UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Essential Reliability Services and the Evolving Bulk-Power System— Primary Frequency Response	)))	Docket No. RM16-6-000

COMMENTS OF THE ISO-RTO COUNCIL ON NOTICE OF PROPOSED RULEMAKING REGARDING PRIMARY FREQUENCY RESPONSE

Pursuant to the Federal Energy Regulatory Commission's (the "Commission" or "FERC") Notice of Proposed Rulemaking issued on November 17, 2016,[1] the ISO-RTO Council ("IRC")[2] respectfully submits these comments in response to the Commission's proposed revisions to its *pro forma* Large Generator Interconnection Agreement ("LGIA") and the *pro forma* Small Generator Interconnection Agreement ("SGIA").[3]

I. COMMENTS

The IRC supports the Commission's goal of ensuring there is sufficient primary frequency response on the bulk-power system. Further, the IRC supports the equitable

[1] *Essential Reliability Services and the Evolving Bulk-Power System – Primary Frequency Response*, Notice of Proposed Rulemaking, 157 FERC ¶ 61,122 (Nov. 17, 2016) ("NOPR").

[2] The IRC comprises the Alberta Electric System Operator ("AESO"), California Independent System Operator ("CAISO"), Electric Reliability Council of Texas, Inc. ("ERCOT"), the Independent Electricity System Operator of Ontario, Inc. ("IESO"), ISO New England, Inc. ("ISO-NE"), Midcontinent Independent System Operator, Inc. ("MISO"), New York Independent System Operator, Inc. ("NYISO"), PJM Interconnection, L.L.C. ("PJM"), and Southwest Power Pool, Inc. ("SPP"). The AESO and ERCOT are not subject to the Commission's jurisdiction with respect to the matters addressed in this rulemaking and, therefore, do not join these comments.

[3] NOPR at P 1.

solutions proposed by the Commission. In response to the specific comments requested by the Commission, the IRC provides the following.

A. Proposed Requirements Pertaining to the Installation, Maintenance, and Operation of a Governor or Equivalent Controls

In the NOPR, the Commission seeks comments on its proposal to revise the *pro forma* LGIA and *pro forma* SGIA to require new large and small generating facilities, both synchronous and non-synchronous, to install, maintain, and operate equipment capable of providing primary frequency response as a condition of interconnection.[4]

The IRC agrees with the Commission's proposal to require functioning governors or equivalent controls in all new generator interconnections, and all existing interconnections that require the submission of a new interconnection request. As certain ISOs and RTOs indicated in their comments responding to the Commission's notice of inquiry issued in this proceeding,[5] all newly interconnecting generating resources, and all existing interconnections that require the submission of a new interconnection request, should be required to install the capability necessary to provide primary frequency response.[6] A number of ISOs and RTOs already require these capabilities and have had these requirements in place for several years. As a result, the Commission's proposal does not create significant burdens as it merely extends nationwide these existing "best practices."

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[4] *Id*. at P 44.

[5] *Essential Reliability Services and the Evolving Bulk-Power System – Primary Frequency Response*, Notice of Inquiry, Docket No. RM16-6-000 (Feb. 18, 2016) ("NOI").

[6] Joint Comments of ISO New England Inc., New York Independent Operator, Inc., PJM Interconnection, L.L.C., Southwest Power Pool, Inc., and Independent Electricity System Operator, Docket No. RM16-6-000 (Apr. 25, 2016) ("NOI Comments"). ISO-NE, NYISO, PJM, SPP, and IESO are referred to herein collectively as "Indicated ISOs and RTOs."

For example, in ISO-NE, the LGIA already requires the provision and maintenance of a functioning governor on all new generating units comprising the Large Generating Facility in accordance with applicable provisions of the ISO-NE operating documents and applicable reliability standards. The requirements also apply when an existing unit is required to submit a new interconnection request. In addition, ISO New England Operating Procedure No. 14 ("OP-14") contains specific frequency response requirements for existing and new generating units in New England.

Similarly, the NYISO's LGIA requires that governors and automatic voltage regulators be configured for automatic operation whenever the Large Generating Facility is operated in parallel with the New York State Transmission System. Where governors and automatic voltage regulators are not capable of such automatic operation, the facility owner is required to notify the NYISO and to ensure that its real and reactive power are within the design capability of the facility's generating unit(s) and steady state stability limits as well as NYISO system operating limits (i.e., thermal, voltage, and transient stability limits).

