Setting that is: (1.1) Less than zero at all times, and (1.2) Equal to or more negative than its Frequency Response Obligation when Frequency varies from 60 [Hertz] Hz by more than +/− 0.036 Hz.

NERC explains that, in an Interconnection with multiple balancing authorities, the Frequency Bias Setting should be coordinated among all balancing authorities in the Interconnection. According to NERC, when there is a minimum Frequency Bias Setting requirement, it should apply for all balancing authorities. However, balancing authorities using a variable Frequency Bias Setting may have non-linearity in their actual response for a number of reasons including the deadband settings of their generator governors. The measurement to ensure that these balancing authorities are conforming to the Interconnection minimum is adjusted to remove the deadband range from the calculated average Frequency Bias Setting actually used.[25]

18. Requirement R4 states that:

> Each Balancing Authority that is performing Overlap Regulation Service shall modify its Frequency Bias Setting in its ACE calculation, in order to represent the Frequency Bias Setting for the combined Balancing Authority area, to be equivalent to either:
> • the sum of the Frequency Bias Settings as shown on FRS Form 1 and FRS Form 2 for the participating Balancing Authorities as validated by the ERO, or
> • the Frequency Bias Setting shown on FRS Form 1 and FRS Form 2 for the entirety of the participating Balancing Authorities' areas.

[17] NERC proposes to retire the existing definition of Frequency Bias Setting at midnight of the day immediately prior to the effective date of Requirement R2, Requirement R3, and Requirement R4 of the Reliability Standard.

[18] NERC Petition at 15. *See also* Reliability Standard BAL–003–1, Purpose Statement:

> To 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. To provide consistent methods for measuring Frequency Response and determining the Frequency Bias Setting.

[19] NERC defines Frequency Response Sharing Group as ''[a] group whose members consist of two or more Balancing Authorities that collectively maintain, allocate, and supply operating resources required to jointly meet the sum of the Frequency Response Obligations of its members.'' NERC Petition at 13. The Reliability Standard allows balancing authorities to cooperatively form Frequency Response Sharing Groups as a means to jointly meet the obligations of the standard. *Id.*

[20] NERC defines Frequency Response Measure as ''[t]he median of all the frequency response observations reported annually by Balancing Authorities or Frequency Response Sharing Groups for frequency events specified by the ERO. This will be calculated as MW/0.1Hz.''

[21] NERC Petition at 15.

[22] *Id.* NERC explains that ''Attachment A (appended to the proposed standard) is a supporting document for Reliability Standard BAL–003–1 that discusses the process the ERO will follow to validate the Balancing Authority's FRS Form 1 data and publish the official Frequency Bias Settings. FRS Form 1 provides the guidance as to how to account for and measure Frequency Response. FRS Form 1, and the underlying data retained by the balancing authority, will be used for measuring whether sufficient Frequency Response was provided.'' NERC Petition at 4.

[23] *Id.* at 16 (citing Order No. 693, FERC Stats. & Regs. ¶ 31,242 at P 375).

[24] NERC explains that overlap regulation service is a method of providing regulation service in which a balancing authority incorporates another balancing authority's actual interchange, frequency responses, and schedule into the providing balancing authority's AGC/ACE equation. NERC Petition at 21.

[25] NERC Petition at 20. NERC further states that ''For [balancing authorities] using variable bias, FRS Form 1 has a data entry location for the previous year's average monthly Bias. The [balancing authority] and the ERO can compare this value to the previous year's Frequency Bias Setting minimum to ensure Requirement R3 has been met.'' Id.

NERC states that Requirement R4 is similar to Requirement R6 in the currently-effective BAL–003–0.1b.

III. Notice of Proposed Rulemaking

19. On July 18, 2013, the Commission issued a Notice of Proposed Rulemaking (NOPR) proposing to approve Reliability Standard BAL–003–1 as just, reasonable, not unduly discriminatory or preferential, and in the public interest.[26] The Commission also proposed to approve three new definitions and the revised definition of Frequency Bias Setting, all but one of the associated violation risk factors, most violation severity levels, the implementation plan, effective date, and the retirement of the ''Version 0'' Standard BAL–003–0.1b. The NOPR stated that the Reliability Standard establishes a minimum Frequency Response Obligation and addresses other related matters that are not addressed in any currently-effective Reliability Standard.

20. While the Commission proposed to approve Reliability Standard BAL–003–1, the Commission raised concerns regarding certain provisions of the proposed standard, some of which NERC itself identified in the reports included in its petition. In the NOPR, the Commission sought comments on the following issues: (1) In Requirement R1, the use of the median statistical method in the calculation of Frequency Response Measure, i.e., selecting the middle value in a set of data that is arranged in an ascending or descending order; (2) the potential for early withdrawal of primary frequency response before secondary frequency response is activated; (3) the need to study frequency response during light-load conditions; (4) whether the resource contingency criteria in the Western Interconnection is properly identified; and (5) the need to adequately ensure that each balancing authority has available the resources it needs to meet its frequency response obligation.[27]

21. In response to the NOPR, the Commission received comments from: NERC, Midcontinent Independent System Operator (MISO), Electricity Consumers Resource Council (ELCON), ISO/RTO Council (IRC), Arizona Public Service Company (APS), Bonneville Power Administration (BPA), and Trade Associations.[28] On October 15, 2013, NERC submitted reply comments. We address below the issues raised in the NOPR and comments.

IV. Discussion

22. Pursuant to FPA section 215(d), we approve Reliability Standard BAL–003–1 as just, reasonable, not unduly discriminatory or preferential, and in the public interest. The Reliability Standard establishes a minimum Frequency Response Obligation for each balancing authority; provides a uniform calculation of frequency response; establishes Frequency Bias Settings that are closer to actual balancing authority frequency response; and encourages coordinated automatic generation control operation. The Reliability Standard addresses an existing gap in reliability, as these matters are either not covered, or not adequately addressed, in any currently-effective Reliability Standard. Further, Reliability Standard BAL–003–1 adequately addresses certain directives from Order No. 693. We also approve the new and modified definitions and, with two exceptions, the proposed violation severity levels and violation risk factors, and retirement of the currently-effective standard and NERC's implementation plan.

23. We discuss below the following issues raised in the NOPR and addressed in the comments: (A) The use of the median statistical method in determining the Frequency Response Measure; (B) the determination of Interconnection Frequency Response Obligation; (C) methods of obtaining frequency response; (D) withdrawal of primary frequency response before secondary frequency response is activated; (E) development of a new light-load case study; (F) assignment of violation risk factors and violation severity levels; and (G) associated and supporting documents.

A. Use of the ''Median'' in Determining the Frequency Response Measure NERC Petition

24. As discussed above, Requirement R1 of Reliability Standard BAL–003–1 provides that each balancing authority or Frequency Response Sharing Group achieve an annual Frequency Response Measure that is equal to or more negative than its Frequency Response Obligation needed to ensure sufficient frequency response. NERC proposed to define the Frequency Response Measure as ''the median of all the Frequency Response observations reported annually by balancing authorities or Frequency Response Sharing Groups for the frequency events specified by the ERO.'' [29] NERC defines the ''median'' as ''the numerical value separating the higher half of a one-dimensional sample, a one-dimensional population, or a one-dimensional probability distribution from the lower half. The median of a finite list of numbers is found by arranging all the observations from lowest value to highest value and picking the middle one.'' [30]

25. NERC stated in its petition that the standard drafting team evaluated different approaches for averaging individual event observations to compute a technically sound estimate of Frequency Response Measure, including median and linear regression analysis.[31] Explaining why the drafting team chose to use the median, NERC stated:

> In general, statisticians use the median as the best measure of a central tendency when a population has outliers. Based on the analyses performed thus far, the standard drafting team believes that the median's superior resiliency to this type of data quality problem makes it the best aggregation technique at the time. However, the standard drafting team sees merit and promise in future research with sample filtering combined with a technique such as linear regression. When compared with the mean, linear regression shows superior performance with respect to the elimination of noise because the measured data is weighted by the size of the frequency changes associated with the event. The standard drafting team acknowledges that linear regression should be re-evaluated for use in the BAL–003 Reliability Standard once more experience is gained with data collected.[32]

NOPR

26. In the NOPR, the Commission stated that NERC provided adequate rationale for using the median to determine the required Frequency Response Measure.[33] The NOPR also

[26] *Frequency Response and Frequency Bias Setting Reliability Standard,* Notice of Proposed Rulemaking, 78 FR 45479 (July 29, 2013), 144 FERC ¶ 61,057 (2013) (NOPR).

[27] On July 18, 2013 the Commission issued a Notice of Request for Comments (Docket No. AD13–8) concerning the market implications of frequency response and frequency bias setting requirements. *See Market Implications of Frequency Response and Frequency Bias Setting Requirements,* 144 FERC ¶ 61,058 (2013).

[28] The Trade Associations group consists of Edison Electric Institute (EEI), National Rural Electric Cooperative Association (NRECA), American Public Power Association (APPA) and Electric Power Supply Association (EPSA).

[29] NERC Petition at 13.

[30] Frequency Response Initiative Report at 72. NERC developed a procedure for selecting frequency response observations. *See* NERC Petition, Exh. C (Procedure for ERO Support of Frequency Response and Frequency Bias Setting Standard). The Procedure is referenced, but not included, in Attachment A of Reliability Standard BAL–003–1.

[31] NERC Petition at 17–18. The Frequency Response Initiative Report defines the linear regression method as the linear average of a multi-dimensional sample, or a multi-dimensional population. *See id.,* Exh. F at 73.

[32] *Id.* at 17–18 (footnote omitted). *See also id.,* Exh. F at 72–78. NERC explained that the ''noise'' refers to factors that can influence data and produce outliers. *Id.* at 18, n.34.

[33] NOPR, 144 FERC ¶ 61,057 at P 26.

noted NERC's explanation that application of the median is supported by the analyses performed to date.[34] Therefore, the Commission proposed to approve BAL–003–1 on that basis.

