

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

Requirements for Frequency and Voltage)
Ride Through Capability of Small)
Generating Facilities)

RM16-8-000

COMMENTS OF THE ISO/RTO COUNCIL

Pursuant the Federal Energy Regulatory Commission’s (“Commission”) Notice of Proposed Rulemaking (“NOPR”) issued on March 17, 2016,¹ the ISO/RTO Council (“IRC”) submits the following comments on the Commission’s proposal to modify the *pro forma* Small Generator Interconnection Agreement (“SGIA”) to require newly interconnecting small generating facilities that are subject to the interconnection procedures of an Independent System Operator or Regional Transmission Organization to ride through abnormal frequency and voltage events and not disconnect during such events. Specifically, in the NOPR, the Commission proposes to revise the *pro forma* SGIA to include proposed section 1.5.7, which would require interconnection customers to ensure the frequency ride through capability and the voltage ride through capability of small generating facilities that execute agreements following the effective date of the proposed section 1.5.7.²

As explained in Section III below, the IRC agrees with the Commission that it is appropriate to subject small generating facilities to ride through requirements. The IRC supports the addition of section 1.5.7 to the SGIA as well as the specific requirements in proposed section 1.5.7. The IRC also supports the Commission’s proposal to permit appropriate entities to seek

¹ *Requirements for Frequency and Voltage Ride Through Capability of Small Generating Facilities*, 154 FERC ¶ 61,222 (2016).

² NOPR at P 11.

“independent entity variations” from the proposed revisions to the *pro forma* SGIA, demonstrate that previously-approved variations in existing provisions of transmission providers’ SGIA continue to be consistent with or superior to the *pro forma* SGIA, or both.³ Finally, the IRC respectfully submits clarifying language for proposed section 1.5.7, as well as comments regarding the demonstration of compliance with the requirements.

I. IDENTIFICATION OF FILING PARTY

The IRC is comprised of the Alberta Electric System Operator (“AESO”); California Independent System Operator Corporation (“CAISO”); Electric Reliability Council of Texas, Inc. (“ERCOT”); the Independent Electricity System Operator (“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”).⁴

II. BACKGROUND

In Order No. 2003, the Commission required large generating facilities (*i.e.* facilities larger than 20 MW) to have ride through capability for abnormal voltage and frequency conditions.⁵ The Commission defined “ride through” as “a Generating Facility staying connected to and synchronized with the Transmission System during system disturbances within a range of over- and under-frequency conditions, in accordance with Good Utility Practice.”⁶ In

³ NOPR at P 17.

⁴ ERCOT, AESO and IESO are not subject to the Commission’s jurisdiction and are not joining these comments.

⁵ *Standardization of Generator Interconnection Agreements and Procedures*, Order No. 2003, FERC Stats. & Regs. ¶ 31,146 (2003), *order on reh’g*, Order No. 2003-A, FERC Stats. & Regs. ¶ 31,160, *order on reh’g*, Order No. 2003-B, FERC Stats. & Regs. ¶ 31,171 (2004), *order on reh’g*, Order No. 2003-C, FERC Stats. & Regs. ¶ 31,190 (2005), *aff’d sub nom. Nat’l Ass’n of Regulatory Util. Comm’rs v. FERC*, 475 F.3d 1277 (D.C. Cir. 2007), *cert. denied*, 552 U.S. 1230 (2008) (“Order No. 2003”).

⁶ Order No. 2003 at P 562 n.88.

Order No. 2006, however, the Commission declined to extend the same requirement to small generating facilities (*i.e.* facilities 20 MW or smaller) based on the rationale that such facilities would have minimal impact on the transmission system.⁷ While the Commission reconsidered this requirement in Order No. 792, it declined to extend ride through requirements to small generating facilities at that time because the Institute of Electrical and Electronics Engineers (“IEEE”) was in the process of amending IEEE Standard 1547.⁸

In the NOPR, the Commission points out that it already requires generators interconnecting under the Large Generator Interconnection Agreement (“LGIA”) to have ride through capability,⁹ and, as such, it would be unduly discriminatory not to also impose these requirements on small generating facilities.¹⁰ The Commission explains that conditions have changed since it last evaluated whether to impose ride through requirements on small generating facilities, and that the penetration of small generating facilities, such as distributed energy resources, has increased since the Commission analyzed the impact of small generating facilities in Order No. 2006.¹¹ The Commission also states that IEEE “has revised its standards, and IEEE Standard 1547a now provides wider trip settings that give small generating facilities greater ability to ride through disturbances.”¹² Moreover, the Commission is concerned that small

⁷ Order No. 2006, FERC Stats. & Regs. ¶ 31,180 (“Order No. 2006”) at P 24.