PJM manuals also require both new and existing generators to 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.[7] 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

[7] *See* NOPR at P 19 n.4 ("PJM's *pro forma* interconnection agreements obligate interconnection customers within its region to abide by all PJM rules and procedures, including rules set forth in PJM's Manuals (*See* PJM Open Access Transmission Tariff, Attachment O, § 8.0). *See also* PJM Manual 14D, § 7.1.1 (Generator Real-Power Control), http://www.pjm.com/~/media/documents/manuals/m14d.ashx.

directed. Moreover, as the Commission mentions in the NOPR, PJM recently added new interconnection requirements requiring new non-synchronous generators to interconnect with enhanced inverters that include various capabilities including, among others, the ability to provide primary frequency response.[8]

Last year, the Commission accepted CAISO tariff provisions clarifying requirements for participating generators with governors to set the governor droop for each generating unit with governor controls no higher than 4 percent droop for combustion turbines and 5 percent droop for other technology types.[9] The CAISO's requirements also provide that generating units with governor controls must use a deadband no larger than +/- 0.036 Hz. The resources may not inhibit primary frequency response except under certain operational constraints such as ambient temperature limitations, outages of mechanical equipment, or regulatory considerations.

B. Proposed Requirements for Droop and Deadband Settings of 5 Percent and ±0.036 Hz for New Generating Facilities

The Commission also seeks comments on its proposal "…to require new large and small generating facilities to install, maintain and operate governor or equivalent controls with the ability to operate with a maximum 5 percent droop and ±0.036 Hz deadband parameter, consistent with North American Electric Reliability Corporation's ("NERC") recommended guidance."[10]

The Commission's droop and deadband settings proposal for new generators is appropriate. Absent unique local requirements (*e.g.*, some remote areas of the grid may

[8] NOPR at P 19.

[9] *Cal. Indep. Sys. Operator Corp*, 156 FERC ¶ 61,182 (2016).

[10] NOPR at P 48.

require a smaller droop), NERC's guidelines provide a sound baseline and are consistent with current requirements in some regions, for example, ISO-NE, NYISO, and PJM.

However, should the NERC develop a reliability standard applicable to specific droop and deadband parameters, such NERC reliability standard, if more strict than the droop and deadband parameters proposed by this NOPR, should control but only if FERC approves the standard. Thus, the LGIA and SGIA should be written to allow for this eventuality without amending the *pro forma* agreements (*e.g.*, require the generator to comply with the more stringent of the following requirements: (1) a maximum 5 percent droop and ±0.036 Hz deadband parameter; or (2) an approved NERC reliability standard providing for a more stringent parameter).

C. Proposed Requirements for Timely and Sustained Response

The Commission also seeks comments on its proposal to require new generating facilities to respond to frequency deviations without undue delay and to sustain the response until at least system frequency returns to a stable value within the governor's deadband setting.[11]

The IRC concurs with the Commission's proposal that frequency response should be sustained until frequency returns within the deadband. As noted by the Commission, the proposal is consistent with the current requirements of PJM and ISO-NE, as well as CAISO.

[11] *Id*. at P 49.

D. Proposed Requirement for Droop Parameters to be Based on Nameplate Capability with a Linear Operating Range of 59 to 61 Hz

The Commission seeks comments on its proposal "…to require the droop parameter to be based on the nameplate capability of the unit and linear in operating range between 59 to 61 Hz."[12] The IRC agrees with the need for linear 5 percent maximum droop in a direction to correct frequency deviations for the range of 59 to 61 Hz, unless a more stringent requirement is established through a subsequently approved NERC reliability standard. The IRC, however, notes that nameplate capability of a unit may not be consistent with the rated capacity of a resource for purposes of obtaining interconnection service or for participation in an organized market. The Commission should consider this factor in adopting any final rule. In addition, the Commission should clarify whether efficiency improvements to a resource that may increase its output (*e.g.*, duct burners that allow for increased output from a steam generator) should be factored into the calculation of a generating unit's droop parameter.

Similar to the language proposed in Section B above, the LGIA and SGIA should be written to allow for the eventuality of a subsequently approved NERC reliability standard without amending the *pro forma* agreements, *e.g.*, require the generator to comply with the more stringent of the following requirements: (1) a droop parameter to be based on the nameplate capability of the unit and linear in operating range between 59 to 61 Hz; or (2) an approved NERC reliability standard providing for a more stringent parameter.

[12] *Id*. at P 50.

E. Proposed Exemptions for New Nuclear Units

The Commission requests comments on its proposal to exempt nuclear generating facilities regulated by the Nuclear Regulatory Commission ("NRC") from the reforms in the NOPR.[13] The IRC believes that any *pro forma* exemptions to the requirement to provide frequency response, including exemptions for new nuclear units, should be supported by applicable regulatory requirements, such as NRC rules and any regional requirements demonstrated by the nuclear owner to be applicable to the particular unit or type of unit. The *pro forma* procedures should not be written to anticipate what those requirements will be.

