Unofficial Comment Form for BAL-003-1 Frequency Response and Frequency Bias Standard

Please **DO NOT** use this form to submit comments on the 1st draft of BAL-003-1 – Frequency Response and Frequency Bias Setting. Comments must be submitted by **March 7, 2011**. If you have questions please contact Darrel Richardson by email at darrel.richardson@nerc.net or by telephone at 609.613.1848.

**Background Information:**

Frequency Response, a measure of an Interconnection’s ability to stabilize frequency immediately following the sudden loss of generation or load, is a critical component to the reliable operation of the bulk power system, particularly during disturbances and restoration. The proposed standard’s intent is to collect data needed to accurately analyze existing Frequency Response, set a minimum Frequency Response obligation, provide a uniform calculation of Frequency Bias Settings that transition to values closer to Frequency Response, and encourage coordinated AGC operation. There is evidence of continuing decline in Frequency Response over the past 10 years, but no confirmed reason for the apparent decline. The proposed standard requires entities to provide data so that Frequency Response in each of the Interconnections can be analyzed, and the reasons for the decline in Frequency Response can be identified. Once Frequency Response has been analyzed and confirmed, requirements can be modified to maintain reliability.

The Drafting Team would like to receive industry comments on this standard. Please submit your comments using the electronic form by **March 7, 2011**.

**You do not have to answer all questions. Enter All Comments in Simple Text Format.**

*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

1. The SDT has developed three new terms to be used with this standard.
   
   **Single Event Frequency Response Data (SEFRD)**
   
   The individual sample of event data from a Balancing Authority which represents the change in Net Actual Interchange (NIa), divided by the change in frequency, expressed in MW/0.1Hz.
   
   **Frequency Response Measure (FRM)**
   
   The median of all Single Event Frequency Response Data observations reported annually on FRS Form 1.
   
   **Frequency Response Obligation (FRO)**
   
   The Balancing Authority’s contribution to the total aggregate Frequency Response needed for reliable operation of an Interconnection assigned by the ERO.
Do you agree with the proposed definitions in this standard? If not, please explain in the comment area.

☐ Yes
☐ No

1. Comments:

2. The SDT has modified the definition for the term Frequency Bias Setting. The new definition is shown below in redline to show the changes proposed.

   Frequency Bias Setting

   A value, *(either fixed or variable Frequency Bias)*, usually expressed in MW/0.1 Hz, set into a Balancing Authority Area Control Error algorithm that allows the Balancing Authority to contribute its Frequency Response to the Interconnection.

   Do you agree with this new definition for Frequency Bias Setting? If not, please explain in the comment area.

   ☐ Yes
   ☐ No

2. Comments:

3. The proposed purpose statement in the draft standard is:

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

   Do you agree with this purpose? If not, please explain in the comment area.

   ☐ Yes
   ☐ No

   Comments:

4. Requirement 1 identifies a minimum level of Frequency Response.

   R1. Each Balancing Authority shall achieve a Frequency Response Measure (FRM) (as detailed in Attachment A and calculated on FRS Form 1) that is equal to or more negative than its Frequency Response Obligation (FRO).

   Do you agree with the concept that a Balancing Authority should be required to achieve a minimum level of Frequency Response and the method for measurement? If not, please explain in the comment area.

   ☐ Yes
   ☐ No

   Comments:
5. Requirement 2 identifies when the Balancing Authority must implement its Frequency Bias Setting.
   R2. Each Balancing Authority shall implement the Frequency Bias Setting (fixed or variable) provided by the ERO into its Area Control Error (ACE) calculation beginning on the date specified by the ERO to ensure effective coordinated secondary control, using the results from the calculation methodology detailed in Attachment A.

   Do you agree with this implementation? If not, please explain in the comment area.
   □ Yes
   □ No
   Comments:

6. Requirement 3 mandates that a Balancing Authority operate its Automatic Generation Control (AGC) on Tie Line Bias unless it becomes adverse to the integrity of its system.
   R3. Each Balancing Authority shall operate its Automatic Generation Control (AGC) on Tie Line Bias, unless such operation would have an Adverse Reliability Impact on the Balancing Authority’s Area.

   Do you agree that a Balancing Authority should operate its AGC on Tie Line Bias unless it becomes adverse to its system? If not, please explain in the comment area below.
   □ Yes
   □ No
   Comments:

7. Do you agree with the proposed Implementation Plan for this standard? If not, please explain in the comment area.
   □ Yes
   □ No
   Comments:

8. This standard proposes to eliminate the 1% minimum Frequency Bias over a period of 4 years as outlined in the Implementation Plan. Do you agree that the elimination of the 1% minimum will bring Frequency Bias closer or equal to natural Frequency Response? If not, please explain in the comment area.
   □ Yes
   □ No
   Comments:
9. Do you agree with the drafting team that this standard should be field tested? If not, please explain in the comment area.
   □ Yes
   □ No
   Comments:

10. Attachment A of the proposed standard describes the criteria for selecting events to be analyzed. Do you agree with the criteria as described in Attached A? If not, please explain in the comment area.
    □ Yes
    □ No
    Comments:

11. The proposed standard has a document attached to it that describes the SDT’s reasoning for the Requirements (Attachment A - Frequency Response Background Document). Do you agree with the SDT that this document is useful and provides a clear understanding of the Requirements? If not, please explain in the comment area.
    □ Yes
    □ No
    Comments:

12. The proposed standard requires the use of FRS Form 1 for calculating a Balancing Authority’s FRM. Do you agree with the SDT that this is the proper method to calculate its FRM? If not, please explain in the comment area and if possible provide an alternate method to calculate FRM.
    □ Yes
    □ No
    Comments:

13. The proposed standard requires the use of FRS Form 1 for calculating a Balancing Authority’s Frequency Bias Setting. Do you agree with the SDT that this is the proper method to calculate its Frequency Bias Setting? If not, please explain in the comment area and if possible provide an alternate method to calculate Frequency Bias Setting.
    □ Yes
    □ No
    Comments:

14. The SDT has provided a document (FRS Form 1 Instructions) describing how to use FRS Form 1 for calculating FRM and Frequency Bias Setting. Do you agree with the SDT that this document provides a clear understanding of how to use the form? If not, please explain in the comment area.
    □ Yes
    □ No
15. The SDT is soliciting comments on methods of obtaining Frequency Response to meet the FERC Order 693 directive. If possible please provide any thoughts you may have on this subject.

Comments:

16. If you are aware of any conflicts between the proposed standard and any regulatory function, rule order, tariff, rate schedule, legislative requirement, or agreement please identify the conflict here.

Comments:

17. Please provide any other comments (that you have not already provided in response to the questions above) that you have on the draft standard BAL-003-1.

Comments: It is not clear from either Form 1 or its instructions whether the supplied frequency deviation for an event should be used without modification, or if it should be overwritten with a value computed from the Balancing Authority’s data source (or if there is an option, to use the lesser value, for example). Clearly express which frequency deviation value to use.

The load sensitivity calculation is an important Balancing Authority Area value to compute accurately for modeling purposes. As proposed, it would use the same computational technique as that used for frequency bias sampling calculations. To yield a useful result, load values would need to have “convergence characteristics” similar to that found in the actual net interchange values used for frequency bias sampling. While experience has shown that the average or median values of the frequency bias samples computed for most Balancing Authorities will converge with about 20 samples, a similar outcome for load sensitivity calculations might not occur. Frequency bias samples rely on the measured actual net interchange values that are sampled at the AGC scan rate, and the actual net interchange tends to be a rather stable value because AGC and operator actions usually keep the actual net interchange close to a scheduled value. The total net system load may have greater volatility and may be trending in a particular direction much more often than actual net interchange. Also, the load calculation typically relies on adding the sum of the generation within the Balancing Authority to the actual net interchange. The generation values may have a slower scan rate, longer data latency periods, and smaller generators might not be telemetered, with hourly scheduled values or manually entered values being used instead. These differences can contribute to a very different convergence characteristic than that found for actual net interchange. Simply put, the load sensitivity calculation needs validation.
The Form 1 instructions mention a generation only Balancing Authority form to be filled in. It is not shown on the spreadsheet provided, and it is not clear what data should be entered, though it seems like it would still be actual net interchange.

Form 1 contains an entry form for a single Balancing Authority Interconnection, however, it is not referenced in the Form 1 instructions. Section A of the Form 1 instructions contains excellent background material that explains why this effort is important. However, section B needs a careful review so that the instructions are thorough and unambiguous.

The information on variable bias calculations seems sparse, and the requirements for variable bias should be reviewed thoroughly with those Balancing Authorities that are familiar with the nuances and challenges of determining an appropriate variable bias. If BIAS is set equal to response, about 50% of the time, AGC will cancel out the primary response; the BIAS, therefore, should be slightly higher than the natural response but clearly 1% is too large. The game plan to continually reduce the floor percentage for frequency bias settings needs to be reconsidered. With .4% peak load being a typical actual frequency response lately for Balancing Authorities, the 1% of peak load to .8% of peak load transition seems prudent. Perhaps a further reduction to .6% may be useful as well, but lesser floors may in effect result in AGC too often canceling out the primary frequency response being provided.

While the 16 to 52 second sampling window for point B computations seem to be a reasonable initial guess for the metric, preliminary studies by the Frequency Responsive Reserve Standard Drafting Team (FRRSDT) indicate that AGC contributions from fast acting hydro generators will be included in the samples. As those same studies were not conclusive, perhaps the initial years of this standard could require the provision of scan rate data from 30 seconds before to 60 seconds after the start of the frequency decline for each event. While this significantly increases the volume of data to be provided, it would allow the FRRSDT to determine the best sampling intervals to be used. Perhaps a point B sampling interval of 15 to 30 seconds would filter out most of the fast acting AGC, but more data/analysis is needed to determine the best sampling interval to be sure that the primary response data is not being corrupted by this fast acting AGC response.

To support Balancing Authorities in achieving the targeted level of frequency response, a standard for generators is needed as well, as they are historically the largest source of discretionary frequency response. The standard could give a Balancing Authority the right to waive these requirements should they pursue other sources of frequency response, such as ERCOT’s “load acting as a resource (LAAR)” efforts.
Point C values are the more important reliability metric. Since point C metrics are challenged with data quality issues on a Balancing Authority and generator level, an effort should be made to correlate the required frequency response in the point B time window with that needed in the point C time window (perhaps using rules of thumb, such as 100% of load’s frequency response and 30% of generator’s frequency response occurs in time for point C).

While Attachment A mentions that N-2 category C events will be used to determine the frequency response obligation on an interconnection level, there is insufficient detail provided at this time to evaluate the appropriateness of the obligations selected. Efforts in this area for the frequency model developed by the Reliability-Based Control Standard Drafting Team (and now the BARCSDT) for HQTE may shed some insight into this process.