

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

Development Steps Completed:

1. The Standards Committee approved the SAR for posting on January 13, 2005.
2. The SAR was posted for industry comment from January 17, 2005 through February 17, 2005.
3. Reply comments and a revised SAR were posted for a second industry comment period from April 4, 2006 through May 3, 2006.
4. Reply comments and a revised SAR were posted for a third industry comment period from February 8, 2007 through March 9, 2007.
5. Standards Committee approved moving the project into the standards development phase on July 12, 2007.
6. The Standards Committee appointed the Standard Drafting Team on August 13, 2007.
7. The draft standard was posted for a 30 day formal comment period from February 4, 2011 through March 7, 2011.

Proposed Action Plan and Description of Current Draft:

This is the second posting of the proposed standard and its associated documents for a 45 day formal comment period and a successive 10 day ballot, from October 11, 2011 through November 24, 2011.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Respond to comments submitted within the comment period and with the successive ballot.	December, 2011
2. Conduct a recirculation ballot for ten days.	January, 2012
3. BOT adoption.	March, 2012

Definitions of Terms used in the Standard

Frequency Response Measure (FRM)

The **median** of all the Frequency Response observations reported annually on FRS Form 1.

Frequency Response Obligation (FRO)

The Balancing Authority's share of the required Frequency Response needed for the reliable operation of an Interconnection.

Frequency Bias Setting

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 Frequency response contribution to the Interconnection, and discourage withdrawal through secondary control systems.

Introduction

Title: Frequency Response and Frequency Bias Setting

Number: BAL-003-1

Purpose: To require sufficient Frequency Response from the Balancing Authority to maintain Interconnection Frequency within predefined bounds by arresting frequency deviations and supporting frequency until the frequency is restored. To provide consistent methods for measuring Frequency Response and determining the Frequency Bias Setting.

Applicability:

- 1.1. Balancing Authority
- 1.2. Reserve Sharing Group

Effective Date:

- 1.3. In those jurisdictions where regulatory approval is required, Requirements R2, R3 R4 and R5 of this standard shall become effective the first calendar day of the first calendar quarter 12 months after applicable regulatory approval. In those jurisdictions where no regulatory approval is required, Requirements R2, R3, R4 and R5 of this standard shall become effective the first calendar day of the first calendar quarter 12 months after Board of Trustees adoption.
- 1.4. In those jurisdictions where regulatory approval is required, Requirements R1 of this standard shall become effective the first calendar day of the first calendar quarter 24 months after applicable regulatory approval. In those jurisdictions where no regulatory approval is required, Requirements R1 of this standard shall become effective the first calendar day of the first calendar quarter 24 months after Board of Trustees adoption.

A. Requirements

- R1.** Each Balancing Authority or Reserve Sharing Group shall achieve a Frequency Response Measure (FRM) (as calculated on FRS Form 1) that is equal to or more negative than its Frequency Response Obligation (FRO) to ensure that sufficient Frequency Response is provided by each BA or RSG to maintain an adequate level of Frequency Response in the Interconnection. [*Risk Factor: Medium*][*Time Horizon: Operations Assessment*]
- R2.** Each Balancing Authority not participating in Overlap Regulation Service shall implement the Frequency Bias Setting (fixed or variable) validated by the ERO, into its Area Control Error (ACE) calculation beginning on the date specified by the ERO to ensure effectively coordinated Tie Line Bias control. [*Risk Factor: Medium*][*Time Horizon: Operations Planning*]
- R3.** Each Balancing Authority not receiving Overlap Regulation Service shall operate its Automatic Generation Control (AGC) in Tie Line Bias mode to ensure effectively

coordinated control, unless such operation would have an Adverse Reliability Impact on the Balancing Authority's Area. *[Risk Factor: Medium][Time Horizon: Real-time Operations]*