27. However, in the NOPR, the Commission expressed concern ''whether use of the median adequately represents actual data that could, on occasions, be significantly higher or lower than the median.'' [35] Further, the Commission noted the standard drafting team's support for re-evaluating the use of linear regression when more experience is gained with Reliability Standard BAL–003–1. Accordingly, the Commission proposed to direct NERC to develop a modification to Reliability Standard BAL–003–1 to replace use of the median with a ''more appropriate methodology,'' suggesting that ''based on the record in this docket, it appears that the linear regression method is superior to the median when determining the Frequency Response Measure.'' [36]

Comments

28. NERC, IRC and Trade Associations disagree with the NOPR proposal, and support use of the median statistical measure. NERC states that the Commission's proposed directive to develop a modification to the methodology for determining the Frequency Response Measure is premature. NERC asserts that the standard drafting team evaluated different approaches for averaging individual event observations to compute a technically sound estimate of Frequency Response Measure, including the median and linear regression analysis. NERC also notes that, in the NOPR, the Commission indicated that NERC provided adequate rationale for using the median to determine the required Frequency Response Measure, and that use of the median is supported by the analyses performed to date.[37]

29. Trade Associations and IRC also disagree with the Commission's proposal to direct NERC to develop a modification to the proposed standard and assert that the standard drafting team selected the most appropriate methodology. Trade Associations assert that the standard drafting team's reasoning was ''well thought out and balanced considering the advantages and disadvantages of both approaches (i.e., 'median' and 'linear regression').'' [38] Trade Associations understand that the standard drafting team evaluated both methods and found that the median approach consistently produced a more conservative Frequency Response Measure value, and was significantly less likely to result in calculation errors. Thus, Trade Associations support the median methodology because ''it is far better to err on the side of having slightly more available reserves than not having enough.'' [39] Finally, Trade Associations and IRC comment that that the median methodology is less complicated and will minimize the compliance risks and resource burdens of applicable entities. IRC notes that the frequency response measurement process is easily susceptible to distortion due to a very large noise to signal ratio, and that use of the median discards such ''outliers,'' while results from linear regression may be skewed by such ''noise.''

30. BPA raises a concern that use of the median method for determining the Frequency Response Measure ''gives equal weight to large and small disturbances.'' [40] In particular, BPA expresses concern with NERC's proposal to use 20 to 30 events per year for calculating the Frequency Response Measure because targeting a fixed number of events per year may lead to using relatively small (less than 400 MW) events in frequency response calculations. BPA asserts that extrapolating from these small events to large events could lead to misleading indications of the Interconnection and balancing authority's performance during large events and ''undermine the intent'' of the Reliability Standard.[41] BPA recommends the following specific revisions to the frequency response measurement proposal: (1) Use resource loss events equal to or greater than 1,000 MW or events with frequency deviations below 59.9 Hz for calculating frequency response, rather than a fixed number of events per year; and (2) use the smallest of actual maximum design frequency or the maximum design delta from NERC Table 1 Interconnection Frequency Response Obligation.

31. In reply comments, NERC responds to BPA's proposed revisions, stating that the values in Table 1 are not static and are revised on an annual basis pursuant to a written process for identifying candidate frequency events and an annual review of the calculations. Further, NERC explains that the methodology set forth in Table 1 of Attachment A to Reliability Standard BAL–003–1 is based on frequency and not the size of events, as suggested by BPA.

Commission Determination

32. The Commission does not adopt the NOPR proposal that NERC develop a modification to replace the use of the median with a more appropriate methodology and, instead, approves the use of the median methodology to determine the required Frequency Response Measure as set forth in Reliability Standard BAL–003–1. As indicated by NERC, the standard drafting team considered various approaches for averaging individual event observations to compute a technically sound estimate of Frequency Response Measure and determined that ''the median's superior resiliency to this type of data quality problem [i.e., a data set with outliers] makes it the best aggregation technique at the time.'' [42] We also see merit at this time in IRC's explanation that the frequency response measurement process is susceptible to distortion due to a large noise to signal ratio, and that use of the median discards such ''outliers.'' Accordingly, we are persuaded that, based on this record, there is sufficient justification for NERC's use of the median method for determining the required Frequency Response Measure in the initial implementation of Reliability Standard BAL–003–1.

33. Further, with respect to BPA's concerns regarding NERC's process for determining the appropriate Frequency Response Measure, we agree with NERC's explanation that NERC has developed an acceptable methodology for identifying candidate frequency events and an annual review of the calculations.[43] The methodology developed by NERC is based on frequency and not the size of events. Therefore, if any revisions are necessary, as BPA suggests, they can be implemented via this established review process.[44]

34. In addition, while the use of the median provides an adequate initial means to achieve the objectives of Reliability Standard BAL–003–1, we continue to believe that over the long term the Reliability Standard can be improved by adopting the linear method.[45] However, we are persuaded

[34] *Id.* P 25 (citing NERC Petition at 17–18).

[35] *Id.* P 27.

[36] *Id.*

[37] NERC Comments at 5.

[38] Trade Associations Comments at 5; *see also* IRC Comments at 4.

[39] Trade Associations Comments at 5.

[40] BPA Comments at 2.

[41] *Id.*

[42] NERC Petition at 17–18.

[43] NERC Reply Comments at 3–4.

[44] *Id.*

[45] *See* NOPR, 144 FERC ¶ 61,057 at P 27. One of the recommendations contained in NERC's Frequency Response Initiative Report states that

Continued

by the comments of NERC and others that adopting the linear regression method will insert an additional level of complexity to the process, and a directive to that effect would be premature. Accordingly, as stated above, we do not adopt our NOPR proposal to direct that NERC immediately develop a modification to Reliability Standard BAL–003–1 to calculate the Frequency Response Measure using linear regression. Rather, the Commission acknowledges NERC's commitment to studying the use of linear regression [46] and the analysis contained in the Frequency Response Initiative Report,[47] and directs NERC to continue its evaluation of the use of the linear regression methodology based upon experience and data collected following the implementation of BAL–003–1 and to submit a report to the Commission within three months after two years of operating experience once Requirement R1 of BAL–003–1 becomes effective (i.e., 27 months from the effective date of Requirement R1). The report should assess the accuracy of the linear regression methodology compared to the median methodology for purposes of determining Frequency Response Measure. Based on this report and actual experience, the Commission may revisit this issue.

B. Determination of Interconnection Frequency Response Obligation NERC Petition

35. Reliability Standard BAL–003–1 establishes an Interconnection Frequency Response Obligation designed to require sufficient frequency response for each Interconnection to arrest frequency decline even for severe, but possible, contingencies. The methodology for determining each Interconnection's obligation for obtaining the necessary amount of frequency response is set forth in Attachment A of the Reliability Standard. The Interconnection Frequency Response Obligation is based on the ''resource contingency criteria,'' which is the largest ''Category C'' event for the Interconnection,[48] except for the Eastern Interconnection, which uses the largest event and maximum actual change in frequency in the last ten years.[49] The maximum change in frequency is calculated by adjusting the starting frequency for each Interconnection by the ''prevailing UFLS first step,'' i.e., under-frequency load shedding for the Interconnection as adjusted by specific information on the frequency deviations for the observed events which make up the data-set used to calculate the Frequency Response Measure.[50] For multiple balancing authority Interconnections, the Frequency Response Obligation is allocated to balancing authorities based on the formula set forth in Attachment A. FRS Form 1 and the underlying data retained by the balancing authorities are used for measuring whether frequency response was provided.

NOPR

36. In the NOPR, with respect to the determination of the Interconnection Frequency Response Obligation, the Commission discussed two matters: (1) Eastern Interconnection—prevailing first step of under-frequency load shedding and (2) Western Interconnection—identifying the largest N–2 contingency.

1. Eastern Interconnection—Prevailing UFLS First Step

37. For the Eastern Interconnection, Attachment A to the Reliability Standard identifies 59.5 Hz as the ''first step'' of under-frequency load shedding in the calculation of the default Interconnection Frequency Response Obligation. Attachment A notes that this set point is ''a compromise value set midway between the stable frequency minimum established in Reliability Standard PRC–006–1 (59.3 Hz) and the local protection under frequency load shedding setting of 59.7 Hz used in Florida and Manitoba.'' [51] The NERC Frequency Response Initiative Report notes that the Florida Reliability Coordinating Council (FRCC) concluded that the Interconnection Frequency Response Obligation starting frequency of the prevalent 59.5 Hz for the Eastern Interconnection is acceptable because it imposes no greater risk of triggering under-frequency load shedding operation for contingencies internal to FRCC than for contingencies external to FRCC.[52]

38. Noting that the actual first-step of under-frequency load shedding for the Eastern Interconnection is 59.7 Hz, the NOPR sought comment on the technical source or support for NERC's statement that the first-step value of 59.5 Hz in the calculation of the Interconnection Frequency Response Obligation imposes no greater risk of under-frequency load shedding operation in FRCC for an external resource loss than for an internal FRCC event. Also, the NOPR sought clarification of whether the intent of the proposal is that FRCC will start shedding load automatically before an event meets the value of 59.5 Hz used in the Reliability Standard to determine the Interconnection Frequency Response Obligation.

Comments

39. NERC, Trade Associations, and MISO submitted comments in support of using the prevailing under-frequency load shedding first step for the Eastern Interconnection of 59.5 Hz. Trade Associations state that they understand that FRCC has evaluated the impact of the proposed standard and has determined that the probability of a load shedding event caused by a generation loss within the Eastern Interconnection is comparable with an event internal to the FRCC region.[53]

40. NERC comments that FRCC's 59.7 Hz under-frequency load shedding setting is designed to arrest dynamic transients for system events occurring on the Florida peninsula to avoid separation from the rest of the Eastern Interconnection. NERC states that further analysis by NERC showed that the under-frequency load shedding settings on the Florida peninsula are not susceptible to activation even by very large resource losses within the main body of the Eastern Interconnection. NERC explains that ''[u]sing the 'generic' dynamics case available, a follow-on analysis was performed by NERC staff to determine the general order of magnitude of a frequency event that could be sustained by the Eastern Interconnection without violating the 59.7 Hz first step under-frequency load shedding in FRCC. A simulation was run that tripped about 8,500 MW of generation in the southeast United

''[l]inear regression is the method that should be used for calculating Balancing Authority Frequency Response Measure (FRM) for compliance with Standard BAL–003–1–Frequency Response.''

