

149 FERC ¶ 61,027  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Cheryl A. LaFleur, Chairman;  
Philip D. Moeller, Tony Clark,  
and Norman C. Bay.

Reliability Standard for Geomagnetic Disturbance  
Operations

Docket No. RM14-1-001

ORDER NO. 797-A

ORDER DENYING REHEARING

(Issued October 16, 2014)

1. In Order No. 797, the Commission approved Reliability Standard EOP-010-1 (Geomagnetic Disturbance Operations) submitted by the North American Electric Reliability Corporation (NERC).<sup>1</sup> Foundation for Resilient Societies (Foundation) filed a request for rehearing of Order No. 797.<sup>2</sup> For the reasons discussed in the body of this order, we deny rehearing.

2. A number of Foundation's arguments are denied here because they address a later stage of efforts on geomagnetic disturbances (i.e., NERC's future filing of Second Stage GMD Reliability Standards) and Foundation may seek to present those arguments at an appropriate time in response to that filing. More generally, we acknowledge the concerns expressed by Foundation and others that, given the still evolving scientific and engineering knowledge on geomagnetic disturbances (GMDs) and the gaps in understanding of this issue, our decision on the Second Stage GMD Reliability Standards

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<sup>1</sup> *Reliability Standard for Geomagnetic Disturbance Operations*, Order No. 797, 79 Fed. Reg. 35,911 (June 25, 2014), 147 FERC ¶ 61,209 (2014).

<sup>2</sup> On August 18, 2014, Foundation moved to supplement its request for rehearing. As Foundation's supplement was filed beyond the 30 days allowed by statute, 16 U.S.C. § 8251(a) (2012), the Federal Power Act does not allow us to consider the supplement here. *See also* 18 C.F.R. § 385.713(b) (2014); *Public Service Company of New Hampshire*, 134 FERC ¶ 61,041, at P 7 n.13 (2011).

should at least be based on as much information as is currently known and available. In this regard, we expect interested parties to present all relevant information and analyses so our decision can be based on a full record of current knowledge on GMD issues.

## **I. Background**

### **A. Order No. 779**

3. In Order No. 779, the Commission directed NERC, pursuant to section 215(d)(5) of the Federal Power Act (FPA),<sup>3</sup> to develop and submit for approval proposed Reliability Standards that address the impact of GMDs on the reliable operation of the Bulk-Power System.<sup>4</sup> The Commission determined that the potentially severe, wide-spread impact on the reliable operation of the Bulk-Power System that can be caused by GMD events, and the then absence of Reliability Standards to address GMD events, justified the development of Reliability Standards.

4. The Commission ordered NERC to implement the directive in two stages. In the first stage, the Commission directed NERC to submit, within six months of the effective date of Order No. 779, one or more Reliability Standards (First Stage GMD Reliability Standards) that require owners and operators of the Bulk-Power System to develop and implement operational procedures to mitigate the effects of GMDs consistent with the reliable operation of the Bulk-Power System. The Commission directed that NERC, for the Second Stage GMD Reliability Standard, provide more comprehensive protections by requiring applicable entities to protect their facilities against a benchmark GMD event.

### **B. NERC Petition**

5. On November 13, 2013, NERC petitioned the Commission to approve Reliability Standard EOP-010-1 and its associated violation risk factors and violation severity levels, implementation plan, and effective dates. NERC maintained that Reliability Standard EOP-010-1 satisfied the Commission's directive in Order No. 779 corresponding to the development and submission of the First Stage GMD Reliability Standards.

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<sup>3</sup> 16 U.S.C. § 824o(d)(5) (2012).

<sup>4</sup> *Reliability Standards for Geomagnetic Disturbances*, Order No. 779, 78 Fed. Reg. 30,747 (May 23, 2013), 143 FERC ¶ 61,147, *reh'g denied*, 144 FERC ¶ 61,113 (2013).

**C. NOPR**

6. On January 16, 2014, the Commission issued a Notice of Proposed Rulemaking proposing to approve Reliability Standard EOP-010-1 as just, reasonable, not unduly discriminatory or preferential, and in the public interest based on the Commission's review of NERC's petition and supporting exhibits.<sup>5</sup> The NOPR stated that Reliability Standard EOP-010-1 satisfied the directive in Order No. 779 that NERC submit one or more Reliability Standards that require owners and operators of the Bulk-Power System to develop and implement operational procedures to mitigate the effects of GMDs consistent with the reliable operation of the Bulk-Power System.

