

**NERC**

NORTH AMERICAN ELECTRIC  
RELIABILITY CORPORATION

# Industry Webinar

## Project 2007-12 Frequency Response

BAL-003-1 Standard Drafting Team  
September 12, 2014

**RELIABILITY | ACCOUNTABILITY**



- **NERC Antitrust Guidelines**
  - It is NERC's policy and practice to obey the antitrust laws and to avoid all conduct that unreasonably restrains competition. This policy requires the avoidance of any conduct that violates, or that might appear to violate, the antitrust laws. Among other things, the antitrust laws forbid any agreement between or among competitors regarding prices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that unreasonably restrains competition.
- **Notice of Open Meeting**
  - Participants are reminded that this webinar is public. The access number was widely distributed. Speakers on the call should keep in mind that the listening audience may include members of the press and representatives of various governmental authorities, in addition to the expected participation by industry stakeholders.

- NERC Standard BAL-003-1 overview (Dave Lemmons)
- When each of the requirements becomes effective and the timeline for compliance with the standard (Darrel Richardson)
- The event selection process (Bob Cummings)
- Where data will be deposited (Bob Cummings)
- The use of FRS Forms 1 and 2 (Sydney Niemeyer)
- How Balancing Authorities and Generator Owners can evaluate generator fleet response to frequency events utilizing the Form 2 (Sydney Niemeyer)

- Purpose

- 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.

- Requirement 1

- 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.

- Requirement R2
  - Each Balancing Authority that is a member of a multiple Balancing Authority Interconnection and is not receiving Overlap Regulation Service 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.
  
- Requirement R3
  - 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 Hz by more than +/- 0.036 Hz.

- Requirement R3
  - 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 Hz by more than +/- 0.036 Hz

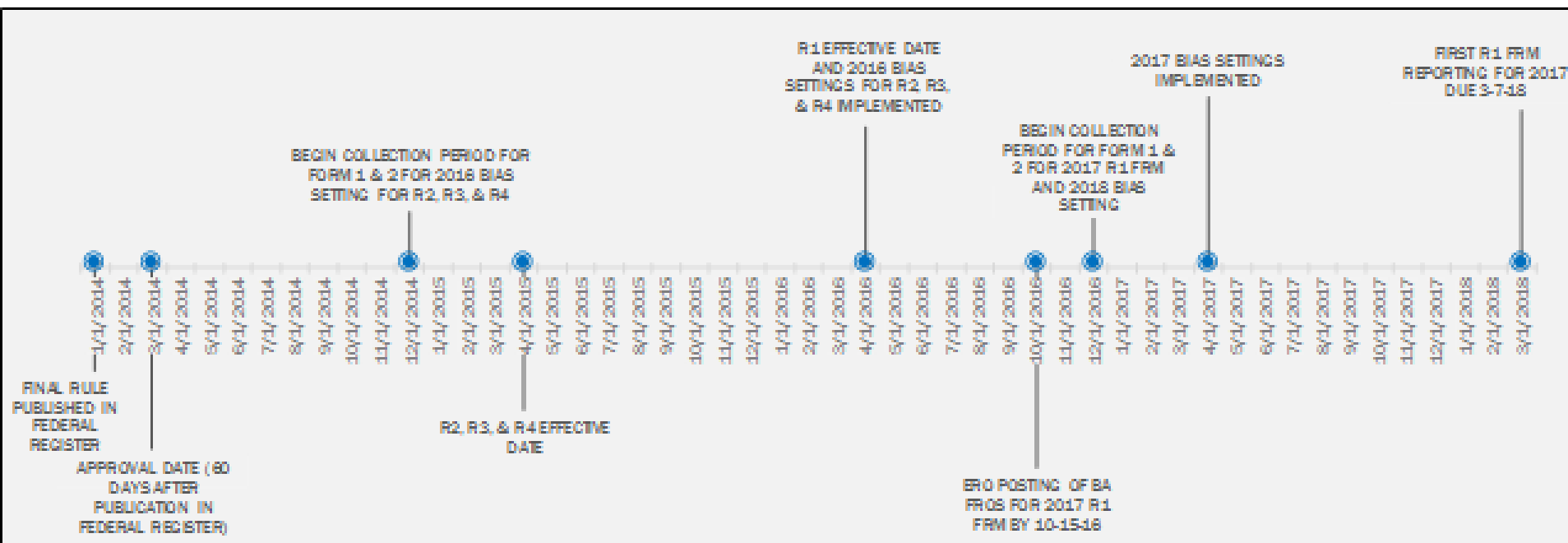
- Requirement R4

- 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.