[46] NERC Comments at 6 and NERC Petition at 18, fn. 35.

[47] *See* NERC Petition at 17–18; *see also id.,* Exh. F at 72–78.

[48] *See* Reliability Standard BAL–003–1, Attachment A at 1. Category C events are defined in Reliability Standard TPL–003–0 (System Performance Following Loss of Two or More Bulk Electric System Elements), Table 1.

[49] For the Eastern Interconnection, the largest event in the last ten years is the loss of 4,500 MW of generation, which occurred on August 4, 2007. *See* Reliability Standard BAL–003–1, Attachment A at 1; Frequency Response Initiative Report at 34–37, 54.

[50] *Id.* Under-frequency load shedding is intended to be a safety net to prevent against system collapse from severe contingencies. The resource contingency criterion is selected to avoid violating the under-frequency load shedding settings. *See* NERC Petition, Exh. D at 36 (''in general, the goal is to avoid triggering the first step of under-frequency load shedding (UFLS) in the given Interconnection for reasonable contingencies expected'').

[51] Reliability Standard BAL–003–1, Attachment A at 2.

[52] *See* Frequency Response Initiative Report at 4, n.3.

[53] Trade Association Comments at 6.

States (north of Florida).'' [54] NERC further states that the simulation showed that the lowest frequency resulting from that event would be about 59.76 Hz in southern Florida.

41. NERC further states that the initial nadir of 59.78 Hz in southern Florida from the simulation is lower than the nadir in northern Florida due to the wave properties of the disturbance.[55] Finally, NERC asserts that because the simulation was conducted with nearly twice the 4,500 MW resource loss used to determine the Interconnection Frequency Response Obligation for the Eastern Interconnection, it is prudent to conclude that the smaller resource loss could not generate a transient or momentary system disturbance that would trip the FRCC 59.7 Hz under-frequency load shedding. For these reasons, NERC concludes that the proposed first-step value of 59.5 Hz is adequately supported by technical considerations.[56]

42. MISO also supports the proposed first-step value of 59.5 Hz for the Eastern Interconnection and asserts that NERC has provided sufficient support for using the 59.5 Hz value. According to MISO, the FRCC 59.7 Hz frequency value reflects local concerns specific to Florida, based on the observation that an event in Florida causes a wider frequency swing locally than what propagates out to the rest of the Eastern Interconnection. MISO asserts that there has been no recorded case of frequency in the Eastern Interconnection declining to 59.7 Hz.[57] MISO further submits that, given the localized nature of the concerns supporting the first-step value in Florida, and the extreme nature of the event that would be required to drive Interconnection-wide impact, NERC has sufficient justification for establishing 59.5 Hz as the first-step value for the Eastern Interconnection.

Commission Determination

43. The Commission accepts NERC's and MISO's explanation of the technical support for using 59.5 Hz as the ''first step'' of under-frequency load shedding in the calculation of the default Interconnection Frequency Response Obligation. The Commission also agrees with Trade Associations' assertion that FRCC has evaluated the impact of the proposed standard and has determined that the probability of a load shedding event caused by a generation loss within the Eastern Interconnection is comparable with an event within the FRCC region. Accordingly, the Commission is satisfied with the NOPR responses and takes no further action on this matter.

2. Western Interconnection—Largest N–2 Event NERC Petition

44. The Interconnection Frequency Response Obligation is based on the largest Category C event, or N–2 (loss of two or more bulk electric system elements) for the Interconnection. The default Interconnection Frequency Response Obligation for the Western Interconnection is based on the loss of two Palo Verde generating station units, which results in a resource contingency criterion of 2,740 MW.[58] NERC indicated in its petition that the default Interconnection Frequency Response Obligation calculation scenarios and the calculation of the Frequency Response Measure for the Western Interconnection do not take into account the intentional tripping of generation that will occur during the operation of specific remedial action schemes. According to the Frequency Response Initiative Report, operation of the Pacific Northwest Remedial Action Scheme trips up to 3,200 MW of generation in the Pacific Northwest due to the loss of the Pacific DC Intertie.[59] The Frequency Response Initiative Report recommends that NERC and the Western Interconnection analyze the Frequency Response Obligation allocation implications of the activation of the Pacific Northwest Remedial Action Scheme that trips 3,200 MW of generation for a single contingency.[60]

NOPR

45. In the NOPR, the Commission expressed concern regarding whether the N–2 contingency identified as an input to the Attachment A methodology for calculating the Interconnection Frequency Response Obligation accurately identifies the largest N–2 event in the Western Interconnection. The NOPR referenced the Frequency Response Initiative Report, which indicates that the Pacific Northwest Remedial Action Scheme could result in a larger contingency that, if included as an input to the Attachment A calculation, would produce more accurate results.[61] Accordingly, the Commission proposed in the NOPR to direct NERC to submit a report that analyzes, with supporting documentation, the implications of the Pacific Northwest Remedial Action Scheme or any other Remedial Action Scheme which involves intentional tripping of greater than 2,400 MW of generation, and whether such a contingency would provide a more accurate basis for the determination of the Western Interconnection default Interconnection Frequency Response Obligation.

Comments

46. Trade Associations comment that they recognize the Commission's issue and have no concerns with a directive mandating the ERO to study the implications of the Pacific Northwest Remedial Action Scheme and other similar arrangements that intentionally involve the tripping of greater than 2,400 MW of generation.

47. BPA comments that ''[Remedial Action Scheme] events should not determine the Resource Contingency Criteria in the Western Interconnection'' because, *inter alia,* simulation of Remedial Action Scheme events and two Palo Verde events show similar system frequency performance and ''RAS events off-load the system stress . . . while an unplanned 2 Palo Verde unit outage would increase the system stress.'' [62]

Commission Determination

48. In light of NERC's December 30, 2013 annual analysis informational filing, we will not adopt our NOPR proposal. In its 2013 annual analysis NERC explains that ''[Remedial Action Schemes] in the Western Interconnection that trip generation resources in excess of 2,400 MW for transmission system contingencies should not be used for the resource contingency protection criteria for the Western Interconnection. Because of the location of the resources tripped and the fact that [Remedial Action Schemes] would not be armed to trip those levels of generation under peak conditions, the loss of two Palo Verde units is a larger hazard to the interconnection.'' [63] Accordingly, the Commission will not direct NERC to submit a report concerning the implications of the Pacific Northwest Remedial Action Scheme or any other Remedial Action

[54] NERC Comments at 13.

[55] The ''nadir'' is the lowest point at which frequency excursion is arrested. Frequency Response Initiative Report at 13.

[56] NERC Comments at 14.

[57] MISO Comments at 5.

[58] *See* Frequency Response Initiative Report at 53.

[59] The Pacific Northwest Remedial Action Scheme, among other things, blocks frequency response from a number of generators and Balancing authorities to avoid overloading the Pacific AC ties. *See* Frequency Response Initiative Report at 62.

[60] *See id.* NERC noted that the maximum value of the Pacific Northwest Remedial Action Scheme has been updated to be 2,850 MW. *See* NERC Petition, Exh. G (Status of Recommendations of the Frequency Response Initiative Report).

[61] *See* NOPR, 144 FERC ¶ 61,057 at P 32.

[62] *See* BPA Comments at 7 (providing additional rationale for not considering Remedial Action Scheme events).

[63] NERC's 2013 Annual Analysis at 2.

Scheme which involves intentional tripping of greater than 2,400 MW of generation, and whether such a contingency would provide a more accurate basis for determining the Western Interconnection default Interconnection Frequency Response Obligation. We expect, however, that NERC will continue to study any modified or new Remedial Action Schemes that may have an impact greater than the tripping of 2,400 MW in its annual frequency response analysis, including an assessment of the adequacy of the resource contingency protection criteria for the Western Interconnection.

49. While BPA advocates that Remedial Action Schemes should not be considered in determining the Interconnection Frequency Response Obligation, BPA did not provide support in the record for its claim that activation of Remedial Action Schemes will reduce system stress while the loss of two Palo Verde units will increase it. Contrary to BPA's argument, we believe that it is appropriate to study this matter, as NERC has done, and take possible future action depending on study results because if the obligation is set too low, the Western Interconnection may not have sufficient frequency response to arrest frequency decline.

C. Method of Obtaining Frequency Response

50. In Order No. 693, the Commission directed NERC to develop a modification to BAL–003–0 that includes methods for obtaining frequency response.[64] While the Reliability Standard establishes an Interconnection Frequency Response Obligation and allocates this obligation to the balancing authorities within the Interconnection, the Reliability Standard imposes no obligation on resources that are capable of providing frequency response.

NOPR

51. In the NOPR, the Commission stated that Reliability Standard BAL–003–1 imposes an obligation, subject to compliance and enforcement, on each balancing authority to obtain frequency response. The Commission recognized, however, that balancing authorities must obtain frequency response from other entities with available resources, and Reliability Standard BAL–003–1 imposes no obligation on those entities to provide frequency response.

52. In the NOPR, the Commission proposed to direct NERC to submit a report 15 months after implementation of BAL–003–1 that provides an analysis of the availability of resources for each balancing authority to meet its Frequency Response Obligation during the first year of implementation.[65] The Commission also proposed that the report provide data indicating whether actual frequency response was sufficient to meet each balancing authority's Frequency Response Obligation. Further, the NOPR proposed that, if NERC's findings indicate that the Frequency Response Obligation was not met, NERC should provide appropriate recommendations to ensure that frequency response can be maintained at all times within each balancing authority's footprint.