⁸ NOPR at PP 5-7.

⁹ *Id.* at P1. Article 9 of the LGIA, together with North American Electric Reliability Corporation (“NERC”) Reliability Standard PRC-024-2 (Generator Frequency and Voltage Protective Relay Settings) (effective July 1, 2016), generally require generating facilities larger than 20 MW to ride through frequency and voltage disturbances. *See id.* n.5.

¹⁰ *See id.* at Summary, P 8.

¹¹ *Id.* at P 3, 8, n.7.

¹² *Id.* at P 8. The Commission explains that “[s]ince the Commission issued Order No. 792, IEEE has completed a partial revision of IEEE Standard 1547, which is IEEE Standard 1547a. IEEE is also in the process of fully revising IEEE Standard 1547. IEEE Standard 1547a permits generating facilities to have wider trip setting[s] compared with IEEE Standard 1547. However, IEEE Standard 1547a includes permissive -and not mandatory- ride through requirements.” *Id.* at P 6.

generating facilities, in the aggregate or in significant combination, could exacerbate an initial disturbance by tripping off-line instead of riding through a disturbance.¹³ The Commission concludes that there is now reason to subject small generating facilities to ride through requirements.¹⁴

III. COMMENTS

As the Commission correctly points out, small generating facilities are becoming a larger portion of the energy supply. The aggregation or significant combination of small generating facilities that do not ride through transmission disturbances can lead to undesirable consequences for system operations, including causing an otherwise acceptable system post-contingency response to exhibit unacceptable low or high voltage or thermal limit exceedances. In a worst case scenario, if a number of small generating facilities do not ride through all transmission disturbances, what would otherwise be a System Operating Limit could become an Interconnection Reliability Operating Limit.¹⁵ For these reasons, the IRC agrees with the Commission that small generating facilities should be required to ride through abnormal frequency and voltage events and not disconnect during such events. These requirements are consistent with other requirements that ISOs and RTOs already have in place. For instance, ISO-NE recently submitted revisions to Schedules 22 and 23 to its Open Access Transmission Tariff

¹³ NOPR at P 8.

¹⁴ *Id.*

¹⁵ In its comments in the Order No. 792 proceeding, ISO-NE supported the Commission's proposal and pointed out that, according to a report that was issued by NERC's Integration of Variable Generation Task Force, high penetrations of small generators interconnecting to the distribution system could impact the reliability of the bulk power system in a number of ways due to their lack of voltage and frequency ride-through capabilities in response to disturbances on the bulk power system. Accordingly, ISO-NE requested that the Commission revise the proposed modifications in Order No. 792 to include a voltage ride-through provision. *See Small Generator Interconnection Agreements and Procedures*, Comments of ISO New England Inc.; Docket No. RM13-2-000 (June 3, 2013).

(“ISO-NE OATT”)¹⁶ to extend the *pro forma* low-voltage ride through requirements for wind generators to all inverter-based generating facilities.¹⁷ The Commission accepted ISO-NE’s revisions¹⁸ and, as a result, all inverter-based generating facilities in New England must be able to ride-through voltage disturbances. Similarly, in 2015, the Commission accepted amendments to PJM’s *pro forma* interconnection agreements¹⁹ requiring that all wind and non-synchronous units be capable of providing voltage and frequency ride-through capabilities similar to those for legacy generating resources in PJM.²⁰ As a result of amendments, going forward, all resource owners within PJM must be able to provide such ride-through capabilities irrespective of size.

The IRC supports the Commission’s proposal to add section 1.5.7 to the SGIA.²¹ The IRC supports the requirements included in the proposed new section including: (1) that the interconnection customer ensure “frequency ride through” capability and “voltage ride through capability” of its small generating facility; (2) that the interconnection customer enable those capabilities such that its small generating facility does not disconnect automatically or instantaneously from the system or equipment of the transmission provider and any affected systems for a defined under-frequency or over-frequency condition, or an under-voltage or over-

¹⁶ Schedule 22 to the ISO-NE OATT contains the Standardized Large Generator Interconnection Procedures (“LGIP”) and LGIA, and Schedule 23 to the ISO-NE OATT contains the Standardized Small Generator Interconnection Procedures (“SGIP”) and SGIA.