7. In response to the NOPR, interested entities filed 20 comments.

**D. Order No. 797**

8. In Order No. 797, the Commission adopted the NOPR proposal to approve Reliability Standard EOP-010-1. The Commission determined that Reliability Standard EOP-010-1 addressed the directive in Order No. 779 that NERC submit one or more Reliability Standards that require owners and operators of the Bulk-Power System to develop and implement operational procedures to mitigate the effects of GMDs consistent with the reliable operation of the Bulk-Power System. The Commission also determined that the requirements in Reliability Standard EOP-010-1 were consistent with the guidance in Order No. 779 that NERC develop Reliability Standards that, rather than require specific operational procedures, require responsible entities to develop and implement entity-specific operational procedures because owners and operators of the Bulk-Power System are most familiar with their own equipment and system configurations. The Commission further determined that Reliability Standard EOP-010-1 required coordination of operational procedures and processes, overseen by a functional entity with a wide-area perspective (i.e., reliability coordinators), which was also consistent with the Commission's guidance in Order No. 779.

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<sup>5</sup> *Reliability Standard for Geomagnetic Disturbance Operations*, Notice of Proposed Rulemaking, 79 Fed. Reg. 3547 (Jan. 22, 2014), 146 FERC ¶ 61,015 (2014) (NOPR).

## II. Discussion

9. The Commission denies Foundation's rehearing request, for the reasons discussed below.

### A. Applicability Criteria of Reliability Standard EOP-010-1

#### Order No. 797

10. Reliability Standard EOP-010-1 applies to reliability coordinators and transmission operators with a "Transmission Operator Area that includes a power transformer with a high side wye-grounded winding with terminal voltage greater than 200 kV." In Order No. 797, the Commission determined that the applicability criteria in Reliability Standard EOP-010-1 are technically justified and consistent with Order No. 779, both in terms of using a 200 kV threshold for determining applicable transmission operators and not including balancing authorities and generator operators as applicable entities.<sup>6</sup> Order No. 797 determined that the NERC petition and White Paper Supporting Network Applicability provided an adequate technical basis to conclude that transformers operating at 200 kV and below are likely to have a limited impact on the Bulk-Power System during a GMD event.<sup>7</sup> Order No. 797 also determined that NERC's petition and White Paper Supporting Functional Entity Applicability adequately justified excluding generator operators and balancing authorities from the applicability criteria of Reliability Standard EOP-010-1.<sup>8</sup>

#### Request

11. Foundation contends that the Commission erred in approving the applicability criteria in Reliability Standard EOP-010-1. Foundation maintains that the 200 kV threshold in the applicability criteria is arbitrary because a report from the Oak Ridge National Laboratory "make[s] the case that networks operating below 200 kV were in

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<sup>6</sup> See Order No. 797, 147 FERC ¶ 61,209 at PP 16, 24-29 (citing NERC Petition, Exhibit D (White Paper Supporting Network Applicability); NERC Petition, Exhibit E (White Paper Supporting Functional Entity Applicability)).

<sup>7</sup> See Order No. 797, 147 FERC ¶ 61,209 at P 25 (citing NERC Petition, Exhibit E (White Paper Supporting Network Applicability)).

<sup>8</sup> See Order No. 797, 147 FERC ¶ 61,209 at PP 28-29 (citing NERC Petition, Exhibit E (White Paper Supporting Functional Entity Applicability)).

fact impacted by a moderate solar storm on March 13, 1989.”<sup>9</sup> Foundation also cites to “PowerWorld modeling results,” discussed in Foundation’s NOPR comment, that, according to Foundation, show that “reactive power in networks at 200 kV and above left out more than 40 percent of cumulative reactive power (MVAR) consumed in solar storm modeling scenarios for some regions.”<sup>10</sup>

12. In addition, Foundation contends that the 200 kV threshold is inconsistent with the 100 kV threshold in the Commission-approved definition of bulk electric system. Foundation also asserts that the applicability criteria improperly exclude balancing authorities and generator operators because Reliability Standard EOP-010-1 unreasonably relies on reliability coordinators to perform certain functions that reliability coordinators are unlikely to be able to perform. Foundation further contends that the exclusion of generator operators from the applicability criteria, and the lack of geomagnetic induced current monitoring and blocking requirements, does not “assure reliable ‘black start’ for all nuclear generating facilities.”<sup>11</sup>

### **Commission Determination**

13. We deny Foundation’s rehearing requests regarding the applicability criteria of Reliability Standard EOP-010-1.

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<sup>9</sup> Foundation Rehearing Request at 5 (citing Oak Ridge National Laboratory, *Electromagnetic Pulse: Effects on the U.S. Power Grid: Meta-R-319* (January 2010), available at [http://www.ornl.gov/sci/ees/etsd/pes/pubs/ferc\\_Meta-R-319.pdf](http://www.ornl.gov/sci/ees/etsd/pes/pubs/ferc_Meta-R-319.pdf) (Oak Ridge Report)).