F. Proposed Effective Dates

The Commission requests comments on its proposed effective date for the reforms in the NOPR.[14] The Commission proposed to apply the primary frequency response requirements to any new large or small generating facility that executes or requests the unexecuted filing of a LGIA or SGIA on or after the effective date of any final rule issued in this proceeding. In addition, the Commission proposes to apply the requirements to generators that: (1) executed or requested the filing of an unexecuted LGIA or SGIA prior to the effective date of any final rule; and (2) take any action that requires the submission of a new interconnection request that results in the filing of an executed or unexecuted interconnection agreement on or after the effective date of any final rule issued in Docket No. RM16-6-000.[15]

[13] *Id*. at P 56.

[14] *Id*. at P 54.

[15] *Id*.

The IRC supports the proposed effective date and implementation. To the best of its knowledge, the IRC is unaware of any limitations that would render the Commission's proposed effective date infeasible or unduly burdensome. However, the IRC suggests the Commission expand the application of the primary frequency response requirements to both conforming and non-conforming interconnection agreements resulting from new interconnection requests by existing generators. As the language is currently written, an existing generator that takes an action that requires the submission of a new interconnection request resulting in the execution of a conforming interconnection agreement would not be obligated under the Commission's proposed requirements because the interconnection agreement would not be filed. Therefore, the proposed requirements should apply to any existing generator that takes any action that requires the submission of a new interconnection request that results in the execution of an interconnection agreement, regardless of whether the agreement is filed, or the filing of an unexecuted interconnection agreement after the effective date.

G. Proposal not to Mandate Headroom

The Commission seeks comments on its proposal not to impose a generic headroom requirement for new generating facilities.[16]

The IRC agrees with the Commission's proposal not to impose a generic headroom requirement for new generating facilities assuming the Commission ultimately requires each newly interconnecting and existing generator to enable and set its governor or other frequency control device settings as proposed in the NOPR and NERC Primary Frequency Control Guideline. Primary frequency response should be an inherent

[16] *Id*. at P 51.

characteristic of resources that are interconnected to the power grid. Moreover, primary frequency response is essential for reliability and should be provided broadly across each interconnection. As such, it should be required of both newly interconnecting and existing generators. Requiring all new and existing units to have governor or other frequency control device response spreads the requirement over a large mix of resources and obviates the need for specific headroom requirements.

H. Proposal not to Require Compensation

The Commission also seeks comments on its proposal not to mandate compensation related to the reforms proposed in the NOPR.[17] While the Commission does not propose to require compensation in the NOPR, it clarifies that nothing prohibits a public utility from filing a proposal for primary frequency response compensation under Federal Power Act ("FPA") section 205, if it so chooses.[18]

The IRC supports the Commission's proposal to refrain from requiring compensation for primary frequency response while allowing a public utility to file a proposal for primary frequency response compensation under section 205 of the FPA , if it so chooses. As discussed in the NOI comments of the Indicated ISOs and RTOs, separate compensation or a market mechanism is not needed for primary frequency response. Because the incremental cost to provide frequency response is minimal, and because in most cases generators presently have this capability through governor controls, establishing the "right" level of additional or separate compensation for frequency response could be quite contentious. While for some ancillary services it is

[17] *Id*. at P 56.

[18] *Id*. at P 55.

appropriate to establish compensation or market mechanisms to incent behavior that may not otherwise be appropriately incented, providing compensation for frequency response is not appropriate in RTO and ISO regions where there is sufficient primary frequency response and the incremental cost of providing the service is *de minimis*.[19] Moreover, in these regions, generator owners may receive compensation for frequency response through the existing market-based or cost-based mechanisms currently used to compensate generators for their fundamental costs to operate. Fundamentally, the costs of providing primary frequency response by all registered generators should be viewed simply as a cost of reliable generator operation (similar to, for example, maintenance, staffing, metering, software, and communications). This should be true for all registered generators operating in ISO and RTO regions that have sufficient primary response, as it would be for registered generators in the non-ISO or non-RTO areas.