Comments

53. NERC, Trade Associations, IRC, APS, and ELCON generally support the Commission's proposal that NERC submit a report regarding the availability of resources for frequency response. Trade Associations comment that they ''recognize the potential benefit of such a study,'' but suggest that 20 to 24 months is a more reasonable time frame for a directive. Trade Associations also ask the Commission to exercise care when directing NERC to conduct studies to ensure that scarce resources are not expended unnecessarily.

54. NERC commits to submitting an analysis of resource availability as proposed in the NOPR. However, NERC provides a detailed timeline for implementation and indicates that it will not receive the necessary information from responsible entities until March 24 of the year following the implementation of Requirement R1 of BAL–003–1, beyond the 15 month time frame proposed in the NOPR. Thus, NERC proposes to submit the report ''within six months of the validation by the ERO of the Frequency Bias Setting values and computation of the sum of all Frequency Bias Setting values for each Interconnection and determination of the L 10 values for the CPS 2 criterion for each Balancing Authority or, if applicable, confirmation of the Frequency Bias Setting to be used for the calculation of the Balancing Authority ACE limit.'' [66] NERC also seeks clarification that the study should analyze the availability of resources for both balancing authorities and Frequency Response Sharing Groups, since the latter was not specifically mentioned in the NOPR proposal. NERC states that, upon completion of the analysis, ''should the findings indicate that the Frequency Response Obligation was not met, NERC will provide appropriate recommendations.'' [67]

55. Several commenters, including IRC, APS and BPA, raise concerns regarding the compliance responsibilities of balancing authorities to meet a Frequency Response Obligation. IRC asserts that BAL–003–1 creates an inequitable alignment of compliance responsibility and generator performance capability. IRC states that while the obligation to meet the frequency response requirements lies with the balancing authority, the ability to provide the resources necessary to meet those obligations lies primarily with generators. Therefore, while IRC supports the analysis proposed in the NOPR, IRC also requests that the Commission direct prospective revisions to the Reliability Standard to assign responsibilities based on performance capability. IRC contends that this approach is appropriate because balancing authorities have no control over generators' performance in supporting the Frequency Response Obligation assigned to balancing authorities.

56. BPA agrees with the Commission that Reliability Standard BAL–003–1 does not address the ability of each balancing authority to ensure adequacy of resources to meet its frequency response obligations. According to BPA, there is a proposal in WECC to develop a regional Reliability Standard complementary to NERC BAL–003–1 to address this gap. BPA comments that, until such a standard is developed, each balancing authority must determine how to meet its own frequency response obligation. BPA states that this frequency response, measured by balancing authority interchange, includes not only the response of balancing authority generation but also incremental transmission losses and natural load response to voltage and frequency.[68] Finally, BPA asserts that balancing authorities that have to acquire resources will also need to develop monitoring capabilities to ensure that the contracted resources provide frequency response and that such monitoring will further increase the cost of compliance with Reliability Standard BAL–003–1.

[64] Order No. 693, FERC Stats. & Regs. ¶ 31,242 at P 375. The Commission directed NERC to develop 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.'' *Id.* (emphasis added).

[65] NOPR, 144 FERC ¶ 61,057 at P 34.

[66] NERC Comments at 16 (footnote omitted).

[67] *Id.* at 17.

[68] BPA Comments at 20.

57. APS believes it is appropriate for NERC to study and report on the availability of resources. However, APS asserts it is neither just nor reasonable for a balancing authority to be held to this requirement when frequency response services are simply not available. APS states that until such time that NERC has completed the studies, the results are reviewed, and appropriate solutions are developed to assure that affected entities have the resources available to comply under all conditions, either the implementation of the requirements should be delayed, or in the alternative, those balancing authorities who cannot obtain the required frequency response should be exempt from the proposed requirements.

58. APS also proposes that the Commission take a phased-in approach to compliance obligations to allow adequate time for necessary activities such as testing generation units for ramp-up capability, tuning generation and retesting, as well as time to allow a frequency response market to develop. APS comments that the types of resources a balancing authority has in its portfolio may significantly impact its ability to comply with BAL–003–1 because some resources, such as hydroelectric generation, are more effective in responding to frequency declines. APS asserts that it does not have sufficient fast-ramping resources to provide the required frequency response should the Western Interconnection experience an event that results in significant frequency response deviation. To address its concern, APS suggests a revision to the definition of a Balancing Authority's ''annual generation'' to exclude non-responsive units and apply a higher weighting factor for responsive units. According to APS, this revision would align the allocation of Frequency Response Obligation with a generator's physical ability to provide it.

59. In its reply comments, NERC responds to APS, stating that the standard drafting team determined technical evidence indicates that sufficient frequency response resources would be available for balancing authorities to comply with the requirements of Reliability Standard BAL–003–1.[69] Therefore, NERC contends that there is no need to adjust the implementation plan for Reliability Standard BAL–003–1 on the basis of availability.[70] Further, NERC disagrees with APS's suggestion to revise the definition of balancing authority ''annual generation,'' contending that such a change would create a ''perverse incentive'' for entities to install generating units that are not capable of providing Frequency Response. Further, NERC explains in response to APS that the Reliability Standard is appropriately technology- neutral, does not require every generator to respond and provide Frequency Response, and allows for flexibility since Frequency Response is measured on a balancing authority and an Interconnection-wide basis and permits the formation of Frequency Response Sharing Groups.

Commission Determination

60. The Commission adopts the NOPR proposal and directs NERC to submit a report that provides an analysis of the availability of resources for each balancing authority and Frequency Response Sharing Group to meet its Frequency Response Obligation during the first year of implementation. However, NERC indicates in its comments that it needs more than the proposed 15 months to prepare the report based on the time frame for NERC to receive relevant data from applicable entities.[71] Accordingly, we direct NERC to submit this report within 27 months of implementation of Requirement R1. The Commission believes that the need for the report is well justified based on the record in the proceeding, including the support of most commenters. While we conclude that BAL–003–1 is reasonable and should be approved, it includes a new methodology for determining the Frequency Response Obligation and the results when applied are not yet known. Further, as discussed above, the ability of balancing authorities and Frequency Response Sharing Groups to meet the obligation is untested. Thus, we believe the required report is an appropriate means to inform us as to whether additional steps are needed on the Frequency Response Obligation and what those might be. The required report should provide data indicating whether actual frequency response was sufficient to meet each balancing authority's Frequency Response Obligation. Further, consistent with NERC's representation in its comments, the Commission directs that, upon completion of the required analysis, should the findings indicate that the Frequency Response Obligation was not met, NERC shall provide appropriate recommendations to ensure that frequency response can be maintained at all times within each balancing authority's footprint.[72]

61. In response to the concerns expressed by the IRC, BPA and APS that balancing authorities may not have control over adequate resources necessary to support the Frequency Response Obligations assigned to the balancing authorities, we will not forego compliance or delay implementation. Certainly, a balancing authority's ability or inability to draw on the necessary resources to meet the compliance obligations of BAL–003–1 might be a potential mitigating factor in a compliance action, depending on the efforts made to obtain resource commitments. Moreover, NERC and its stakeholders had, and still have, the option to propose a Reliability Standard imposing obligations directly on resources, if they find it appropriate. (Similarly, we may consider a directive for such a Standard or other options such as market or tariff mechanisms, if appropriate.) However, we are not persuaded that a blanket waiver or delay in compliance is warranted.

62. While we share concerns regarding the ability of balancing authorities and Frequency Response Sharing Groups to meet the Frequency Response Obligation pursuant to BAL–003–1, we do not believe that such changes are warranted based on the current record in the proceeding. Rather, a recent NERC study indicates that sufficient frequency response resources would be available for balancing authorities to comply with the requirements of Reliability Standard BAL–003–1.[73] Further, as noted by NERC, Reliability Standard BAL–003–1 provides flexibility, for example by allowing entities to form Frequency Response Sharing Groups to meet the Frequency Response Obligation. Likewise, we are not persuaded by APS that a change to the definition of balancing authority annual generation is warranted at this time, and we are concerned that APS's suggestion would change the resource-neutral approach of the standard.

63. We do not discount the concerns of APS and others regarding resource availability. However, we believe that the prudent course is to have NERC complete the directed report. The

[69] NERC Reply Comments at 4 (citing NERC Report: State of Reliability 2013 Report (May 2013), Key Finding 3, Page 12).

[70] NERC Reply Comments at 4.

[71] *See* NERC Comments at 16.

[72] *See* NERC Comments at 17.

[73] *See* NERC Reply Comments at 4 (citing NERC Report: State of Reliability 2013 Report (May 2013), Key Finding 3, Page 12). *See also* APS Comments at 8 (''[a]s NERC Reported in its recent State of Reliability 2013 Report, from 2009 to 2012 interconnection frequency response performance, and expected frequency response . . . has been higher than the recommended interconnection frequency response obligation'').

