

Procedure for ERO Support of Frequency Response and Frequency Bias Setting Standard

This procedure outlines the ERO process for supporting the Frequency Response Standard (FRS). A Procedure revision request may be submitted to the ERO for consideration. The revision request must provide a technical justification for the suggested modification. The ERO shall post the suggested modification for a 45-day comment period and discuss the revision request in a public meeting. The ERO will make a recommendation to the NERC BOT, which may adopt the revision request, reject it, or adopt it with modifications. Any approved revision to this Procedure shall be filed with FERC for informational purposes.

Event Selection Criteria

The ERO will use the following criteria to select FRS frequency excursion events for analysis. All events that meet the selection criterion will be included in the evaluation process.

1. The evaluation period for performing the annual Frequency Bias Setting and the Frequency Response Measure (FRM) calculation is December 1 of the prior year through November 30 of the current year.
2. The ERO will identify at least 20 frequency excursion events in each Interconnection for calculating the Frequency Bias Setting and the FRM. If the ERO cannot identify in a given evaluation period 20 frequency excursion events satisfying the limits specified in criteria 3 below, then similar acceptable events from the previous evaluation period also satisfying listed criteria will be included with the data set by the ERO for determining FRS compliance.
3. The ERO will use two limits to determine if an acceptable frequency excursion event for determining FRM has occurred:
 - a. The change in frequency as defined by the difference from the A Value to Point C and the arresting frequency Point C exceeds the excursion threshold values specified for the Interconnection in Table 1 below. Point C is the arrested value of frequency observed within 8 seconds following the start of the excursion.

Interconnection	A Value to Pt C	Frequency Point Prior to B Value Measurement	
		Under Frequency	Over Frequency
East	0.04Hz	< 59.97	> 60.03
West	0.07Hz	< 59.95	> 60.05
ERCOT	0.15Hz	< 59.90	> 60.10
HQ	0.30Hz	< 59.85	> 60.15

Table 1: Interconnection Frequency Excursion Threshold Values

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- b. The time from the start of the rapid change in frequency until the point at which Frequency has stabilized within a narrow range should be less than 18 seconds.
 - c. If any data value in the B Value average recovers to the A Value the event will not be evaluated.
 4. Pre-disturbance frequency should be relatively steady and near 60.000 Hz. The A Value is computed as an average over the period from -16 seconds to 0 seconds before the frequency transient begins to decline.
 5. Events that coincide with a second event that does not stabilize before the first scan used in the B-Value will not be considered.
 6. Frequency excursion events occurring during periods when large interchange schedule ramping or load change is happening, and frequency excursion events occurring within 5 minutes of the top of the hour, will be excluded from consideration if other acceptable frequency excursion events can be used for analysis.
 7. Select the cleanest 2 or 3 frequency excursion events occurring monthly that satisfy selection criteria. If there are not 2 frequency excursion events satisfying selection criteria occurring during the month, then other frequency excursion events from the same season of the year satisfying selection criteria should be considered for use if necessary.

NOTE: *The ERO may use for analysis of Interconnection frequency performance, but not for Balancing Authority Frequency Response compliance, additional frequency excursion events not satisfying the criteria specified, but not for Balancing Authority Frequency Response compliance.*

To assist Balancing Authority preparation for complying with this standard, the ERO will provide quarterly posting of candidate frequency excursion events for the current year FRM calculation. The ERO will post the final list of frequency excursion events used for standard compliance by December 10 each year. ~~Balancing Authorities are encouraged to develop scanning tools that identify candidate frequency excursion events so they are ready to access data files when needed. The following is a general description of the full process that the ERO will use to ensure that BAs can evaluate events during the year in order to monitor their performance throughout the year.~~

Monthly

Candidate events will be initially screened by the "Frequency Event Detection Methodology" shown on the following link located on the NERC Resources Subcommittee area of the NERC website: http://www.nerc.com/docs/oc/rs/Frequency_Event_Detection_Methodology_and_Criteria_Oct_2011.pdf. Each month's list will be posted by the end of the following month on the NERC website, <http://www.nerc.com/filez/rs.html> and listed under "Candidate Frequency Events".

