



Memorandum

To: ISO Board of Governors

From: Keith Casey, Vice President, Market & Infrastructure Development

Date: March 17, 2016

Re: **Decision on phase 1 frequency response proposal**

This memorandum requires Board action.

EXECUTIVE SUMMARY

In January 2014, FERC approved new frequency response requirements for balancing authority areas proposed by the North American Electric Reliability Council (NERC). With the approval of this standard, NERC created a new obligation for balancing authorities, including the ISO, to demonstrate sufficient frequency response to disturbances in system frequency. Frequency response is the initial or primary response of resources and load to arrest and quickly recover from changes in system frequency. Under the new standard, balancing authority areas are allocated their load share of the western interconnection's frequency response needs. Each balancing authority area must meet the new standard beginning December 1, 2016 or risk being assessed penalties.

To comply with this new requirement, Management initiated a stakeholder initiative in August 2015. The ISO assessed its current frequency response capabilities and historical frequency response rates and compared them to the new NERC requirements. The analysis showed that the ISO could, at times, be short of its required share of frequency response. In particular, when there is high renewable output and low load levels, there may not be sufficient frequency-responsive resources on-line to meet the new NERC requirement. Management proposes a two phased process to ensure the ISO has sufficient frequency response capabilities to meet the new standard. The first phase provides a short-term solution that can be implemented by December 1, 2016. The second phase will consider more comprehensive, long-term design solutions to be implemented at a later date.

Management requests Board approval of its phase 1 proposal. Under the phase 1 proposal, the ISO will conduct a request for offers to transfer a portion of the ISO's frequency response obligation to another balancing authority area in the western interconnection. The phase 1 proposal also includes a proposal for more specific

frequency response standards for resources within the ISO balancing authority. The current market rules do not require generators that are capable of providing frequency response to be operated in a manner that maintains that capability. This contributes to lower primary frequency response levels than expected for most contingency events. The proposed standards are designed to increase the frequency response performance of ISO resources. In phase 2, the ISO will work with stakeholders to consider more comprehensive design solutions that could include the development of a new frequency response product procured through the ISO market.

Management recommends the following motion:

Moved, that the ISO Board of Governors approves the phase 1 frequency response proposal, as described in the memorandum dated March 17, 2016; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.

DISCUSSION AND ANALYSIS

Background

Frequency is constant across an interconnection and balanced when the generation on the system is matched to the demand. If generation output falls below demand, frequency will drop below the scheduled frequency of 60 Hz. Frequency response is the system's ability to arrest and stabilize a frequency drop after a sudden generation loss. Primary frequency response is the first stage of frequency response beginning seconds after an event and is provided automatically by mechanical equipment on generators, known as governors, rather than through response to dispatch or control by the ISO systems. Most conventional synchronous generators come equipped with governors or equivalent control systems that enable the generator to respond to events with an automatic, autonomous response triggered by a frequency drop.

The amount of frequency response the ISO system can provide depends on the amount of conventional synchronous generators that are on-line with governor or equivalent control systems, the physical capabilities of those control systems and the amount of available capacity to provide frequency response. Currently, only conventional synchronous generators typically provide frequency response. The ISO's system's ability to provide frequency response has decreased over the past few years as the amount of asynchronous variable energy resources increased.

ISO's frequency response requirement

The new NERC frequency response standard (Reliability Standard BAL-003-1) will require each balancing area to demonstrate they provided the required amount of frequency

response based on actual frequency disturbances throughout the year. The ISO must comply with the new standard beginning in December 2016.

The ISO's frequency response performance under the standard for each event will be based on the difference in generation output before and after the frequency event given the magnitude of the change in frequency. For example, if generation within the ISO increases by 500 MW in response to a 0.2 Hz frequency drop, its performance for that event would be 250 MW per 0.1Hz. NERC will evaluate the ISO's performance and compliance with its standard by selecting the median value of sampled events.

Propose procuring frequency response from external balancing area

Under the phase 1 proposal, Management proposes to procure frequency response capability from neighboring balancing areas as an interim measure to comply with the NERC frequency response standard. This will allow the ISO to comply with the standard while it continues to pursue requirements and market mechanisms for resources to provide frequency response capabilities.

Management proposes that the ISO transfer some of its frequency response obligation to one or more neighboring balancing areas through a competitive solicitation process. This proposed process will help to ensure the ISO is in compliance with the new NERC standard at lowest cost while maintaining reliability.

This re-allocation of the ISO's frequency response obligation would be done through a competitive solicitation process to transfer a portion of the ISO's frequency response obligation to an external balancing authority area(s). Through the competitive solicitation process the ISO would purchase the right to transfer a portion of its frequency response requirement to another balancing authority area(s) on its NERC reporting form. The selling balancing area or areas would make a corresponding adjustment in their NERC reporting form. The procurement costs would be allocated to demand.

Propose ensuring spinning reserves held for contingency events

To ensure the ISO has the ability to provide its remaining frequency response obligation, Management proposes to clarify in the tariff that it may convert day-ahead procured operating reserve to contingency-only reserves in the real-time market regardless of the resource's election. This is necessary to preserve the frequency responsive headroom, and the contingency reserve capability, by not dispatching it for energy.

Propose improving market transparency

Providing frequency response service is essential to the reliability and stability of the bulk-electric system, and if not provided to the Western Interconnection it can undermine market

quality for the entire West. Management proposes to routinely monitor and report its primary frequency response performance through its Monthly Market Quality Report.

Propose strengthening participating generator requirements

Management proposes to introduce stronger requirements for all participating generators able to provide frequency services. Generators with frequency response capability will be required to have frequency responsive equipment enabled. Currently, the tariff only requires resources providing spinning reserve to have frequency responsive equipment enabled. In addition, generators will have to have the physical parameters of their control systems according to NERC's regional reliability guidance. Specifically, NERC published reliability guidelines for primary frequency control which recommend plant coordination of its control systems as well as specific settings for the systems physical parameters. Management proposes to align its requirements with these guidelines and require resources to coordinate controls from their generator turbine through each level of plant controls to enable governor response, except for controls needed to manage operational constraints. Management also proposes to require generators to tune their frequency response equipment to NERC recommended settings. These proposed changes provide guidance that restricting frequency response service is acceptable only for operational needs.

Management also proposes to require generators to submit their physical parameters for frequency response capability to the ISO. This proposed change will provide the ISO increased visibility into the generation fleet's frequency response capability.

Management anticipates the stronger requirements in combination with its own efforts to improve market transparency by regularly communicating frequency response performance will promote consistent improvements to the ISO's frequency response performance levels.

POSITIONS OF THE PARTIES

Stakeholders largely support Management's phase 1 proposal to ensure compliance with BAL-003-1 in the short-term and continued evaluation of longer-term market design solutions as the result of this stakeholder process. Some generators contend it is discriminatory to procure frequency response from other balancing areas without also considering procuring it from generators within the ISO. Management believes procuring frequency response externally will be an economic solution that is the only practical means to comply with the new frequency response standard until it can examine the market product and generator-specific frequency response performance requirements that would be needed to procure frequency response capability from resources within the ISO. A stakeholder comment matrix is included as Attachment A.

CONCLUSION

Management recommends the Board approve its phase 1 frequency response proposal to meet the new NERC requirements. The proposal helps to ensure that the ISO will be

able to meet the new frequency requirements by transferring a portion of its obligation to another balancing authority area and strengthening requirements for generators with governor or equivalent control systems to enable service provision consistent with NERC's regional reliability guidance.