<sup>10</sup> Foundation Rehearing Request at 5. Foundation also argues that excluding balancing authorities is unreasonable because a report from the Electric Infrastructure Council (EIS) “indicates above-average risks of regional blackouts from solar storms in high latitude nations such as Canada.” Foundation Comments at 15. Foundation did not address the EIS report in its NOPR comments. Moreover, the pages in the EIS report cited by Foundation only include a survey of GMD regulations and mitigation efforts in various countries, but do not address whether balancing authorities should be added to the applicable entities under Reliability Standard EOP-010-1. Electric Infrastructure Council, *The International E-Pro Report* (September 2013) at 117-118, available at <http://eiscouncil.org/images/upload/media/The%20International%20EPRO%20Report.pdf>.

<sup>11</sup> Foundation Rehearing Request at 18.

14. We first deny Foundation's request for rehearing of the 200 kV threshold in the applicability criteria of Reliability Standard EOP-010-1.<sup>12</sup> Order No. 797 determined that NERC's petition and White Paper Supporting Network Applicability "provide[d] an adequate technical basis to conclude that transformers operating at 200 kV and below are likely to have a limited impact on the Bulk-Power System during a GMD event."<sup>13</sup> Foundation does not contest the data in NERC's White Paper Supporting Network Applicability. Instead, Foundation contends that even a limited impact on the Bulk-Power System is inconsistent with the definition of "reliable operation" in FPA section 215 because "reliable operation" means that the Bulk-Power System must be operated so that "instability uncontrolled separation, or cascading failures of such system will not occur...." However, the Commission held in Order No. 779 that the "Second Stage GMD Reliability Standard should not impose 'strict liability' on responsible entities for failure to ensure the reliable operation of the Bulk-Power System in the face of a GMD event of unforeseen severity, as some commenters fear."<sup>14</sup> In addition, the "limited impact" discussed in Order No. 797 referred to the modelling analysis described in the White Paper Supporting Network Applicability, which showed only a minimal difference in geomagnetic induced current levels on transformers operating at voltages higher than 200 kV when transformers operating at 200 kV and below were excluded from the model.<sup>15</sup> Thus, the White Paper reasonably demonstrated that the exclusion of

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<sup>12</sup> As the Commission noted in Order No. 797, the applicability criteria determine which transmission operators must comply with Reliability Standard EOP-010-1 (i.e., those with a power transformer with a high side wye-grounded winding with terminal voltage greater than 200 kV in the transmission operator area). Order No. 797, 147 FERC ¶ 61,209 at P 26. While the 200 kV threshold excludes transmission operators operating transformers 200 kV and below, the 200 kV threshold does not mean that applicable transmission operators will ignore reactive power supplies operating at 200 kV or below on their systems when developing the required GMD Operating Procedures or Operating Processes. *Id.*

<sup>13</sup> Order No. 797, 147 FERC ¶ 61,209 at P 25.

<sup>14</sup> Order No. 779, 143 FERC ¶ 61,147 at P 84.

<sup>15</sup> Order No. 797, 147 FERC ¶ 61,209 at P 27.

transformers operating at 200 kV or below on factors such as maximum transformer geomagnetic induced current, average transformer geomagnetic induced current, maximum VAR absorption and average VAR absorption was minimal.<sup>16</sup>

15. We also disagree with Foundation's assertion that the 200 kV applicability threshold is inconsistent with the Commission-approved definition of bulk electric system. Foundation misconstrues the purpose of the bulk electric system definition. The bulk electric system definition is the first step in determining what entities are subject to a NERC Reliability Standard. As the Commission stated in Order No. 693, the "[Electric Reliability Organization (ERO)] will identify those entities that must comply with Reliability Standards in three steps: (1) the ERO will identify and register those entities that fall under its definition of bulk electric system; (2) each registered entity will register in one or more appropriate functional categories and (3) each registered entity will comply with those Reliability Standards applicable to the functional categories in which it is registered."<sup>17</sup> In addition, Order No. 693 contemplated the use of electric facility characteristics to further refine the types of registered entities subject to Reliability

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<sup>16</sup> Regarding Foundation's reference to the "PowerWorld modeling results," Foundation's NOPR comment only references PowerWorld in Appendix 1 (Comments of the Foundation for Resilient Societies relating to Proposed Standards for "Operating Procedures" to protect the bulk power system from geomagnetic disturbances – Proposed NERC Standard EOP-010-1) where Foundation states, without citation, that "PowerWorld has estimated that less than 60% of total MVAR enters the bulk power system through transformers at 230 kV or higher, in both New England and in Michigan." Foundation NOPR Comments at Appendix A1-5. This statement, however, does not support Foundation's argument that the 200 kV applicability threshold for transformers in Reliability Standard EOP-010-1 is arbitrary. Foundation's rehearing request also cites to the Oak Ridge Report, but the two cited pages do not support Foundation's rehearing request. Page 4-12 of the Oak Ridge Report addresses extra high-voltage (EHV) transformers operating at 765 kV, 500 kV, or 345 kV; it does not refer to transformers operating between 100 kV and 200 kV. Similarly, page 2-30 of the Oak Ridge Report only discusses GMD-related damage to a transformer operating at 500 kV.