¹⁷ *ISO New England Inc. and the Participating Transmission Owners Administrative Committee*, Revisions to Schedules 22, 23 and 25 of the Open Access Transmission Tariff Relating to Certain Interconnection Process Improvements; Docket No. ER16-946-000, (February 16, 2016) at 18.

¹⁸ *ISO New England Inc. and Participating Transmission Owners Administrative Committee*, 155 FERC ¶ 61,031 (2016).

¹⁹ Attachment O to the PJM OATT is PJM’s Form of Interconnection Service Agreement.

²⁰ *PJM Interconnection, L.L.C.*, 151 FERC ¶ 61,097 (2015).

²¹ MISO does not have a separate SGIA (or LGIA), but will implement the final language as appropriate within its Generator Interconnection Agreement.

voltage condition; and (3) that the transmission provider coordinate the small generating facility's protective equipment settings with any automatic load shedding program (*e.g.* under-frequency load shedding, under-voltage load shedding).

The IRC also supports the Commission's proposal to permit appropriate entities (*i.e.* ISOs/RTOs) to seek "independent entity variations" from the proposed revisions to the *pro forma* SGIA, demonstrate that previously-approved variations in existing provisions of transmission providers' SGIA continue to be consistent with or superior to the *pro forma* SGIA, or both. Independent entity variations and regional differences should be allowed as part of compliance with a final order in this proceeding.

The IRC supports the Commission's proposal to not include specific frequency and voltage ride through parameters but rather allow for the development of appropriate system-specific standards through industry efforts, including but not limited to, IEEE's efforts. The IRC notes, however, that NERC Reliability Standards already provide requirements for coordination of automatic under-frequency generator tripping with automatic under-frequency load shedding programs that should be incorporated into the new ride through requirements. Accordingly, the IRC respectfully suggests that NERC Reliability Standards and Regional Entity standards be explicitly mentioned in new section 1.5.7 of the SGIA. Specifically, proposed SGIA section 1.5.7 requires that "defined conditions shall be in accordance with Good Utility Practice and consistent with any standards and guidelines that are applied to other generating facilities in the Balancing Authority Area on a comparable basis,"²² Section 1.5.7 also refers to the appropriate range of under-frequency and over-frequency conditions and under-voltage and over-voltage conditions "in accordance with Good Utility Practice and consistent with any standards and

²² NOPR at P 12.

guidelines that are applied to other generating facilities in the Balancing Authority Area on a comparable basis.”²³ The IRC recommends that the *pro forma* language refer specifically to NERC Reliability Standard PRC-024 and applicable Regional Entity standards. The IRC proposes that, in both instances, conditions be defined “in accordance with Good Utility Practice and consistent with any standards and guidelines that are applied to other generating facilities in the Balancing Authority Area on a comparable basis, *including but not limited to, NERC Reliability Standard PRC-024 (or its successor) and applicable Regional Entity standards.*”

The IRC also recommends that, where the Commission proposes to require that the small generating facility’s protective equipment settings comply with “the Transmission Provider’s automatic load-shed program,” the Commission instead refer to the NERC Reliability Standards and Regional Entity standards for coordination of automatic generator tripping with automatic load shedding, and as appropriate, permit individual Transmission Providers to also reference their automatic load-shed program.

Finally, the IRC submits that the proposed required characteristics for small generating facilities should be demonstrated “as tested,” and this should be specified in proposed SGIA section 1.5.7. Demonstrating characteristics “as tested” is already required under Section 24 of the LGIA. While a similar requirement is not present in the SGIA, pursuant to the Commission’s direction in Order No. 2006, the “as tested” requirement is applied to small generating facilities.²⁴

²³ NOPR at 12.

²⁴ See Order No. 2006 at P 59.

III. CONCLUSION

The IRC respectfully supports adoption of the Commission's proposal in the NOPR, with the revisions suggested in these comments.

Respectfully submitted,

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