Quarterly

The monthly event lists will be reviewed quarterly with the quarters defined as:

December through February

March through May

June through August

September through November

Based on criteria established in the " Procedure for ERO Support of Frequency Response and Frequency Bias Setting Standard", events will be selected to populate the FRS Form 1 for each interconnection. The Form 1's will also be posted on the NERC website, in the Resources Subcommittee area under the title "Frequency Response Standard Resources". The updated Form 1's will be posted at the end of each quarter listed above after a review by the NERC RS' Frequency Working Group. While the events on this list are expected to be final, as outlined in the selection criteria, additional events may be considered, if the number of events throughout the year do not create a list of at least 20 events. It is intended that this quarterly posting of updates to the FRS Form 1 would allow BAs to evaluate the events throughout the year, lessening the burden when the yearly posting is made.

Yearly

The yearly FRS Form 1 for each interconnection, which would contain the events from all four quarters listed above, will be posted by January 10th. Each Balancing Authority reports its previous year's Frequency Response Measure (FRM), Frequency Bias Setting and Frequency Bias type (fixed or variable) to the ERO by February 10 each year to allow the ERO to validate the revised Frequency Bias Settings on FRS Form 1. If the ERO posts the official list of events after January 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.

Once the ERO validates the data submitted in FRS Form 1 and FRS Form 2 for all Balancing Authorities, the ERO will use FRS Form 1 data to post the following information for each Balancing Authority for the upcoming year:

- Frequency Bias Setting
- Frequency Response Obligation (FRO)

Once the data listed above is fully posted, the ERO will announce the three-day implementation period for changing the Frequency Bias Setting, allowing flexibility in how each BA implements its settings. It is anticipated that this date will be April 1st of each year.

NOTE: *The ERO may use for analysis of Interconnection frequency performance, but not for Balancing Authority Frequency Response compliance, additional frequency excursion events not satisfying the criteria specified.*

Process for Adjusting Interconnection Minimum Frequency Bias Setting

This procedure outlines the process the ERO is to use for modifying minimum Frequency Bias Settings to better meet reliability needs. The ERO will adjust the Frequency Bias Setting minimum in accordance with this procedure.

The ERO will post the minimum Frequency Bias Setting values on the ERO website along with other balancing standard limits.

Under BAL-003-1, the minimum Frequency Bias Settings will be moved toward the natural Frequency Response in each interconnection. In the first year, the minimum Frequency Bias Setting for each interconnection is shown in Table 1 below.

Interconnection	Interconnection Minimum Frequency Bias Setting (in MW/0.1Hz)	
	BAs with Load	Generation-only BAs
Eastern	0.9% of peak load	0.9% of peak generation
Western	0.9% of peak load	0.9% of peak generation
ERCOT*	N/A	N/A
HQ*	N/A	N/A

Table 1. Frequency Bias Setting Minimums

*The minimum Frequency Bias Setting requirement does not apply to a Balancing Authority that is the only Balancing Authority in its Interconnection. These Balancing Authorities are solely responsible for providing reliable frequency control of their Interconnection. These Balancing Authorities are responsible for converting frequency error into a megawatt error to provide reliable frequency control, and the imposition of a minimum bias setting greater than the magnitude the Frequency Response Obligation may have the potential to cause control system hunting, and instability in the extreme.

The ERO, in coordination with the regions of each interconnection, will annually review Frequency Bias Setting data submitted by BAs. If an Interconnection’s total minimum Frequency Bias Setting exceeds (in absolute value) the Interconnection’s total natural Frequency Response by more (in absolute value) than 0.2 percentage points (of peak load expressed in MW/0.1Hz), the minimum Frequency Bias Setting for BAs within that Interconnection may be reduced (in absolute value) based on the technical evaluation and consultation with the regions affected by 0.1 percentage point to better match that Frequency Bias Setting and natural Frequency Response.

The ERO, in coordination with the regions of each Interconnection, will monitor the impact of the reduction of minimum frequency bias settings, if any, on frequency performance, control performance, and system reliability. If unexpected and undesirable impacts such as, but not limited to, sluggish post-contingency restoration of frequency to schedule or control performance problems occur, then the prior reduction in the minimum frequency bias settings may be reversed, and/or the prospective reduction based on the criterion stated above may not be implemented.