<sup>17</sup> Order No. 797, 147 FERC ¶ 61,209 at P 25 n.36 (citing *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242, at PP 97-98, *order on reh'g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007) (explaining that each Reliability Standard will identify the set of users, owners and operators that must comply with that standard and "NERC has indicated that in the future it may add to a Reliability Standard limitations on applicability based on electric facility characteristics such as generator nameplate ratings.")).

Standards. Since Order No. 693, the Commission has approved the use of electric facility characteristics in other NERC Reliability Standards. For example, the Reliability Standard on vegetation management also contains a 200 kV threshold.<sup>18</sup>

16. We next deny Foundation's request for rehearing regarding the exclusion of balancing authorities and generator operators from the applicability criteria of Reliability Standard EOP-010-1. In Order No. 797, the Commission considered and rejected Foundation's comment that balancing authorities should be listed as applicable entities because reliability coordinators allegedly cannot communicate quickly with transmission operators, generator operators, and balancing authorities. The Commission, citing NERC's Reliability Functional Model Technical Document and Reliability Standard COM-002-2, Requirement R1, stated that reliability coordinators are responsible for real-time system reliability and often must respond quickly or even immediately to Bulk-Power System events with little or no warning.<sup>19</sup> The Commission determined that there was no evidence from which to conclude that, unlike with other types of disturbances on the Bulk-Power System, reliability coordinators could not respond to a GMD event.

17. Foundation's rehearing request provides no basis to revisit that determination. Citing Reliability Standard IRO-001-1.1, Requirement R8, Foundation in its rehearing request, contends that the "likelihood that [generator operators and balancing authorities] will reliably execute the directives of Reliability Coordinators during fast-moving and wide-area solar storms is greatly diminished" because the Reliability Standard "allows Transmission Operators, Balancing Authorities, and Generator Operators to ignore the directives of Reliability Coordinators" under certain conditions.<sup>20</sup> However, Reliability

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<sup>18</sup> See *Revisions to Reliability Standard for Transmission Vegetation Management*, Order No. 777, 78 Fed. Reg. 18,817 (Mar. 28, 2013), 142 FERC ¶ 61,208 (2013) (approving the use of a 200 kV applicability threshold in Reliability Standard FAC-003-2); see also *Version 5 Critical Infrastructure Protection Reliability Standards*, Order No. 791, 78 Fed. Reg. 72,755 (Dec. 3, 2013), 145 FERC ¶ 61,160 (2013) (approving the use of electric facility characteristics in the applicability criteria of Reliability Standard CIP-002-5).

<sup>19</sup> Order No. 797, 147 FERC ¶ 61,209 at P 28 (citing Reliability Standard COM-002-2, Requirement R1 ("Each Transmission Operator, Balancing Authority, and Generator Operator shall have communications (voice and data links) with appropriate Reliability Coordinators, Balancing Authorities, and Transmission Operators ... [and] [s]uch communications shall be staffed and available for addressing a real-time emergency condition.)).

<sup>20</sup> Foundation Rehearing Request at 14.



Standard IRO-001-1.1, Requirement R8 does not allow transmission operators, balancing authorities, and generator operators to ignore a reliability coordinator's directives. Reliability Standard IRO-001-1.1, Requirement R8 provides that generator operators, transmission operators and balancing authorities, among other entities, "shall comply with Reliability Coordinator directives unless such actions would violate safety, equipment, or regulatory or statutory requirements." In instances where compliance with a reliability coordinator's directive violates safety, equipment, or regulatory or statutory requirements, generator operators, transmission operators and balancing authorities cannot simply ignore the directive but, instead, "shall immediately inform the Reliability Coordinator of the inability to perform the directive so that the Reliability Coordinator may implement alternate remedial actions."