I. Adequacy of Reforms and Treatment of Existing Generation

In the NOPR, the Commission requests comments regarding whether the reforms proposed in this NOPR are sufficient to ensure adequate levels of primary frequency response, or whether additional reforms are needed.[20] In particular, the Commission seeks comment on whether additional primary frequency response performance or capability requirements for existing resources are needed, and if so, whether the Commission should impose those requirements by: (1) directing the development or

[19] Given the deterioration of primary frequency response capability in its region and to ensure compliance with NERC reliability standard BAL-003-1.1, the CAISO is currently examining a means to compensate resources for primary frequency response to ensure it has sufficient capability available to respond to frequency disturbance events. The CAISO is conducting this effort through a stakeholder process. More information on the CAISO's stakeholder initiative is available at: http://www.caiso.com/informed/Pages/StakeholderProcesses/FrequencyResponsePhase2.aspx

[20] NOPR at P 56.

modification of a reliability standard pursuant to section 215(d)(5) of the FPA; or (2) acting pursuant to section 206 of the FPA to require changes to the *pro forma* Open Access Transmission Tariff.[21]

As discussed in the NOI comments of the Indicated ISOs and RTOs, the majority of the IRC members believe that the most effective manner to obtain sufficient primary frequency response is to establish a clear requirement that all newly interconnected resources and existing resources have primary frequency response capability.[22] As such, a majority of the IRC members[23] urges the Commission to expand the application of the rules proposed in the NOPR to all registered generators by means of a NERC reliability standard while also allowing RTOs and ISOs to incorporate or retain more stringent requirements in their respective tariffs by means of regional differences, pursuant to section 215(d)(6) of the FPA,[24] or a combination thereof.[25] Both section 215(d)(6) and

[21] *Id*.

[22] NOI Comments at 11.

[23] Although these comments advocate for a standard development process, the IRC recognizes that NERC and the industry have undertaken steps to ensure sufficient primary frequency response as evidenced in the development of BAL-003-1, publishing an operating guide for generators, outreach to governor and controls manufacturers, supporting webinars, as well as outreach to the Generator Forum. NERC is also implementing surveys of all generators to identify those generators needing attention. Any standard development process needs to recognize that, over time, existing generation will be replaced with new generation that will be contractually bound to provide primary frequency response capability under the revised generator interconnection agreements. The Commission should not delay the issuance of this proposed rule by requiring the development of a reliability standard for existing generators. Such requirements should be evaluated, and if necessary, proposed in a future proceeding.

[24] 16 U.S.C. 824o(d)(6).

[25] Section 215(d)(6) of the FPA, provides a procedure to resolve conflicts between reliability standards and any ISO or RTO function, rule, or tariff provisions, affirming that such function, rule, or tariff provision must remain in place until the Commission finds that a conflict exists and that it should be resolved by a change to either the applicable RTO or ISO provision or NERC reliability standard. *See also Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, FERC Stats. & Regs. ¶ 31,204 at P 445, *order on reh'g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006) ("[The Commission does] not agree that every conflict between a Reliability Standard and a Transmission Organization tariff must be resolved by changing the tariff.").

the Commission's policy on regional differences strongly support the IRC's request to maintain more stringent requirements in the ISOs' and RTOs' respective tariffs. Section 215(d)(6) of the FPA provides for a procedure unique to RTOs and ISOs to resolve conflicts between reliability standards and ISOs' and RTOs' tariffs. As the Commission stated in Order No. 693, if the Commission "…find[s] that a conflict exists between a reliability standard and any function, rule, order, tariff, rate schedule, or agreement accepted, approved, or ordered by the Commission applicable to a transmission organization [i.e., an RTO or ISO, among others] and if we determine that the Reliability Standard needs to be changed as a result of such a conflict, we must order the ERO to develop and file with the Commission a modified Reliability Standard for this purpose."[26] Moreover, as the Commission stated in Order No. 672, section 215 of the FPA specifically provides for exceptions to reliability standards and FERC will generally accept rules that are more stringent than a reliability standard pursuant to regional differences.[27]

Requiring all new and existing units equipped with governor or frequency response controls to have governor response spreads the requirement over a large mix of resources. This diversity mitigates risks that could occur at the same time. For example, some units may lack sufficient headroom, some units may be offline due to scheduled maintenance or forced outage, or some units may not be dispatched due to light load

[26] *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242 at P 28, *order on reh'g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

[27] *See* Order No. 672 at P 291 ("As a general matter, [the Commission] will accept the following two types of regional differences, provided they are otherwise just, reasonable, not unduly discriminatory or preferential and in the public interest, as required under the statute: (1) a regional difference that is more stringent than the continent-wide Reliability Standard, including a regional difference that addresses matters that the continent-wide Reliability Standard does not; and (2) a regional Reliability Standard that is necessitated by a physical difference in the Bulk-Power System.").

conditions. Requiring these units to provide primary frequency response ensures that the system operators will be able to meet emerging real-time events, which may not be the case if the system has only a smaller mix of frequency responsive resources. An across-the-board requirement would also provide for an equitable non-discriminatory approach to this requirement and avoid some generators 'leaning' on others to ensure grid stability. In addition, when more generators provide primary frequency response, the system will respond more quickly to events. Since each generator's response is based on the frequency movement observed by that generator, not the number of generators responding, more generators responding to an event will not result in over-response to the event.