- R4.** Each Balancing Authority that is performing Overlap Regulation Service shall modify its Frequency Bias Setting in its ACE calculation to equal the sum of the Frequency Bias Settings of the participating Balancing Authorities as validated by the ERO and thereby to represent the Frequency Response for the combined area being controlled. *[Risk Factor: Medium][Time Horizon: Operations Planning]*
- R5.** Balancing Authorities shall have a monthly average Frequency Bias Setting whose absolute value is at least equal to the minimum percentage of the Balancing Authority's estimated yearly peak demand if serving native load, and yearly peak generation if not serving native load, per 0.1 Hz change as specified by the ERO in accordance with Attachment B. *[Risk Factor: Medium][Time Horizon: Operations Planning]*

B. Measures

- M1.** The Balancing Authority or Reserve Sharing Group shall have FRS Form 1 with data showing FRM is equal to or more negative than FRO to demonstrate compliance with Requirement R1.
- M2.** The Balancing Authority shall have evidence such as a dated document in hard copy or electronic format showing the ERO validated Frequency Bias Setting was entered into its ACE calculation on the date specified or other evidence to demonstrate compliance with Requirement R2.
- M3.** The Balancing Authority shall have evidence such as a dated operating log, database or list in hard copy or electronic format or operator interviews supported by other evidence showing the AGC operating mode including explanation when operating in other than Tie Line Bias mode to demonstrate compliance with Requirement R3.
- M4.** The Balancing Authority shall have evidence such as a dated operating log, database or list in hard copy or electronic format showing when Overlap Regulation Service is provided including Frequency Bias Setting calculation to demonstrate compliance with Requirement R4.
- M5.** The Balancing Authority shall have evidence such as dated data plus documented formula to support the calculation retained in either hardcopy or electronic format showing the monthly average Frequency Bias Setting or other evidence to demonstrate compliance with Requirement R5.

C. Compliance

- 1. Compliance Monitoring Process**
 - 1.1. Compliance Enforcement Authority**

The Regional Entity is the Compliance Enforcement Authority except where the responsible entity works for the Regional Entity. Where the responsible entity works for the Regional Entity, the Regional Entity will establish an agreement with the ERO or another entity approved by the ERO and FERC (i.e. another Regional Entity), to be responsible for compliance enforcement.

1.2. Compliance Monitoring and Assessment Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

Periodic Data Submittals

1.3. Data Retention

The Balancing Authority shall retain data or evidence to show compliance with Requirements R1, R2, R3, R4 and R5, Measures M1, M2, M3, M4, and M5 for three calendar years unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

If a Balancing Authority is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the time period specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all subsequent requested and submitted records.

1.4. Additional Compliance Information

Periodic Data Submittals: Each Balancing Authority shall report its previous year's Frequency Response Measure (FRM) to the ERO on FRS Form 1 by January 10 each year. If the ERO posts the official list of events after December 10, Balancing Authorities will be given 30 days from the date the ERO posts the official list of events to submit their FRS Form 1.

If a Balancing Authority elects to report as an RSG, the total of the participating Balancing Authorities' FRO will be compared to the total of the participating Balancing Authorities' FRM.

Balancing Authorities providing Overlap Regulation will report the sum of two areas' projected peak demand and generation on FRS Form 1. FRM event data reported on FRS Form 1 will be the sum of the provider's and recipient's performance.

Balancing Authorities with variable Frequency Bias Settings shall calculate monthly average Frequency Bias Settings. The previous year's monthly averages will be reported annually on FRS Form 1.

For Interconnections that are also Balancing Authorities, Tie Line Bias control and Flat Frequency control are equivalent and either is acceptable.

By definition, Balancing Authorities receiving Overlap Regulation Service have an ACE and Frequency Bias Setting equal to zero (0). See the R1 Supplemental Information for annual reporting on FRS Form 1.