18. We also reject Foundation's assertion that two-way communications between reliability coordinators and generator operators would be unreliable during a GMD event. In Order No. 797, the Commission stated that Reliability Standard COM-002-2, Requirement R1 requires reliability coordinators, transmission operators, balancing authorities, generator operators, and reliability coordinators to have the technical capacity to communicate and coordinate with each other. We are not persuaded that reliability coordinators and generator operators could not comply with this requirement during a GMD event. To support its position regarding the alleged unreliability of two-way communications during a GMD event, Foundation cites Order No. 779, which only stated, by way of background, that GMD events in the past have "impacted" communication systems.<sup>21</sup> Foundation also cites a report addressing man-made electromagnetic pulses, which, as we stated in Order No. 797, are not at issue in this

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<sup>21</sup> Order No. 779, 143 FERC ¶ 61,147 at P 6 (citing Oak Ridge National Laboratory, *Electric Utility Industry Experience with Geomagnetic Disturbances* at xiii (1991), available at <http://www.ornl.gov/~webworks/cpr/v823/rpt/51089.pdf> ("This disturbance, which results in distortions to the earth's magnetic field, can be of varying intensity and has in the past impacted the operation of pipelines, communications systems, and electric power systems.")).

rulemaking.<sup>22</sup> Even recognizing that GMD events could impact communication systems, Foundation has not established that reliability coordinators and generator operators would be unable to comply with Reliability Standard COM-002-2, Requirement R1 during a GMD event.

19. We further reject Foundation's contention that generator operators should be included within the scope Reliability Standard EOP-010-1 to ensure that sufficient black start resources exist to "bring back nuclear operations in time to safeguard radioactive materials."<sup>23</sup> In Order No. 797, the Commission credited NERC's justification for the exclusion of generator operators because some generator operators "would not have the technical basis for taking steps [to mitigate GMDs] on [their] own and would instead take steps based on the [reliability coordinator's] or [transmission operator's] Operating Plans, Processes, or Procedures."<sup>24</sup> Foundation does not contest that determination. Instead, Foundation appears to link the inclusion of generator operators in the applicability criteria of Reliability Standard EOP-010-1 with the adoption of additional requirements that generator operators perform mandatory geomagnetic induced current monitoring and blocking. As discussed below, we believe that such requirements would be inconsistent with the Commission's guidance in Order No. 779 regarding the First Stage GMD Reliability Standards.<sup>25</sup>

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<sup>22</sup> Foundation Rehearing Request at 19 (citing Report of the EMP Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack: Critical National Infrastructures (April 2008) at 43 ("The communications and control systems' functionality are at high risk of disruption and damage themselves during an EMP attack.)); Order No. 779, 143 FERC ¶ 61,147 at P 14 n.20 (determining that the impact of electromagnetic pulses was outside the scope of Order No. 779).

<sup>23</sup> Foundation Rehearing Request at 18.

<sup>24</sup> Order No. 797, 147 FERC ¶ 61,209 at P 16 (citing NERC Petition at 4).

<sup>25</sup> In Order No. 797, the Commission also recognized NERC's statement that generator owners and generator operators will be considered for inclusion in the Second Stage GMD Reliability Standards, "which will require applicable entities to conduct vulnerability assessment and develop appropriate mitigation strategies . . . [and that] [s]uch mitigation strategies could include the development of Operating Procedures for applicable [generator owners] and [generator operators]." *Id.* We also note that the Nuclear Regulatory Commission has the statutory responsibility for licensing and regulating commercial nuclear facilities operating in the United States. *See* 42 U.S.C. § 5801 *et seq.*

20. In sum, we deny Foundation's request for rehearing concerning the applicability criteria of Reliability Standard EOP-010-1.

**B. Requirements of Reliability Standard EOP-010-1**

**Order No. 797**

21. In Order No. 797, the Commission determined that Reliability Standard EOP-010-1 satisfied the directive in Order No. 779 that NERC submit one or more Reliability Standards that require owners and operators of the Bulk-Power System to develop and implement operational procedures to mitigate the effects of GMDs consistent with the reliable operation of the Bulk-Power System. The Commission also determined that the requirements in Reliability Standard EOP-010-1 are consistent with the guidance in Order No. 779 that NERC develop Reliability Standards that, rather than require specific operational procedures, require responsible entities to develop and implement entity-specific operational procedures because owners and operators of the Bulk-Power System are most familiar with their own equipment and system configurations. Further, the Commission determined that Reliability Standard EOP-010-1 required coordination of operational procedures and processes, overseen by a functional entity with a wide-area perspective (i.e., reliability coordinators), which was also consistent with the guidance in Order No. 779.<sup>26</sup>

**Request**

22. Foundation contends that the Commission erred in approving the requirements of Reliability Standard EOP-010-1. First, Foundation characterizes Reliability Standard EOP-010-1 as a "lowest common denominator" Reliability Standard because it lacks specific requirements such as "mandatory exercises, unscheduled drills, authentication of de-energizing orders, or practice of GMD operating procedures."<sup>27</sup> Second, Foundation contends that Order No. 797 failed to address Foundation's NOPR comments regarding the "lack of mandatory mitigative actions and lack of mandatory external review of GMD Operating Plans of Reliability Coordinators" in Reliability Standard EOP-010-1. Third, Foundation contends that the Commission erred in not requiring the installation of geomagnetic induced current monitoring and blocking devices in Reliability Standard EOP-010-1. Fourth, Foundation contends that the Commission erred by relying on a future Second Phase GMD Reliability Standard to correct the alleged defects with Reliability Standard EOP-010-1. Fifth, Foundation contends that the Commission erred

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<sup>26</sup> *Id.* P 14.