Commission will review NERC's report, any related recommendations from NERC, and the record developed in Docket No. AD13–8 regarding the market implications of frequency response requirements,[74] to determine whether additional action is warranted. However, if prior to the deadline for the report NERC learns that a lack of resource availability could prevent achieving the purpose of Reliability Standard BAL–003–1, (e.g., balancing authorities are experiencing problems procuring sufficient resources to satisfy their frequency response obligations), NERC should immediately report that to the Commission together with appropriate recommendations for mitigation.[75]

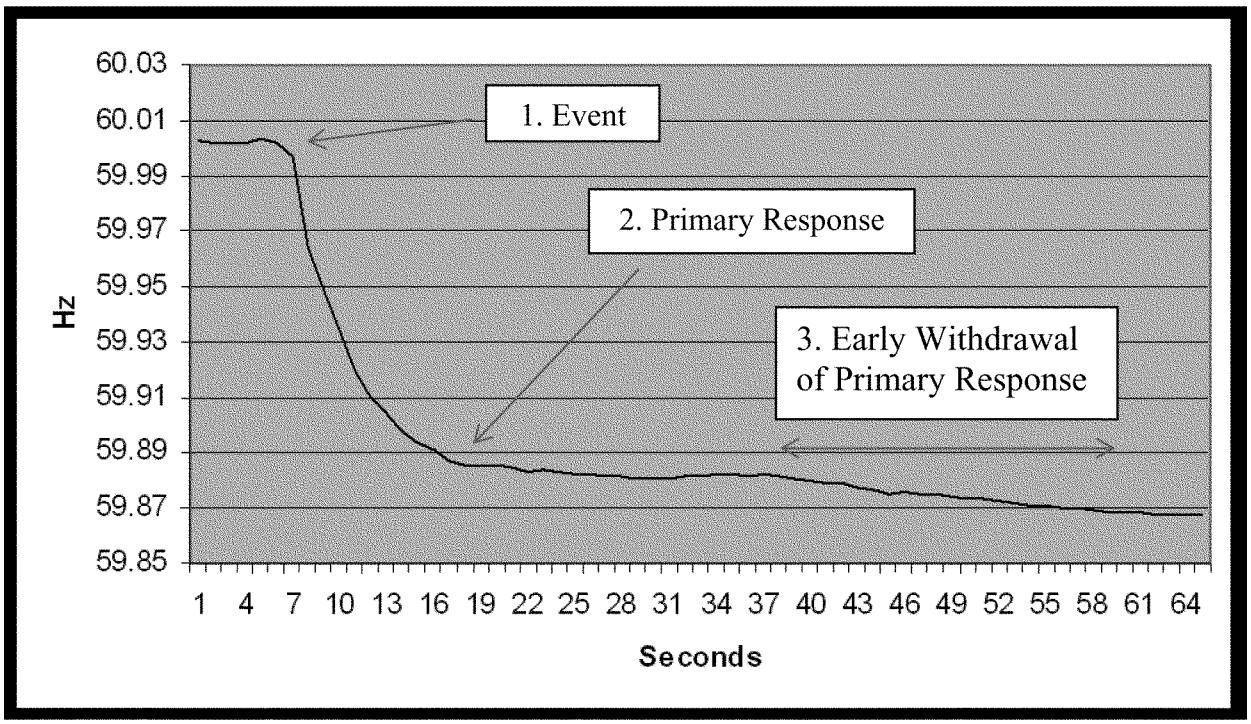
D. Premature Withdrawal of Primary Frequency Response NERC Petition

64. In its petition, NERC indicated that, while the standards drafting team addressed the early withdrawal of primary frequency response, there are no requirements that address this issue and it remains a concern.[76] Specifically, during the initial recovery from the loss of a generator, a gap can occur if a significant amount of primary frequency response is withdrawn before the secondary response is fully activated. As previously noted, the Interconnection Frequency Response Obligation for each Interconnection is a function of the resource contingency criteria and the maximum change in frequency.[77]

65. NERC's Frequency Response Initiative Report states that ''[w]ithdrawal of primary frequency response is an undesirable characteristic associated most often with digital turbine-generator control systems using set point output targets for generator output. These are typically outer-loop control systems that defeat the primary frequency response of the governors after a short time to return the unit to operating at a requested MW output.'' [78] The Frequency Response Initiative Report recommends measuring and tracking frequency response sustainability trends.[79] The Frequency Response Initiative Report also recommends that ''NERC should include guidance on methods to reduce or eliminate the effects of primary frequency response withdrawal by outer-loop unit or plant control systems.'' [80]

NOPR

66. In the NOPR, the Commission explained that ''following the sudden loss of generation, the automatic and immediate increase in power output by resources providing primary frequency control seeks to quickly arrest and stabilize the frequency of the interconnection, usually within 30 seconds or less. After this rapid primary frequency response, AGC provides secondary frequency response to return frequency to the scheduled value in time frames of several minutes after the loss of generation.'' [81] However, the withdrawal of a significant amount of primary frequency response before the secondary frequency response is activated can cause a further drop in frequency response. This drop in frequency is illustrated by the following diagram: [82]



[74] *See Market Implications of Frequency Response and Frequency Bias Setting Requirements,* 144 FERC ¶ 61,058 (2013).

[75] For example, in such circumstances, NERC could look to regional Reliability Standard BAL–001–TRE–01, approved concurrently with this Final Rule, which contains provisions for assuring frequency response in the ERCOT Interconnection.

[76] *See* NERC Petition, Exh. D (Frequency Response Standard Background Document) at 19 (''the intentional withdrawal of response before frequency has been restored to schedule can cause a decline in frequency beyond that which would be otherwise expected. This intentional withdrawal of response is highly detrimental to reliability. Therefore, it can be concluded in general that sustained response has a higher reliability value than un-sustained response.'').

[77] The maximum change in frequency is an amount of frequency deviation based on the loss of the identified resource contingency that will not trigger under-frequency load shedding.

[78] NERC Petition, Exh. F (Frequency Response Initiative Report) at 31.

[79] *Id.* at 35. The Frequency Response Initiative Report also recognizes unit characteristics and operating philosophies as typical causes.

[80] *Id.* at 41–42.

[81] NOPR, 144 FERC ¶ 61,057 at P 35.

[82] *Id.* P 35 (citing Frequency Response Initiative Report at 35, fig. 21).

67. In the NOPR, the Commission expressed concern that Reliability Standard BAL–003–1 does not adequately address the reliability issue created by the withdrawal of primary frequency response prior to activation of secondary frequency response. The withdrawal of primary frequency response before the activation of resources providing secondary frequency response may lead to under-frequency load shedding and possible cascading outages. Accordingly, the Commission proposed to direct NERC to develop a modification to BAL–003–1 to address the concern of premature withdrawal of primary frequency response prior to the activation of secondary frequency response.

Comments

68. NERC disagrees with the need for the proposed directive. First, NERC asserts that Form 1 of the Reliability Standard addresses premature withdrawal of frequency response and suggests that experience with the actual implementation of the Reliability Standard will better indicate whether premature withdrawal is an issue that requires revisions to the Reliability Standard and, if necessary, definitions of the scope and parameters of the potential issue. Second, NERC notes that the premature withdrawal issue could be impacted by the Commission's ongoing effort to determine whether action is necessary to coordinate the requirements of the Reliability Standard with tariffs and market rules.[83] Third, NERC asserts the issue of premature withdrawal can be addressed with other mechanisms rather than a revision to the Reliability Standard. Finally, NERC states that it ''commits to monitoring the issue of premature withdrawal on a going-forward basis and will submit an informational filing two years after Requirement R1 of Reliability Standard BAL–003–1 becomes effective.'' [84]

69. NERC maintains that the standard drafting team accounted for the issue of premature withdrawal of frequency response in the calculation of the B-value averaging period within the Frequency Response Measure. NERC states that ''[t]he team recognized that there would be more AGC response in the 20 to 52 second period, but the team also recognized that the 20 to 52 second period would provide a better measure of squelched response from outer loop control action. The 20 to 52 second period was selected because it would indicate squelched response from outer-loop control and *provide incentive to reduce response withdrawal.''* [85] NERC further explains that if there is withdrawal of primary frequency response during the 20 to 52 second interval, the metric will have a lower value, which will then lower an entity's median score thereby impacting compliance with Requirement R1 of Reliability Standard BAL–003–1.

70. NERC also maintains that, while Reliability Standard BAL–003–1 applies to balancing authorities and Frequency Response Sharing Groups, the premature withdrawal issue applies to generators. Therefore, NERC asserts, the withdrawal issue could be addressed with alternative mechanisms, including other Reliability Standards or guidelines. NERC further asserts that there are emerging technologies that can and will affect withdrawal, including energy storage devices. NERC notes that the premature withdrawal issue could be affected by whatever tariff or market solutions the Commission may adopt in related Docket AD13–8. For these reasons, NERC believes the Commission's proposed directive requiring a specific solution, i.e., a modification to BAL–003–1 Reliability Standard, is premature. NERC states that, consistent with the recommendations in the Frequency Response Initiative Report, it will evaluate whether a modification to Reliability Standard BAL–003–1 is necessary to address premature withdrawal and will submit an informational filing to the Commission two years after Requirement R1 of Reliability Standard BAL–003–1 becomes effective.[86]

71. Trade Associations disagree with the Commission's concern over premature withdrawal of frequency response. Trade Associations state that Reliability Standard BAL–003–1, along with other Reliability Standards awaiting implementation, such as BAL–001–2, sufficiently addresses this concern. Trade Associations assert that the Eastern Interconnection has significant inertia which buffers the initial drop in frequency in major events making premature primary frequency response withdrawal more apparent. Trade Associations state that the exemplary post-contingent recovery of all Interconnections' frequency as demonstrated over time supports their view that premature withdrawal is not a significant factor at this time. Finally, Trade Associations state that the desired outcome of automatic generation control for a balancing authority should result in a dispatch of resources to meet the secondary control requirements of NERC BAL–001. Based upon the overall balance of resources and demand, Trade Associations assert that automatic generation control may at times, guide individual regulating resources within a balancing authority, where a positive ACE exists, to withdraw energy (i.e., to reduce ACE) to meet the secondary control requirements of CPS2 under Reliability Standard BAL–001–1. Trade Associations assert that the response of such a unit would be to withdraw support, thereby resulting in an outcome contrary to the desire to sustain frequency response.[87]

72. IRC states that the Commission's concern about premature withdrawal of frequency response is unwarranted. IRC maintains that the Commission should adopt a more comprehensive perspective, taking into account frequency response and withdrawal patterns over an extended period of time and across Interconnections to understand the potential impact of premature withdrawal. IRC states that data collected and analyzed during the standard drafting team's field trial indicated how quickly and steadily frequency is, on average, brought back to a stable level over a five minute response window in all three Interconnections. IRC explains that the standard drafting team considered data regarding the mean frequency recovery rate (mHz/Sec) for all frequency-related events in each of the major Interconnections from 2010 to 2013. IRC states that early withdrawal of primary frequency response has not been a significant problem because ''most responses are incomplete at the time that frequency has been initially arrested and the additional response has generally been sufficient to make up for more than these unpreventable reductions in response.'' [88]

73. ELCON states that secondary frequency response (Regulation) is primarily delivered through automatic generation control, which is governed by Reliability Standard BAL–005–0.2b. That Reliability Standard contains requirements applicable to balancing authorities which therefore, ELCON states, have ''the responsibility to ensure its operability.'' [89] ELCON further states that Reliability Standard TOP–003–1 calls for generator operators to coordinate planned outages with transmission operators, who are

[83] *See Market Implications of Frequency Response and Frequency Bias Setting Requirements,* 144 FERC ¶ 61,058 (2013).

