When completed, email to: gerry.cauley@nerc.net

Standard Authorization Request Form

Title of Proposed Standard	Frequency Response, version 1
Request Date	4/1/06

SAR Requestor Information		**SAR Type** (Put an 'x' in front of one of these selections)	
Name	Don McInnis (Terry Bilke as substitute for Mr. McInnis)	x	New Standard
Primary Contact	Terry Bilke	☐	Revision to existing Standard
Telephone	(317) 249-5463	☐	Withdrawal of existing Standard
Fax	(317) 249-5994		
E-mail	tbilke@midwestiso.org	☐	Urgent Action

Purpose/Industry Need (Provide one or two sentences)

There is evidence of continuing decline in frequency response in the three Interconnections over the past 10 years, while it should be increasing with increasing load and generation. The Interconnections may have sufficient frequency response for normal operations, however, it is not known how this response is dispersed or at what point it will pose a reliability risk. The proposed standard's intent is to ensure frequency of the Interconnections remains above under-frequency load shedding setpoints during transient period following the sudden loss of generation on the Interconnections. By addressing the requirements for control during the "seconds" timeframe, this proposed standard coordinates with and complements the Balance Resources and Demand standards, which addresses Interconnection frequency control generally 5 minutes and longer. (The whitepaper submitted with the original Frequency Response SAR provides the rationale and justification for this standard.)

Reliability Functions

The Standard will Apply to the Following Functions *(Check box for each one that applies by double clicking the grey boxes.)*		
☒	Reliability Authority	Ensures the reliability of the bulk transmission system within its Reliability Authority area. This is the highest reliability authority.
☒	Balancing Authority	Integrates resource plans ahead of time, and maintains load-interchange-resource balance within its metered boundary and supports system frequency in real time
☐	Interchange Authority	Authorizes valid and balanced Interchange Schedules
☐	Planning Authority	Plans the bulk electric system
☐	Resource Planner	Develops a long-term (>1year) plan for the resource adequacy of specific loads within a Planning Authority area.
☐	Transmission Planner	Develops a long-term (>1 year) plan for the reliability of transmission systems within its portion of the Planning Authority area.
☐	Transmission Service Provider	Provides transmission services to qualified market participants under applicable transmission service agreements
☐	Transmission Owner	Owns transmission facilities
☐	Transmission Operator	Operates and maintains the transmission facilities, and executes switching orders
☐	Distribution Provider	Provides and operates the “wires” between the transmission system and the customer
☒	Generator Owner	Owns and maintains generation unit(s)
☐	Generator Operator	Operates generation unit(s) and performs the functions of supplying energy and Interconnected Operations Services
☐	Purchasing-Selling Entity	The function of purchasing or selling energy, capacity and all necessary Interconnected Operations Services as required
☐	Market Operator	Integrates energy, capacity, balancing, and transmission resources to achieve an economic, reliability-constrained dispatch.
☒	Load-Serving Entity	Secures energy and transmission (and related generation services) to serve the end user

Reliability and Market Interface Principles

Applicable Reliability Principles *(Check boxes for all that apply by double clicking the grey boxes.)*	
☒	1. Interconnected bulk electric systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☒	2. The frequency and voltage of interconnected bulk electric systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☐	3. Information necessary for the planning and operation of interconnected bulk electric systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk electric systems shall be developed, coordinated, maintained and implemented.
☐	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk electric systems.
☐	6. Personnel responsible for planning and operating interconnected bulk electric systems shall be trained, qualified and have the responsibility and authority to implement actions.
☒	7. The security of the interconnected bulk electric systems shall be assessed, monitored and maintained on a wide area basis.

Does the proposed Standard comply with all of the following Market Interface Principles? *(Select 'yes' or 'no' from the drop-down box by double clicking the grey area.)*
1. The planning and operation of bulk electric systems shall recognize that reliability is an essential requirement of a robust North American economy. Yes
2. An Organization Standard shall not give any market participant an unfair competitive advantage.Yes
3. An Organization Standard shall neither mandate nor prohibit any specific market structure. Yes
4. An Organization Standard shall not preclude market solutions to achieving compliance with that Standard. Yes
5. An Organization Standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards. Yes

Detailed Description (Provide enough detail so that an independent entity familiar with the industry could draft, modify, or withdraw a Standard based on this description.)

The proposed standard will require or provide the following:

- A technically-sound calculation and report of Balancing Authority and Interconnection frequency response.
- Flexibility to meet specific needs of each Interconnection.
- Will require Balancing Authority and Regional analysis if response is measurably below the Interconnection norm.
- An objective measure of the Balancing Authority's and Interconnection's sub-minute response to changes in frequency.
- The standard will accommodate both fixed and variable bias.
- Will not mandate a given amount of frequency response, but will provide long-term Interconnection target levels for average response to frequency excursions, performance below which triggers Balancing Authority and Regional Reliability Organizations evaluation and analysis.
    - Reasonable time to make corrections, if analysis show a Balancing Authority needs additional frequency response.
- Balancing Authorities to operate their automatic generation control function on tie-line frequency bias.
- Balancing Authorities to perform frequency response characteristic surveys when called for by NERC.
- Generator owners to equip generating units with nameplate ratings of 10 MW or greater, with a governor capable of providing immediate and sustained response to frequency deviations.
    - Governors shall provide droop characteristics within a specified range (to be determined during standard drafting.
    - Governors shall, as a minimum, respond to frequency deviations with a deadband not to exceed a specific limit (to be determined during standard drafting).
- Generator owners seeking exception to the governor requirements to provide specific information (to be determined during standard drafting) to their Balancing Authority and Regional Reliability Organization.

Related Standards

Standard No.	Explanation
BAL-001-0 through BAL-006-0	Balancing Standards, version 0
Balance Resources and Demand draft standards	Balancing Resources and Demand BAL-007 through BAL-012 draft standards, are in standards development process
MOD-013-0	The proposed standard would enable better input data to the modeling standards.

Related SARs

SAR ID	Explanation
MOD-027	Verification and Status of Generator Frequency Response. The proposed standard would provide a mechanism to validate compliance with MOD-027. The proposed standard could also provide a means to achieve MOD-027 (if the Balancing Authority implements on on-line measurement of generator frequency using SCADA data).

Regional Differences

Region	Explanation
ECAR	
ERCOT	Single Balancing Authority Interconnections calculate Frequency Response based on the change in generation (or load) rather than Tie-Line deviation (ERCOT).
FRCC	
MAAC	
MAIN	
MAPP	
NPCC	
SERC	
SPP	
WECC	