<sup>27</sup> Foundation Rehearing Request at 3.

by not requiring applicable entities to conduct “quantified contingency planning,” which Foundation defines as a “mathematical comparison of megawatt capacity of assets at risk during solar storms to power reserves.”<sup>28</sup> Sixth, Foundation contends that the Commission erred by not requiring “failover responsibility” between generator operators and transmission operators.

### **Commission Determination**

23. We deny Foundation’s rehearing request regarding the requirements of Reliability Standard EOP-010-1.

24. In Order No. 779, the Commission directed NERC to develop First Stage GMD Reliability Standards that require applicable entities to mitigate the risks posed by GMD events to the Bulk-Power System by developing and implementing GMD operational procedures. In doing so, the Commission stated that:

As we stated in the NOPR, “operational procedures, while not a complete solution, constitute[] an important first step to addressing the GMD reliability gap because they can be implemented relatively quickly.” Operational procedures may help alleviate abnormal system conditions due to transformer absorption of reactive power during GMD events, helping to stabilize system voltage swings, and may potentially isolate some equipment from being damaged or misoperated.<sup>29</sup>

25. The Commission provided guidance to NERC as to what should be included in the First Stage GMD Reliability Standards. Specifically, the Commission stated that it was “not directing NERC to develop Reliability Standards that include specific operational procedures ... [but instead the First Stage GMD Reliability Standards] should include a mechanism that requires responsible entities to develop and implement operational procedures because owners and operators of the Bulk-Power System are most familiar with their own equipment and system configurations.”<sup>30</sup> Accordingly, the Commission’s expectations regarding the First Stage GMD Reliability Standards were clearly set forth in Order No. 779. While Foundation filed comments in the Order No. 779 rulemaking process, Foundation did not seek rehearing of Order No. 779.

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<sup>28</sup> *Id.* at 12.

<sup>29</sup> Order No. 779, 143 FERC ¶ 61,147 at P 36.

<sup>30</sup> *Id.* P 38.

26. Foundation's rehearing request regarding the requirements of Reliability Standard EOP-010-1 rests on a disagreement with the guidance in Order No. 779 that the First Stage GMD Reliability Standards should not require specific operational procedures that all applicable entities must follow. This disagreement is reflected in Foundation's contention that Reliability Standard EOP-010-1 should require applicable entities to implement specific operational procedures (e.g., mandatory exercises, unscheduled drills, "failover responsibility," "quantified contingency planning") and install equipment (e.g., geomagnetic induced current monitoring or blocking equipment). However, such requirements would be inconsistent with the Commission's explanation in Order No. 779 stating that the First Stage GMD Reliability Standards should not contain specific, "one-size-fits-all" operating procedures.<sup>31</sup> Instead, Order No. 779 stated that the First Stage GMD Reliability Standards should "include a mechanism that requires responsible entities to develop and implement operational procedures because owners and operators of the Bulk-Power System are most familiar with their own equipment and system configurations."<sup>32</sup>

27. Foundation contends that the Commission "has established a system of solar storm mitigation that might work for minor solar storms but it is altogether unworkable, unreasonable, imprudent, and unjust to utilize this design for 'operating procedures' in a severe solar storm."<sup>33</sup> However, we believe that Foundation's concern is better addressed in the Second Stage GMD Reliability Standard development process, in which NERC is developing a Reliability Standard that must identify "benchmark GMD events" that specify what severity GMD events a responsible entity must assess for potential impact

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<sup>31</sup> For the same reason, we reject Foundation's contention that the GMD operational procedure templates for transmission operators and generator operators, developed by the NERC GMD Task Force, should have been included as requirements in Reliability Standard EOP-010-1. NERC, Geomagnetic Disturbance Operating Procedure Template Transmission Operator, *available at* [http://www.nerc.com/docs/pc/gmdtf/Template\\_TOP.pdf](http://www.nerc.com/docs/pc/gmdtf/Template_TOP.pdf). While it is reasonable to anticipate that applicable transmission operators will use the transmission operator template as a reference in developing their own operational procedures, we see no reason why that reference should have been included in the requirements of Reliability Standard EOP-010-1.

<sup>32</sup> Order No. 779, 143 FERC ¶ 61,147 at P 38.