[84] NERC Comments at 7.

[85] NERC Comments at 9 (citing NERC Petition, Exh. D at 13).

[86] *Id.* at 10.

[87] Trade Associations Comments at 8–9.

[88] IRC Comments at 10.

[89] ELCON Comments at 8.

required to share that information with balancing authorities. Therefore, ELCON asserts that ''[t]his means that the [balancing authority] is aware of all AGC capacity that will be unavailable due to planned maintenance well ahead of time—and can plan mitigating actions accordingly.'' [90] ELCON also asserts that Reliability Standard PRC–024–1 has requirements intended to ensure that generator operators can ride through specifically defined frequency deviations, ''which can best assure their availability when needed for secondary frequency response support.'' [91] ELCON suggests that generator concerns with possible violations of Reliability Standard PRC–024–1, such as dropping off-line during a frequency transient within the standard's ''no-trip zones,'' could provide incentives against premature withdrawal.

74. BPA states that it shares the Commission's concerns on early withdrawal of frequency response and provides a recorded frequency response withdrawal by a combined cycle plant.[92] BPA states that the withdrawal was caused by load controllers implemented at many power plants and suggests that load controllers include a frequency bias term, similar to automatic generation control, to allow plants to sustain their frequency response. BPA asserts that the sustainability of frequency response is essential not only for Interconnection system frequency support, but also for voltage stability when the response withdrawal causes excessive loading on stability-limited transmission paths.[93]

Commission Determination

75. The Commission is persuaded not to adopt the NOPR proposal to require NERC to develop a modification to Reliability Standard BAL–003–1 to address premature withdrawal of frequency response. The Commission believes that the nature and extent of the problems that could result from the premature withdrawal of primary frequency response, and how best to address it if necessary, will be better understood after NERC and balancing authorities have more experience with Reliability Standard BAL–003–1. Accordingly, in light of NERC's December 30, 2013 annual analysis informational filing, the Commission expects NERC to continue to evaluate the impact of the withdrawal of primary frequency response before secondary frequency response is activated in its annual analyses.

76. The Commission recognizes BPA's concerns about the early withdrawal of frequency response, particularly the possibility that load controllers may prematurely over-ride primary frequency response. However, we agree with NERC that the need to take action, including requiring load controllers to include a frequency bias term similar to AGC to sustain frequency response or otherwise modifying Reliability Standard BAL–003–1, should be decided after we have actual experience with the Reliability Standard.

E. Light Load Case Study

NOPR

77. In the NOPR, the Commission highlighted NERC's conclusion in its Frequency Response Initiative Report that ''[s]ustainability of primary frequency response becomes more important during light-load conditions when there are generally fewer frequency-responsive generators online.'' [94] Light load conditions require special consideration because inertia, i.e., the resistance to a change in the motion of an object, plays a crucial role in how fast frequency declines following the sudden loss of generation.[95] In the NOPR, the Commission further explained that ''[W]hen the inertia on the system is low (i.e. fewer generators on line), the loss of generation creates a steeper frequency excursion and thus the need for faster frequency response.'' [96]

78. In the NOPR, the Commission focused on the resource contingency criterion in Reliability Standard BAL–003–1 for calculating the Interconnection Frequency Response Obligation for the Eastern Interconnection, and the potential concerns with the use of an event that took place during heavy system load conditions. The use of a generic governor stability case in the stability simulation testing for the Eastern Interconnection resource contingency criteria used in the determination of the Interconnection Frequency Response Obligation represented conditions far different than light-load conditions. This raises questions regarding whether, and by what amount, light load conditions would lower system inertia and load response. The Frequency Response Initiative Report recommended the development of a new light-load case study, and the re-simulation of the resource contingency criterion for the Eastern Interconnection Frequency Response Obligation.[97] According to NERC, the Eastern Interconnection Reliability Assessment Group is preparing an updated generic governor 2013 summer light-load case (from the 2012 case series), and NERC will be evaluating the Eastern Interconnection Frequency Response Obligation during the expected light-load conditions.[98]

79. The Commission agreed with NERC that the study of light-load scenarios is useful in determining an appropriate Interconnection Frequency Response Obligation, especially for the Eastern Interconnection.[99] Accordingly, the Commission proposed to direct NERC to submit the results of the light-load case, together with NERC's recommendations on whether further actions are warranted.

Comments

80. BPA, Trade Associations, and IRC submitted comments agreeing with the Commission that the study of light-load scenarios is useful in determining an appropriate Interconnection Frequency Response Obligation, especially for the Eastern Interconnection.

81. IRC states that it does not oppose the development of a new light-load case study, but believes that better modeling data needs to be collected before an accurate study can be conducted. IRC states that ''[i]n

[90] *Id.*

[91] *Id.*

[92] BPA Comments at 14–15.

[93] *Id.* at 15.

[94] NOPR, 144 FERC ¶ 61,057 at P 39 (quoting Frequency Response Initiative Report at 32).

[95] *Id.* Inertia is provided from the stored energy in the rotating mass of the turbine-generators and synchronous motors on the Interconnection. *See* NERC Petition, Exh. D at 16–17.

[96] *Id.* (quoting Frequency Response Initiative Report at 40). The reduction in inertia also drives a need for higher speed response to frequency excursions.

[97] NERC Petition, Exh. F, Frequency Response Initiative Report at 99.

[98] NERC Petition, Exh. G. A study conducted by the National Renewable Energy Laboratory explored the relationship between system disturbance and grid frequency perturbation. *See* National Renewable Energy Laboratory, Eastern Frequency Response Study (May 2013). A key finding is that the dynamic model of the Eastern Interconnection can be adjusted to more closely capture the observed behavior. In particular, the assumed amount of generation with governor controls activated was increased to model the contingency used in calculating the Eastern Interconnection Frequency Response Obligation. In addition, a light load power flow case was selected with the expectation that it would represent one of the more challenging conditions for the Eastern Interconnection with respect to frequency response. *See http://www.nrel.gov/docs/fy13osti/58077.pdf.*

[99] According to NERC, ''[m]odeling of frequency response characteristics has been a known problem since at least 2008, when forensic modeling of the Eastern Interconnection required a 'de-tuning' of the existing [Multiregional Modeling Working Group] dynamics governor to 20% of modeled (80% error) to approach the measured frequency response values from the [August 4, 2007] event.'' *See* NERC Petition, Exh. F, Frequency Response Initiative Report at 35.

particular, inaccurate modeling of governor deadbands and adjustments to model governor performance based on observed performance for frequency excursions will lead to inaccurate assumptions of performance for extreme events during light-load.'' [100] IRC encourages the Commission to direct that NERC partner with industry to compile the appropriate information needed to ensure an accurate case study, and to review that study through an industry stakeholder process. Finally, the IRC states that while it agrees that a new light-load case study would be useful, the study should also look at tools to estimate frequency response in real time.

82. BPA states that while frequency response is expected to be lower during off-peak light load conditions, there have not been a sufficient number of events under light load conditions to confirm the severity of the problem. BPA states that currently all WECC regions are exceeding their frequency response obligations.

83. The Trade Associations support the Commission's proposal to direct NERC to submit their light-load case study and recommendations.

Commission Determination

84. The Commission adopts the proposal in the NOPR and directs NERC to submit the results of the Eastern Interconnection Reliability Assessment Group's light-load case, using actual turbine governor response data. Additionally, the Commission directs NERC to submit a recommendation on whether further actions are warranted no later than 15 months after implementation of the Final Rule. Further, the report should discuss any appropriate changes to the Interconnection Frequency Response Obligation warranted by the study.

F. Assignment of Violation Risk Factors and Violation Severity Levels

1. Violation Risk Factor for Requirement R1

NOPR

85. In the NOPR, the Commission proposed to approve each violation risk factor assignment NERC proposed for a requirement of the proposed Reliability Standard, with one exception. The Commission indicated that NERC did not adequately justify assignment of a medium violation risk factor to Requirement R1, which establishes the Frequency Response Measure that a balancing authority must achieve to arrest a decline in system frequency. While NERC asserted that a violation of this requirement will not cause bulk electric system instability, separation or cascading failures because ''a balancing authority's previous year's Frequency Bias setting is included within its ACE equation and would provide support for the contingency,'' the Commission indicated that this explanation does not apply to Requirement R1. The Commission noted that the ACE equation provides input to secondary frequency control, which differs from the primary control needed to arrest a frequency decline, as established by Requirement R1. The Commission proposed to direct NERC to assign a high violation risk factor to Requirement R1 because (1) NERC described frequency response as a critical component to the reliable operation of the Bulk-Power System, indicating that Requirement R1 does not impose merely an administrative burden, and (2) the medium violation risk factor that the Commission approved for each BAL–003–0.1b requirement does not apply to Requirement R1 because it has no equivalent in that standard.[101] The Commission sought comments on this proposal.