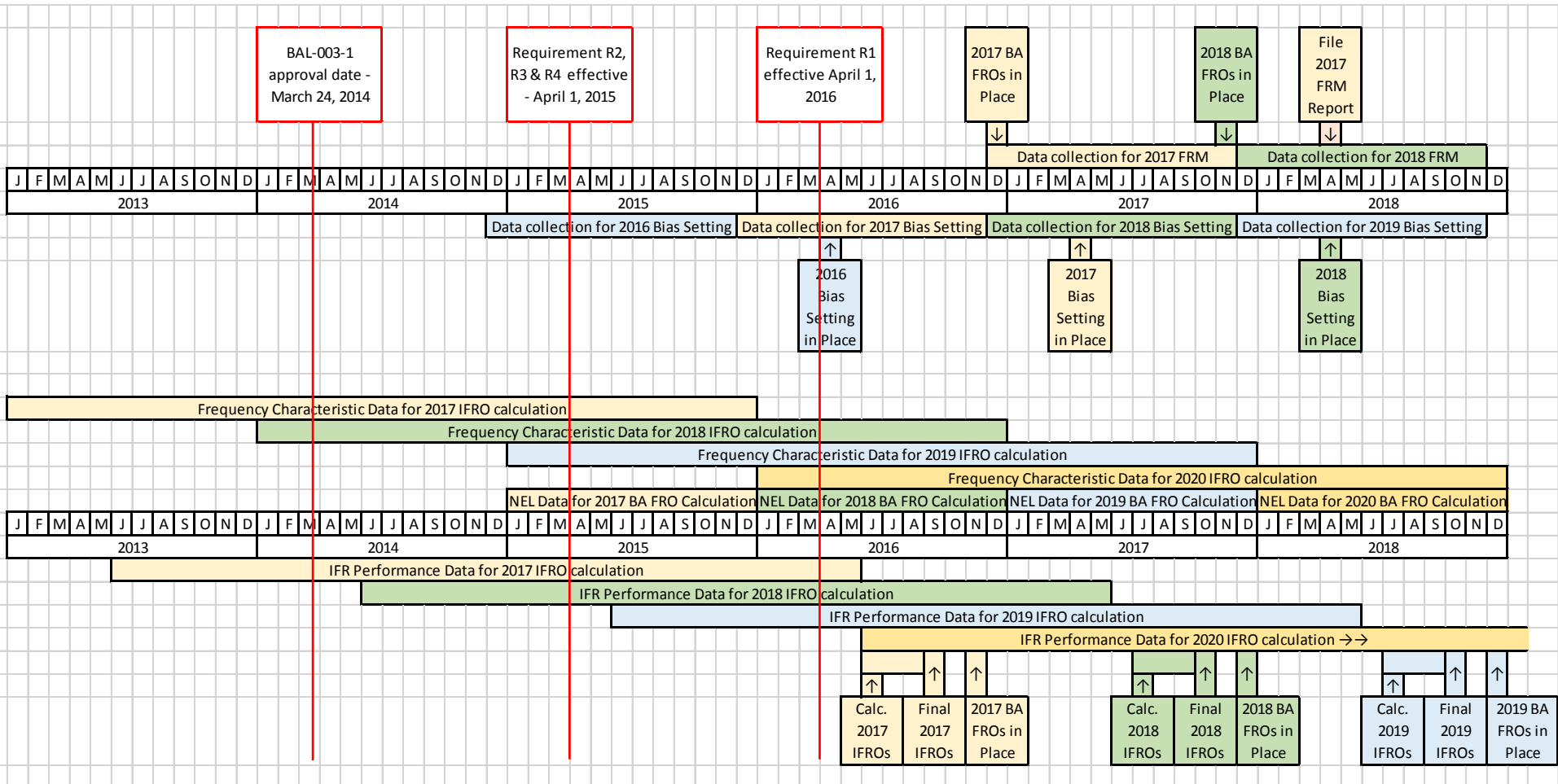
- January 16, 2014 — BAL-003-1 approved by FERC
- January 23, 2014 — Final rule published in Federal Register
- March 24, 2014 — Effective Date (60 days after publication)
- April 1, 2015 — R2, R3, and R4 Effective Date (Bias)
- April 1, 2016 — R1 Effective Date (FRO)



- April 1, 2015 — R2, R3, and R4 Effective date (Bias)
  - April 1, 2016 Compliance effective date
  - December 1, 2014 through November 30, 2015 – Event collection period
- April 1, 2016 — R1 Effective Date (FRO)
  - April 1, 2018 – Compliance effective date
  - December 1, 2016 through November 30, 2017 – Event collection period



# BAL-003-1 Implementation Schedule



- April 30
  - The ERO reviews candidate frequency events and selects frequency events for the first quarter (December through February).
- July 30
  - The ERO reviews candidate frequency events and selects frequency events for the second quarter (March through May).
- October 30
  - The ERO reviews candidate frequency events and selects frequency events for the third quarter (June through August).