<sup>33</sup> Foundation Rehearing Request at 9-10.

on the Bulk-Power System.<sup>34</sup> Further, while Foundation suggests that the Commission meant for the First Stage GMD Reliability Standards to address a “severe solar storm,” that was not the case. Rather, in the absence at that time of any mandatory and enforceable Reliability Standards addressing GMD events, the Commission directed NERC in Order No. 779 to develop Reliability Standards that address the risks posed by GMD to the reliable operation of the Bulk-Power System in two stages. With regard to the First Stage GMD Reliability Standards (i.e., the development of operational procedures), the Commission stated that “operational procedures, while not a complete solution, constitute an important first step to addressing the GMD reliability gap because they can be implemented relatively quickly.”<sup>35</sup> The Commission expects the Second Stage GMD Reliability Standards, which the Commission allowed NERC more time to develop given its greater complexity, to provide more comprehensive protections by requiring applicable entities to protect their facilities against a benchmark GMD event.<sup>36</sup> Regarding geomagnetic induced current monitoring specifically, in Order No. 797 the Commission determined that geomagnetic induced current monitoring requirements should be addressed in the Second Stage GMD Reliability Standards.<sup>37</sup> We continue to

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<sup>34</sup> Order No. 779, 143 FERC ¶ 61,147 at P 54. Foundation contends that the Commission erred by allowing defects in Reliability Standard EOP-010-1 (e.g., the lack of required geomagnetic induced current monitoring) to be remedied in the Second Stage GMD Reliability Standards. As noted above, the lack of specific operational procedures in the First Stage GMD Reliability Standards is not a defect; instead, it is consistent with the Commission’s guidance in Order No. 797. Moreover, as noted in Order No. 797, the Commission’s approval of Reliability Standard EOP-010-1 was not dependent on what the Commission expected NERC to propose in the Second Stage GMD Reliability Standards. Order No. 797, 147 FERC ¶ 61,209 at P 29 n.47. Moreover, in Order No. 797, the Commission stated that it would “also consider then the need for the Second Stage GMD Reliability Standard’s planning requirements to integrate appropriately with the First Stage GMD Reliability Standard’s operating requirements.” *Id.* P 36 n.52.

<sup>35</sup> Order No. 779, 143 FERC ¶ 61,147 at P 36.

<sup>36</sup> The Commission noted that “[g]iven that the scientific understanding of GMDs is still evolving, we recognize that Reliability Standards cannot be expected to protect against all GMD-induced outages.” Order No. 797, 147 FERC ¶ 61,209 at P 84.

<sup>37</sup> Order No. 797, 147 FERC ¶ 61,209 at P 36 (“[W]e directed NERC to develop only operational procedures in the First Stage GMD Reliability Standards, and to develop more comprehensive protections in the Second Stage GMD Reliability Standards. The issue of monitoring requirements properly belongs in the Second Stage GMD Reliability Standards.”).

encourage NERC to address the collection, dissemination, and use of geomagnetic induced current data, by NERC, industry or others, in the Second Stage GMD Reliability Standards because such efforts could be useful in the development of GMD mitigation methods or to validate GMD models.

28. We reject Foundation's assertion that Reliability Standard EOP-010-1 lacks "mandatory mitigative actions" or "mandatory external review" because it lacks requirements for "mandatory exercises, unscheduled drills, authentication of de-energizing orders, or practice of GMD operating procedures."<sup>38</sup> While, as discussed above, Reliability Standard EOP-010-1 does not require specific operational procedures, Foundation's assertion that there are no "mitigative actions" or "mandatory external review" is contradicted by the requirements and compliance measures contained in the Reliability Standard. Reliability Standard EOP-010-1, Requirement R1 requires that "[e]ach Reliability Coordinator shall develop, maintain, and implement a GMD Operating Plan that coordinates GMD Operating Procedures or Operating Processes within its Reliability Coordinator Area." Reliability Standard EOP-010-1, Requirement R3 requires that "[e]ach Transmission Operator shall develop, maintain, and implement a GMD Operating Procedure or Operating Process to mitigate the effects of GMD events on the reliable operation of its respective system." Each of these requirements has associated compliance measures to provide the compliance enforcement authority with proof of compliance. For Requirement R1, Measure M1 states that "[e]ach Reliability Coordinator shall have a current GMD Operating Plan meeting all the provisions of Requirement R1; evidence such as a review or revision history to indicate that the GMD Operating Plan has been maintained; and evidence to show that the plan was implemented as called for in its GMD Operating Plan, such as dated operator logs, voice recordings, or voice transcripts." For Requirement R3, Measure 3 states that "[e]ach Transmission Operator shall have a GMD Operating Procedure or Operating Process meeting all the provisions of Requirement R3; evidence such as a review or revision history to indicate that the GMD Operating Procedure or Operating Process has been maintained; and evidence to show that the Operating Procedure or Operating Process was implemented as called for in its GMD Operating Procedure or Operating Process, such as dated operator logs, voice recordings, or voice transcripts." We believe that NERC and Regional Entities possess the necessary technical expertise to review and ensure compliance with the requirements and measures in Reliability Standard EOP-010-1. Accordingly, we reject Foundation's assertion that Reliability Standard EOP-010-1 lacks "mandatory mitigative actions" or "mandatory external review."