Comments

86. Trade Associations state that while Requirement R1 may merit a high violation risk factor, responsible entities must achieve an annual Frequency Response Measure as calculated in accordance with Attachment A to Reliability Standard BAL–003–1. The Trade Associations therefore observe that it would be inappropriate to apply the violation risk factor for Requirement R1 to a single event rather than to an annual Frequency Response Measure.[102]

87. Commenting that the standard drafting team took a rational approach to its violation risk factor assignments, and that each such assignment appears appropriate and well-reasoned to approximate the impact of a violation on reliability, IRC requests that the Commission accept the medium violation risk factor for Requirement R1 as developed by the standard drafting team and agreed to by industry.[103]

88. APS disagrees with the Commission's proposal to assign a high violation risk factor to Requirement R1. APS agrees with NERC that a violation of this requirement will not cause Bulk Electric System instability, separation or cascading failures. APS maintains that frequency response in the Western Interconnection is and has been stable. APS states that there are almost forty balancing authorities in the Western Interconnection, and even if individual balancing authorities should fall short of their obligation, there is no measurable risk to the Interconnection.[104]

89. APS also states that the worst case scenario from a violation of Requirement R1 is some loss of load due to under-frequency load shedding. APS contends that over the last fifteen years in the Western Interconnection, frequency has not declined below 59.7 Hertz for a generation loss of 3,000 megawatts or less. APS states that the first under-frequency load shedding in the Western Interconnection occurs at 59.5 Hertz, and hence, there has not been a significant impact to the bulk electric system for loss of generation. APS submits that a medium violation risk factor is appropriate.[105]

Commission Determination

90. We direct NERC to change the violation risk factor for Requirement R1 to ''high,'' as proposed in the NOPR. No commenter disagreed with the Commission's observation that Requirement R1 addresses primary frequency control that is necessary to arrest frequency decline within seconds after it begins. Without sufficient primary frequency control, a frequency decline may not be arrested in sufficient time to prevent instability, uncontrolled separation or cascading failures. While APS maintains that frequency in the Western Interconnection is and has been stable, that stability depends on compliance with Requirement R1 by balancing authorities that have sufficient resources to meet Requirement R1. The fact that one entity's violation of Requirement R1 may be offset by the efforts of others is not a basis for ignoring or downplaying the substantial risk posed by inadequate frequency response. Accordingly, we conclude that a ''high'' violation risk factor for Requirement R1 is appropriate. We agree with Trade Associations that Requirement R1 mandates achievement of an annual Frequency Response Measure, and that compliance with that requirement cannot be determined by a single event.

2. Violation Severity Levels for Requirement R1

NOPR

91. In the NOPR, the Commission proposed changes to NERC's proposed violation severity level assignments for Requirement R1. NERC proposed two violation severity levels depending

[100] IRC Comments at 11.

[101] NOPR, 144 FERC ¶ 61,057 at P 42.

[102] Trade Associations Comment at 10–11.

[103] IRC Comments at 12.

[104] APS Comments at 9.

[105] APS Comments at 9.

upon whether a balancing authority or a Frequency Response Sharing Group has an annual Frequency Response Measure ''less negative than its Frequency Response Obligation by more than 1 percent but by at most 30 percent or 15 MW/0.1Hz, whichever one is the greater deviation from its [Frequency Response Obligation].'' This violation would have a ''lower'' severity level if ''[t]he summation of the Balancing authorities' [Frequency Response Measure] within an Interconnection was equal to or more negative than the Interconnection's [Interconnection Frequency Response Obligation],'' and a ''high'' severity level if this summation ''did not meet its [Interconnection Frequency Response Obligation].'' Based on these two possibilities for this summation, NERC proposed either a ''medium'' severity level and a ''severe'' severity level for a balancing authority or Frequency Response Sharing Group with an Frequency Response Measure that is ''less negative than its [Frequency Response Obligation] by more than 30% or by more than 15 MW/0.1 Hz, whichever is the greater deviation from its [Frequency Response Obligation].'' [106]

92. The Commission proposed that NERC modify its severity level assignments for Requirement R1 to remove references to performance by other entities or otherwise so as to address a concern that NERC assigned these severity levels partly on performance of Requirement R1 by all other responsible entities in the Interconnection in which a violator is located. The Commission concluded that it would be unfair to base a penalty on a responsible entity in part upon the collective compliance or lack of compliance by independent entities, because: (1) NERC's sanction guidelines focus violation severity levels on a violator's deviation from required performance, not the risk the violation is expected to pose to reliability or performance by other entities; and (2) a balancing authority or Frequency Response Sharing Group subject to Requirement R1 does not control any other responsible entity's compliance with this requirement.[107] The Commission sought comments on its proposal.

Comments

93. APS agrees with the Commission's proposal that NERC change Requirement R1 violation severity level assignments that are in part based on the performance of other entities in the Interconnection. However, APS contends that there is no justification for a ''severe'' violation severity level applicable to this requirement. APS comments that the violation severity level should be ''low'' for a responsible entity missing its annual Frequency Response Obligation by small amounts (less than 20 percent) and ''medium'' for missing by a larger amount (greater than 20 percent).[108]

94. IRC states that the standard drafting team took an appropriate, rational approach to its violation severity level proposal, taking into account that frequency response is an interconnection-wide service, not balancing authority specific. IRC contends that a single balancing authority should not be penalized for a 10 percent decrease in response, where frequency response is otherwise sufficient amongst its surrounding balancing authorities and the reliability of the Interconnection as a whole is not in jeopardy. IRC asserts that, in contrast, a 10 percent decrease in frequency response within the Interconnection as a whole clearly would signal a reliability issue. IRC contends that, by suggesting that the VSLs for Requirement R1 be modified to remove references to performance by other entities, the Commission essentially suggested that a small deficiency within a single balancing authority is equivalent to deficient frequency response within an Interconnection, and should be equivalently penalized as such.[109]

Commission Determination

95. As proposed in the NOPR, we direct NERC to remove from its violation severity level assignments for Requirement R1 any references to performance of that requirement by other entities. No commenter has questioned the Commission's analysis in the NOPR that NERC's Sanction Guidelines define violation severity levels as a violator's deviation from required performance, not as the risk the violation is expected to pose to reliability or performance by other entities, and that a particular responsible entity's compliance with Requirement R1 is not controlled by performance of the requirement by other responsible entities in an Interconnection. Nor has any commenter suggested any rationale sufficient to support a departure from the Sanction Guidelines in this regard. While we agree with IRC that frequency response is an Interconnection-wide service, a failure by each responsible entity in an Interconnection to comply with Requirement R1 will result in a failure to meet the Interconnection-wide annual Frequency Response Measure, to the detriment of reliability across the Interconnection. We believe that violation severity levels for this requirement should be set so as to discourage particular responsible entities from ''leaning on'' other entities to provide sufficient frequency response collectively to meet the relevant Interconnection Frequency Response Obligation.

96. We leave it to NERC to consider how its violation severity level assignments for Requirement R1 should be changed in response to our concerns, including consideration of APS's suggestions. However, we note that APS did not provide in its comments any rationale for its suggested severity level assignments.

G. Supporting/Associated Documents

97. In the NOPR, the Commission explained that Reliability Standard BAL–003–1 has several supporting or associated documents. For example, Attachment A, appended to the Reliability Standard, is explicitly referenced in Requirements R1 and R2.[110] Further, NERC's Procedure for ERO Support of Frequency Response and Frequency Bias Setting Standard (Procedure), is included as an ''associated document'' in the Reliability Standard, and is referenced in Attachment A.[111] Likewise, Requirement 4 of proposed BAL–003–1 references FRS Forms 1 and 2, stating that ''each balancing authority that provides Overlap Regulation Service shall modify its Frequency Bias Setting in its ACE calculation . . . to be equivalent to 'the sum of Frequency Bias Settings as shown on FRS Form 1 and Form 2 . . . as validated by the ERO.' '' [112]

98. In the NOPR, the Commission stated that ''[t]hese associated and supporting documents are explicitly referenced in the Requirements of the Reliability Standard. Thus, failure of a Balancing Authority to comply with such associated and supporting documents could result in non-compliance with the underlying Requirement.'' [113]

[106] NOPR, 144 FERC ¶ 61,057 at P 43.

[107] *Id.* P 44.

[108] APS Comments at 9–10.

[109] IRC Comments at 12–13.

[110] *See* NOPR, 144 FERC ¶ 61,057 at P 45.

[111] *Id.* The Procedure is provided as Exh. C to the NERC petition. NERC stated that it included the Procedure in the petition for informational purposes. NERC Petition at 4.

[112] NOPR, 144 FERC ¶ 61,057 at P 45. Reliability Standard BAL–003–1 identifies FRS Form 1 and FRS Form 2 as ''associated documents.''

[113] *Id.* P 46 (footnote omitted).

Commission Determination

99. No entity submitted comments on this matter. Accordingly, the Commission affirms its NOPR statement that the failure of a balancing authority to comply with the associated and supporting documents that are referenced in the Requirements of BAL–003–1 could result in non-compliance with the underlying Requirement.[114]

100. NERC, in its Reply Comments, states that ''the values in Table 1 of Attachment A are not static. As explained in Attachment A to the proposed Reliability Standard and the *Procedure for ERO Support of Frequency Response and Frequency Bias Setting Standard,* the values in Table 1 are determined and revised on an annual basis.'' [115] While the Procedure sets forth a mechanical and objective formula for calculating the IFRO value in Table 1 of Attachment A, we believe that any changes to the inputs or IFRO value in Table 1 should occur in a transparent manner. Accordingly, should NERC make changes to Table 1 based upon NERC's Procedure document, the Commission directs NERC to submit an informational notice describing the basis for the changes at least 30 days in advance of the effective date of any such changes.[116]

V. Information Collection Statement

101. The following collection of information contained in this Final Rule is subject to review by the Office of Management and Budget (OMB) under section 3507(d) of the Paperwork Reduction Act of 1995 (PRA).[117] OMB's regulations require approval of certain information collection requirements imposed by agency rules.[118] Upon approval of a collection(s) of information, OMB will assign an OMB control number and an expiration date. Respondents subject to the filing requirements of a rule will not be penalized for failing to respond to these collections of information unless the collections of information display a valid OMB control number. The Commission solicited comments on the need for this information, whether the information will have practical utility, the accuracy of the provided burden estimate, ways to enhance the quality, utility, and clarity of the information to be collected, and any suggested methods for minimizing the respondent's burden, including the use of automated information techniques. The Commission received comments on specific requirements in the Reliability Standard, which we address in this Final Rule. However, the Commission did not receive any comments on our reporting burden estimates.