- January 30
  - The ERO reviews candidate frequency events and selects frequency events for the fourth quarter (September through November).
- 2<sup>nd</sup> business day in February
  - Form1 is posted with all selected events for the year for BA usage by the ERO.

- Currently being tested
  - Targeted in-service date – October 15, 2014
- Private Secured SharePoint Site for BAL data submittals
- Individual NERC ID-level users
- Common area for:
  - Current FRS Forms & instructions
  - Frequency Events lists and related data
  - Other related information
- Exclusive BA-level submittal areas
- User's guide and future training webinar

## User Roles and Capabilities

- NERC staff – Administrator vetting.
  - Complete visibility and administrative control
- FWG/RS Users – Members of the NERC Frequency Working Group and the Resources Subcommittee
  - All members have signed non-disclosure agreements
  - Capabilities – Read and download data from all files for performance analysis
- BA Users – Users from each BA who will download forms and upload their data and forms to their own exclusive area
  - Able to read and download forms from common area
  - Read, Write, delete for their BA only
  - Cannot look at data from other BAs

- FRS Form 1 and Form 2
  - You must use the present versions: Form 1.9a and Form 2.9a.
    - FRS Form1.9a MyBA\_2015\_FRS\_Form\_19a\_Eastern\_Interconnection....
    - FRS Form2.9a MultiBAInterconnection.....
  - General layout of Form 1.9a – “Data Entry” worksheet:
    - Basic Balancing Authority information
    - Time and Date of each event to be evaluated.
    - Measurement of 12 month Median performance of the BA.
      - Frequency Response Obligation (FRO)
      - Frequency Response Measure (FRM)
      - Location of the BA’s event measurements
      - Bias Selection Fixed or Variable
        - 2015 Bias selection continues as presently selected.
        - 2016 Bias selection use FRS Form 1.9a. The FRM will utilize Frequency Events from 12-1-2014 through November 30, 2015



- FRS Form 2.9a – Single Event BA Frequency Response Evaluation.
  - “Copy Results” Worksheet Enter BA mnemonic and select “Auto” or “Manual” Event Detection.
  - Data required.
    - Frequency
    - NAI
    - Bias
    - BA Energy
  - Determine Event Time and Date from FRS Form 1.9a
    - Add data to the “Data” worksheet that starts at least 5 minutes before the event and includes at least 15 minutes after the event starts. Spreadsheet will hold up to 60 minutes of 2 second data.

- Data Alignment
  - Observe “Graph 20 to 52s” worksheet graph
    - Verify correct Frequency Event selected, time of t(0)
    - Align data for correct A Value Average of NAI
      - No data point of the A Value Average includes any Frequency Response
      - Adjust “rows to shift” in cell Q3 for proper alignment
- Save Form 2.9a using the File name on the “Copy Results” worksheet in cell B38
- Copy performance results using the “Copy Form 2 data” button
- Paste/special/values these results into Form 1.9a, “BA Form 2 Event Data” worksheet, adjacent to the appropriate event in the list. Use cell selection in column D and paste special function

- Examples of good delivery of Primary generator performance.
  - Fleet of generators
    - Using Form 2.9a to evaluate multiple generator performance.
  - Individual generator evaluation
    - Sustained proportional Primary Frequency Response
    - Premature withdrawal of Primary Frequency Response
    - Governor dead-band and Droop Settings
  - Generator Coordinated Control.
    - Coordinates Set-point output target with Expected Primary Frequency. Allows sustained delivery of Primary Frequency Response.
    - Generators that do not sustain the delivery of Primary Frequency Response contribute to the “Lazy L” frequency shape and are not supporting grid reliability.

- BA Set-up
- Events
- Data Collection
- Evaluation
- Results
- Fleet Generation Evaluation using Form 2.9a
- Generator Evaluation using Form 2.9a

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# Questions and Answers