Moreover, requiring all NERC registered generators to provide primary frequency response in accordance with, or a manner more stringent to, those requirements proposed in the NOPR, will also facilitate balancing authorities' compliance with the requirements of NERC reliability standard BAL-003-1. Currently, under NERC reliability standard BAL-003-1, balancing authorities are obligated to meet frequency response requirements. However, their ability to meet those requirements is dependent on the frequency response provided by generators. NERC reliability standard BAL-003-1 in essence places a responsibility on balancing authorities without establishing the corresponding authority for balancing authorities to require primary frequency response capability from generators within their footprints. Accordingly, balancing authorities have limited control of compliance with their obligations regarding frequency response. To mitigate this disconnect, a NERC reliability standard should impose appropriate frequency response requirements that apply to generators regardless of technology type. This standard should set the floor while individual tariffs, SGIAs, and LGIAs could impose

more stringent frequency response requirements if warranted. Furthermore, generator obligations under a NERC reliability standard and under the LGIA and SGIA should be coordinated to ensure efficient and effective implementation.

J. Measurability and Enforcement

In the proposed language in the *pro forma* LGIA and SGIA, each interconnection customer (i.e., generator owners and operators) is the party obligated to ensure its generator governor and generator performance satisfies the requirements in the NOPR. Moreover, the proposed language does not require the transmission providers to ensure the governors are properly set or the generators perform as required under the LGIA and SGIA. However, out of an abundance of caution, the IRC requests the Commission clarify that the reliability entities (*e.g.*, the reliability coordinators) are not responsible for ensuring each generator's governor settings or performance satisfy the primary frequency response requirements ultimately required in a final rule.

II. CONCLUSION

In response to the NOPR, the IRC respectfully requests that the Commission consider the comments contained herein.

Respectfully submitted,

/s/ *James M. Burlew*
Craig Glazer
Vice President-Federal Government Policy
James M. Burlew
Senior Counsel
PJM Interconnection, L.L.C.
2750 Monroe Boulevard
Audubon, Pennsylvania 19403
james.burlew@pjm.com

/s/ Margoth R. Caley
Raymond W. Hepper
Vice President, General Counsel, and Secretary
Theodore J. Paradise
Assistant General Counsel, Operations and Planning
Margoth R. Caley
Senior Regulatory Counsel
ISO New England Inc.
One Sullivan Road
Holyoke, Massachusetts 01040
mcaley@iso-ne.com

/s/ *Anna McKenna*
Roger E. Collanton, General Counsel
Anna McKenna
Assistant General Counsel, Regulatory
Andrew Ulmer Director, Federal Regulatory Affairs
California Independent System Operator Corporation
250 Outcropping Way
Folsom, California 95630
amckenna@caiso.com

/s/ Stephen G. Kozey
Stephen G. Kozey
Senior Vice President
Joseph G. Gardner
Vice President & Chief Compliance Officer
Midcontinent Independent System Operator, Inc.
720 City Center Drive
Carmel, Indiana 46032
stevekozey@misoenergy.org

/s/ Adrian Pye
Adrian Pye
Senior Manager, Regulatory Affairs
Independent Electricity System Operator
1600-120 Adelaide Street West
Toronto Ontario M5H1T1
Canada
adrian.pye@ieso.ca

/s/ Sara B. Keegan
Robert E. Fernandez, General Counsel
Raymond Stalter
Director of Regulatory Affairs
Sara B. Keegan
Senior Attorney
New York Independent System Operator, Inc.
10 Krey Boulevard
Rensselaer, NY 12144
skeegan@nyiso.com

/s/ Paul Suskie
Paul Suskie
Executive Vice President & General Counsel
Tessie Kentner
Senior Attorney
Southwest Power Pool, Inc.
201 Worthen Drive
Little Rock, Arkansas 72223-4936
psuskie@spp.org

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Norristown, PA, this 24th day of January, 2017.

James M. Burlew
Senior Counsel
PJM Interconnection, L.L.C.
2750 Monroe Boulevard
Audubon, PA 19403
(610) 666-4345