2.0 Violation Severity Levels

R#	Lower VSL	Medium VSL	High VSL	Severe VSL
R1	The Interconnection met its FRO and the Balancing Authority's, or Reserve Sharing Groups, FRM was less negative than its FRO by more than 1% but by at most 30% or 15 MW/0.1 Hz, whichever one is the greater deviation from its FRO	The Interconnection met its FRO and the Balancing Authority's, or Reserve Sharing Groups, FRM was less negative than its FRO by more than 30% or by more than 15 MW/0.1 Hz, whichever is the greater deviation from its FRO	The Interconnection did not meet its FRO and the Balancing Authority's, or Reserve Sharing Groups, FRM was less negative than its FRO by more than 1% but by at most 30% or 15 MW/0.1 Hz, whichever one is the greater deviation from its FRO	The Interconnection did not meet its FRO and the Balancing Authority's, or Reserve Sharing Groups, FRM was less negative than its FRO by more than 30% or by more than 15 MW/0.1 Hz, whichever is the greater deviation from its FRO
R2	The Balancing Authority failed to implement the validated Frequency Bias Setting value into its ACE calculation on the date specified but did so within 5 calendar days following the date specified by the ERO.	The Balancing Authority implemented the validated Frequency Bias Setting value into its ACE calculation in more than 5 calendar days but less than or equal to 15 calendar days following the date specified by the ERO.	The Balancing Authority implemented the validated Frequency Bias Setting value into its ACE calculation in more than 15 calendar days following the date specified by the ERO, but the new Bias Setting was less than or equal to 10% of the previous year's Frequency Bias Setting	The Balancing Authority implemented the validated Frequency Bias Setting value into its ACE calculation in more than 15 calendar days following the date specified by the ERO and the Frequency Bias Setting was more than 10% different from the previous year.
R3	The Balancing Authority could not provide the type of evidence outlined in Measure M3 that Tie Line Bias is the normal mode of AGC.	N/A	A spot check during an audit found the Balancing Authority's AGC out of Tie Line Bias mode without documentation supporting the need to operate in a different AGC mode.	A system event occurred and it was found that a contributing factor was that the Balancing Authority failed to operate AGC in Tie Line Bias mode.

R4	The Balancing Authority incorrectly changed the Frequency Bias Setting value used in its ACE calculation when providing Overlap Regulation Services with combined footprint setting error less than 5% of the correct value.	The Balancing Authority incorrectly changed the Frequency Bias Setting value used in its ACE calculation when providing Overlap Regulation Services with combined footprint setting error more than 5% but less than or equal to 15% of the correct value.	The Balancing Authority incorrectly changed the Frequency Bias Setting value used in its ACE calculation when providing Overlap Regulation Services with combined footprint setting error more than 15% but less than or equal to 25% of the correct value.	The Balancing Authority incorrectly changed the Frequency Bias Setting value used in its ACE calculation when providing Overlap Regulation Services with setting error more than 25% of the correct value. OR The Balancing Authority failed to change the Frequency Bias Setting value used in its ACE calculation when providing Overlap Regulation Services.
R5	The absolute value of the Balancing Authorities' calculated monthly average Frequency Bias Setting is less than or equal to 5% below the minimum specified by the ERO.	The absolute value of the Balancing Authorities' calculated monthly average Frequency Bias Setting is more than 5% but less than or equal to 15% below the minimum specified by the ERO.	The absolute value of the Balancing Authorities' calculated monthly average Frequency Bias Setting is more than 15% but less than or equal to 25% below the minimum specified by the ERO.	The absolute value of the Balancing Authorities' calculated monthly average Frequency Bias Setting is more than 25% below the minimum specified by the ERO.

D. Regional Variance

None

E. Associated Documents

Attachment A - Frequency Response Standard Supporting Document

Attachment B – Process for Adjusting Bias Setting Floor

FRS Form 1

FRS Form 2

Frequency Response Standard Background Document

F. Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
1		Complete Revision under Project 2007-12	Revision