102. *Public Reporting Burden:* The burden and cost estimates below are based on the collection of certain information to establish the Interconnection Frequency Response Obligation and the Frequency Bias Setting for each balancing authority. Each balancing authority reports its previous year Frequency Response Measure and Frequency Bias Setting to NERC, and revised Frequency Bias Settings are based on data from events the balancing authorities report on the proposed FRS Form 1. The information provided on the FRS Form 1 is based on events which qualify for analyses,[119] and NERC states that it will identify between 20 to 35 events in each Interconnection for calculating the Frequency Response Measure and Frequency Bias Setting.[120] Allotting eight hours for balancing authorities to compile the information on candidate events,[121] multiplied by 28 events per balancing authority per year yields 224 hours per year per balancing authority as the regulatory burden for compliance.[122] Our estimates are based on the NERC Compliance Registry as of May 31, 2013, which indicates that there are about 132 registered balancing authorities.[123] Accordingly, the Commission estimates the annual regulatory burden for compliance with the Reliability Standard to be $13,560 per balancing authority,[124] with an estimated total annual cost for all balancing authorities to be $1,789,920.[125]

BAL–003–1 (frequency response and frequency bias setting)	Number of balancing authority respondents (1)	Number of responses per respondent (2)	Average burden hours per response (3)	Total annual burden hours (1) × (2) × (3)	Estimated total annual cost ($) Total hours × $60
Annual Reporting	132	28	8	29,568	$1,774,080
Data Retention	132	1	2	264	15,840
Total				29,832	1,789,920

[114] Attachment A and the Procedures also require NERC to take certain actions pertaining to the calculation of frequency response measure and allocation among balancing authorities. The ERO is not an applicable entity pursuant to Reliability Standard BAL–003–1. The ERO, however, has an independent obligation to ''ensure compliance with a reliability standard or any Commission order affecting the ERO or a regional entity'' and the Commission can take ''such action as is necessary or appropriate'' to ensure that the ERO fulfills this responsibility under Attachment A and the Procedures. *See id.* P 46, n.73 (citing 16 U.S.C. 824o(e)(5)).

[115] NERC Reply Comments at 3–4.

[116] *Cf. Version One Regional Reliability Standard for Transmission Operations,* Order No. 752, 135 FERC ¶ 61,062, at P 43 (2011) (requiring WECC to notify the Commission of changes to the WECC Transfer Path Table). *See also* NERC Petition, Exh. C at 1 (changes to the Procedure for ERO Support of Frequency Response must be posted for comment by NERC, approved by the NERC Board of Trustees, and filed with the Commission ''for informational purposes'').

[117] 44 U.S.C. 3507(d).

[118] 5 CFR 1320.11.

[119] NERC stated that it will provide quarterly posting of candidate events to assist the balancing authorities with compliance, and lessen the burden of the annual submission of FRS Form 1 data. NERC Petition, Exh. C at 3–4.

[120] *Id.* at 1. The Frequency Response Initiative Report states that between 20 and 25 events are necessary for statistical analysis. Frequency Response Initiative Report at 72.

[121] The information is automatically generated from computer data bases. However, time is allotted to compile, verify, and review the information.

[122] Assuming an average of between 20 and 35 events per year.

[123] NERC Compliance Registry List, May 31, 2013, *available at: http://www.nerc.com.*

[124] The estimated hourly loaded cost (salary plus benefits) for an engineer is assumed to be $60/hour, based on salaries as reported by the Bureau of Labor Statistics (BLS) *(http://bls.gov/oes/current/naics2_22.htm).* Loaded costs are BLS rates divided by 0.703 and rounded to the nearest dollar. *(http://www.bls.gov/news.release/ecec.nr0.htm.)*

[125] The estimated total annual cost includes an annual data retention burden of $15,840 for all balancing authorities.

Title: FERC–725R, Mandatory Reliability Standards: Reliability Standard BAL–003–1.

Action: Proposed Collection of Information.

OMB Control No: To be determined.

Respondents: Business or other for-profit, and not-for-profit institutions.

Frequency of Responses: Annual.

Necessity of the Information: The revision of NERC Reliability Standard BAL–003–1 is part of the implementation of the Congressional mandate of the Energy Policy Act of 2005 to develop mandatory and enforceable Reliability Standards to better ensure the reliability of the nation's Bulk Power System. Specifically, Reliability Standard BAL–003–1 is intended to ensure sufficient Frequency Response from balancing authorities to maintain Interconnection Frequency within predefined bounds.

Internal Review: The Commission has reviewed the revisions to the Reliability Standard and determined that its action is necessary to implement section 215 of the FPA. The Commission has assured itself, by means of its internal review, that there is specific, objective support for the burden estimate associated with the information requirements.

103. Interested persons may obtain information on the reporting requirements by contacting the following: Federal Energy Regulatory Commission, 888 First Street NE., Washington, DC 20426 [Attention: Ellen Brown, Office of the Executive Director, email: *DataClearance@ferc.gov,* phone: (202) 502–8663, fax: (202) 273–0873].

VI. Environmental Analysis

104. The Commission is required to prepare an Environmental Assessment or an Environmental Impact Statement for any action that may have a significant adverse effect on the human environment.[126] The Commission has categorically excluded certain actions from this requirement as not having a significant effect on the human environment. Included in the exclusion are rules that are clarifying, corrective, or procedural or that do not substantially change the effect of the regulations being amended.[127] The actions directed herein fall within this categorical exclusion in the Commission's regulations.

VII. Regulatory Flexibility Act

105. The Regulatory Flexibility Act of 1980 (RFA)[128] generally requires a description and analysis of proposed rules that will have significant economic impact on a substantial number of small entities. The NERC registry includes about 132 individual balancing authorities. Comparison of the NERC Compliance Registry with data submitted to the Energy Information Administration on Form EIA–861 indicates that, of these entities, 15 may qualify as small entities.[129]

106. As noted above, the Commission estimates the annual regulatory burden for compliance with the Reliability Standard to be $13,560 per balancing authority. This estimate for all balancing authorities was established using 28 events per year, but smaller entities may have fewer events which qualify for analysis,[130] and the costs for these smaller entities may be reduced. Further, while the Reliability Standard establishes a balancing authority's Frequency Response Obligation, because balancing authorities are currently providing frequency response, we do not anticipate additional compliance costs. Accordingly, we do not consider the cost of compliance with the Reliability Standard to be a significant economic impact for small entities because it should not represent a significant percentage of an affected small entity's operating budget. Accordingly, no regulatory flexibility analysis is required.

VIII. Document Availability

107. In addition to publishing the full text of this document in the **Federal Register**, the Commission provides all interested persons an opportunity to view and/or print the contents of this document via the Internet through the Commission's Home Page *(http://www.ferc.gov)* and in the Commission's Public Reference Room during normal business hours (8:30 a.m. to 5:00 p.m. Eastern time) at 888 First Street NE., Room 2A, Washington, DC 20426.

108. From the Commission's Home Page on the Internet, this information is available on eLibrary. The full text of this document is available on eLibrary in PDF and Microsoft Word format for viewing, printing, and/or downloading. To access this document in eLibrary, type the docket number excluding the last three digits of this document in the docket number field.

109. User assistance is available for eLibrary and the Commission's Web site during normal business hours from the Commission's Online Support at 202–502–6652 (toll free at 1–866–208–3676) or email at ferconlinesupport@ferc.gov, or the Public Reference Room at (202) 502–8371, TTY (202) 502–8659. Email the Public Reference Room at *public.referenceroom@ferc.gov.*

IX. Effective Date and Congressional Notification

110. These regulations are effective March 24, 2014. The Commission has determined, with the concurrence of the Administrator of the Office of Information and Regulatory Affairs of OMB, that this rule is not a ''major rule'' as defined in section 351 of the Small Business Regulatory Enforcement Fairness Act of 1996.

By the Commission.

Nathaniel J. Davis, Sr.,

Deputy Secretary.

[FR Doc. 2014–01218 Filed 1–22–14; 8:45 am]

BILLING CODE 6717–01–P

[126] *Regulations Implementing the National Environmental Policy Act,* Order No. 486, 52 FR 47897 (Dec. 17, 1987), FERC Stats. & Regs., Regulations Preambles 1986–1990 ¶ 30,783 (1987).

[127] 18 CFR 380.4(a)(2)(ii).

[128] 5 U.S.C. 601–612.

[129] The RFA definition of ''small entity'' refers to the definition provided in the Small Business Act (SBA), which defines a ''small business concern'' as a business that is independently owned and operated and that is not dominant in its field of operation. *See* 15 U.S.C. 632 (2006). According to the Small Business Administration, an electric utility is defined as ''small'' if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale and its total electric output for the preceding fiscal year did not exceed 4 million megawatt hours.

[130] The Procedures establish a minimum of 20 events for analysis, and a process for identifying when fewer than 20 events are available for analysis.

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

21 CFR Part 225

[Docket No. FDA–2013–N–0002]

Current Good Manufacturing Practice for Medicated Feeds

AGENCY: Food and Drug Administration, HHS.

ACTION: Final rule, correcting amendment.

SUMMARY: The Food and Drug Administration (FDA) is amending the regulations for good manufacturing practice of animal feeds containing a new animal drug to correctly cite the applicable section of the Federal Food, Drug, and Cosmetic Act (FD&C Act). This action is being taken to improve the accuracy of the regulations.

DATES: This rule is effective January 23, 2014.

FOR FURTHER INFORMATION CONTACT: George K. Haibel, Center for Veterinary