NERC Industry Advisory
Generator Governor Frequency Response

PJM System Operating Subcommittee
February 25, 2015
NERC Industry Advisory on Generator Governor Frequency Response

- Generating resources with gross plant / facility aggregate nameplate rating greater than 75 MVA excluding nuclear generators
- Governor dead bands do not exceed +/- 36 mHz, droop setting does not exceed 5%
- Generator Owners and Operators should communicate those settings and other important governor control system data to their Balancing Authority and Transmission Planning Authority to ensure accuracy of PJM & NERC models.
• Primary frequency response is the first stage of frequency control and is the response of generator governors and loads to arrest locally detected changes in frequency.
• Primary frequency response is automatic, *is not driven by any centralized system*, and begins within seconds after the frequency changes, rather than minutes.
Order No. 794 approved by the FERC on January 16th, 2014
Applicable to Balancing Authorities

Requirement 2: Effective April 1st, 2015
Each Balancing Authority that ... 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 ...

Requirement 1: Effective April 1st, 2016
Each ... Balancing Authority ... 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) ...
Primary Frequency Control comes from automatic generator governor response, load response (primarily motors), and other devices that provide an immediate response based on local control systems.

Evidence of frequency response withdrawal seen in the Eastern Interconnection.
7.1.1 Generator Real-Power Control

The generator shall operate on unrestricted governor control to assist in maintaining interconnection frequency, except for the period immediately before being removed from service and immediately after being placed in service. With exception of nuclear generators, all generating resources with gross plant/facility aggregate nameplate rating greater than 75 MVA should ensure that, in the absence of technical or operational considerations, the generator governor and Distributed Control System (DCS) settings provide dead bands that do not exceed +/- 36 mHz, and droop settings that do not exceed 5%. Exceptions to this criteria shall be forwarded to PJM for review. Governor outages during periods of operations must be kept to a minimum and must be immediately reported to PJM. When a generator governor is not available, the unit output should not fluctuate from pre-scheduled output unless otherwise directed.
PJM Governor Survey

PJM Governor Survey Types:
- Governor Dead Band Settings
- Droop Setting
- Mode of Operation

Survey Timing & Response Method:
- PJM target for sending surveys to GOs is 4/1/2015
- Survey responses from GOs due 5/1/2015
- Surveys to be sent to GOs via eDART
- Bulk XML upload, copy-forward options to be available
Appendix
Advisory: With exception of nuclear generators, all recipients of this Advisory with generating resources with gross plant / facility aggregate nameplate rating greater than 75 MVA should review generator governor and Distributed Control System (DCS) settings and ensure that, in the absence of technical or operational considerations, dead bands do not exceed +/- 36 mHz, droop setting does not exceed 5%, and that governors are coordinated with the DCS at the generating unit or plant level to provide frequency response.

As generator deadband and droop settings are determined or modified, Generator Owners and Operators should communicate those settings and other important governor control system data to their Balancing Authority and Transmission Planning Authority.

http://www.nerc.com/pa/rrm/bpsa/Pages/Alerts.aspx
Appendix: Examples of Industry Governor Criteria

- IESO – Droop set at 4% unless otherwise specified by IESO. Deadband ≤ 36mHz. (MDP_RUL_002_04A)
- ISONE – Governor droop set at 5% unless technical considerations dictate otherwise (OP-14)
- WECC – Governor droop between 3% and 5% (PRC-001-WECC-CRT-1.1)
- ERCOT – Governor droop set at 4 - 5% with deadband between 34mHz and 17mHz (BAL-001-TRE-1)
- Progress – Governor droop set at 5% (Connection Requirements EGR-TRMC-00008)
- CAISO – Governor droop set at 5% with 36mHz deadband (Tariff Requirement for Spinning Reserve Certification)
- FPL – Governor droop set at ≤ 4% (Connection Requirements)
- NERC Policy 1 Guidelines (2002) – Governor droop set at 5% with 36mHz deadband