NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Frequency Response Technical Conference

BAL-003-1 Overview

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RELIABILITY | ACCOUNTABILITY

Agenda

- BAL-003-1 goals
- Bias vs. Beta
- Overview of BAL-003-1
- Changes since last posting
- Differences between version 0 and version 1
- Bias setting process
- Frequency Response Obligation allocation
- Example annual cycle

FRS Goals

- Original SAR
  - Objectively benchmark and track BA and Interconnection performance
  - Establish a better process for developing Bias Settings
  - Enable technically sound decisions on setting any future performance obligations
- FERC Order No. 693 directed additional work
  - Determine the appropriate periodicity of frequency response surveys
  - Define necessary amount of Frequency Response for reliable operations with methods of obtaining response and measuring that the frequency response is achieved

Bias vs. Beta

- Frequency Bias Setting (B) is not the same as Frequency Response (β)
  - Frequency Response is actual MW contribution to stabilize frequency
  - Bias is an approximation of β used in the ACE equation (prevents AGC withdrawal of β)
- Both are negative numbers by convention* (as frequency drops, MW output increases and vise versa)
- Both are measured in MW/0.1Hz
- Bias (absolute value) must be $\geq$ β (absolute value) (stated another way, Bias should be equal to, or more negative than, β)
- In the East, B (absolute value) is about twice as large as β (absolute value)
- Bias (absolute value) under the present standard must be at least 1% of Balancing Authority peak load
- If there is to be a difference between B and β, it is preferable to be over-biased

Note: Some EMS' use a reverse sign convention for ACE and therefore Bias

BAL-003-1 Overview

- Proposed Standard nearly identical to the "Version 0" BAL-003 (only one Requirement is a material change)
  - Frequency Response performance obligation
  - Frequency Bias Setting Implementation
  - Appropriate Frequency Bias Setting for those providing Overlap Regulation Service,
  - Minimum Frequency Bias Setting
- More detail in the following slides

Changes Since Last Posting

- Minimum Bias Setting modified (covered later)
- Clarified the event selection process
- BA responsibility for Frequency Response Obligation (FRO) allocation now based on historic peak data
- Defined Frequency Response Sharing Groups
- Defined upper bound for Frequency Response Obligation

Requirement R1

- BA to provide an average (median) amount of Frequency Response for defined set of events
- Frequency Response Obligation (FRO) is defined for upcoming year (based on BA size)
- BA reports performance at the end of the year for frequency excursions during the year
- With attention, all BAs should be able to meet their FRO
  - Generally sufficient Frequency Response in each Interconnection
  - Standard provides mechanisms to obtain response
  - Field trial data showed good results

R2-R4 Similar to Today

2. Implement Frequency Bias Setting on date specified by NERC
3. Defines how Overlap Regulation providers implement Bias Setting
4. Identifies minimum Bias Setting
   - Drafting team proposes 0.9% of peak/0.1Hz
   - See *"Procedure for ERO Support of Frequency Response and Frequency Bias Setting Standard"* (formerly Attachment B) for process to manage changes to the Bias Setting floor

Bias Setting Process

- The Bias Setting process will be very similar to what is done today
- Form 1 will automatically calculate a proposed Bias Setting for the upcoming year
  - The data submitted by the BA will be validated
  - CPS Limits, Bias Settings and FRO for upcoming year will be posted on NERC website
- BAs will be given an implementation date for the new Bias Setting (e.g. March 1 or April 1)

Supporting Documents

- *"Procedure for ERO Support of Frequency Response and Frequency Bias Setting Standard"* defines the process NERC will follow to elect events for analysis
- *"Attachment A"* outlines the allocation of the Interconnection's Frequency Response Obligation to BAs
- NERC now publishes lists of events during the year so BAs will have "heads up" on events that will be used
- BAs encouraged to develop local tools to scan for events and capture data for ongoing analysis

Allocation Methodology

- Determine FRO based on the historic annual average monthly peak load and generation (FERC Form 714)
- Formula*:

$$FRO_{BA} = FRO_{Int} \times \frac{\text{Peak Gen}_{BA} + \text{Peak Load}_{BA}}{\text{Peak Gen}_{Int} + \text{Peak Load}_{Int}}$$

*The Peak Gen and Peak Load numbers above are the average of the twelve monthly numbers

Example Annual Cycle

- January 10, 2013: BAs submit FRS Forms 1 and 2
- January-February 2013: NERC and RS validate data, NERC posts CPS, Bias Setting, FRO
- April 1, 2013: Implement 2013 Bias Settings
- March-November 2013: NERC periodically posts and updates list of candidate events likely to be used for current year's FRM and next year's Bias Setting
- December 7, 2013: NERC posts:
  - Official list of events for Bias Setting and FRM (Forms 1 and 2)
  - BAs notified

Adjusting Minimum Bias Settings

- Present minimum Bias Setting is 1% of peak/0.1Hz
- For most BAs, Frequency Response is < this 1% value
- Control theory says Bias and Frequency Response should closely match
- Proposed field test in 2013 to adjust minimum Bias Settings
  - 0.9% of peak
  - If no issues observed, NERC's procedure will be used to consider further reduction in future years

Questions