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<sup>38</sup> Foundation Rehearing Request at 3.

29. With respect to Foundation's contention that Reliability Standard EOP-010-1 should "include provisions for failover responsibilities vesting in Generator Operators and Transmission Operators in their area," we note that Foundation does not explain what it means or proposes by recommending the inclusion of "failover responsibilities," nor did Foundation raise this issue in its NOPR comments.<sup>39</sup> In any case, as discussed above, Reliability Standard EOP-010-1 vests reliability coordinators with the responsibility of coordinating the GMD Operating Procedures or Operating Processes within its Reliability Coordinator Area, consistent with the Commission's guidance in Order No. 779. Thus, we deny Foundation's request for rehearing with respect to this issue.

30. In sum, we deny Foundation's request for rehearing concerning the requirements of Reliability Standard EOP-010-1.

### **C. Other Alleged Errors**

#### **Request**

31. Foundation contends that Reliability Standard EOP-010-1 interferes with the authority of the President of the United States and Secretary of Energy. Foundation states that Reliability Standard EOP-010-1 "excludes Generator Operators and Balancing Authorities from mandatory participation; reduces incentives to install and operate geomagnetic induced current monitors; and makes it impractical and perhaps impossible for the President of the United States to exercise existing statutory and constitutional authority to protect the nation from a severe solar storm under existing Article II powers and specific statutory authorities."<sup>40</sup> Foundation also contends that excluding generator operators "from mandatory participation in 'operating procedures' to mitigate solar geomagnetic storms ... [and] avoiding a mandate for cost-effective geomagnetic induced current monitoring at [generator step up (GSU)] transformers and key interconnections in the transmission networks of the Bulk-Power System[] creates barriers to effective use by

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<sup>39</sup> *Transmission Relay Loadability Reliability Standard*, Order No. 733, 130 FERC ¶ 61,221 (2010), *order on reh'g and clarification*, Order No. 733-A, 134 FERC ¶ 61,127, *order on reh'g and clarification*, Order No. 733-B, 136 FERC ¶ 61,185, at P 57 (2011) (stating that the Commission looks with disfavor on parties raising issues for the first time on rehearing because other parties are not permitted to respond to a request for rehearing).

<sup>40</sup> Foundation Rehearing Request at 16.



the Secretary of Energy of pre-existing emergency interconnection authority [under FPA section 202(c)].”<sup>41</sup>

32. Foundation also contends that the Commission erred by “deferring to NERC on allegations of anti-competitive rulemaking[] and by creating barriers to competition to deliver higher reliability electric transmission services ... by effectively grant[ing] Generator Operators a shield against financial liability for failure to participate in GMD operating procedures.”<sup>42</sup> Foundation maintains that not requiring the use of geomagnetic induced current monitoring or blocking equipment “discourage[s] [the] purchase of hardware protective equipment for GMD, and [] discourage[s] installation of geomagnetic induced current monitors at all GSU transformers and other GMD-impacted equipment ... [with] [t]he indirect impact of these barriers to solar storm protection [being] to render difficult or impossible the competition by one or more transmission companies that may wish to compete to provide higher standards of grid reliability.”<sup>43</sup>

### **Commission Determination**

33. We deny Foundation’s rehearing request based on Foundation’s assertion that Reliability Standard EOP-010-1 might interfere with any authority of the President of the United States and Secretary of Energy, or that Reliability Standard EOP-010-1 creates “anti-competitive barriers” in not requiring the installation of geomagnetic induced current monitoring or blocking equipment.

34. In Order No. 797, the Commission approved Reliability Standard EOP-010-1 pursuant to the Commission’s authority under FPA section 215(d)(2). Reliability Standard EOP-010-1 contains no provision that purports to impair any authority of the President of the United States or Secretary of Energy. Foundations’ assertion that the requirements of Reliability Standard EOP-010-1, or in this case the lack of specific requirements (i.e., not requiring geomagnetic induced current monitoring or blocking), might discourage the President or Secretary of Energy from exercising any authority is speculative and largely immaterial to the Commission’s responsibility to review Reliability Standards pursuant to FPA section 215(d)(2). In addition, we find inadequate support for, and therefore, reject Foundation’s claim that the lack of a geomagnetic induced current monitoring or blocking requirement in Reliability Standard EOP-010-1 creates “anti-competitive barriers.” As the Commission stated in Order No. 797,

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<sup>41</sup> *Id.* at 17.

<sup>42</sup> *Id.* at 20.

<sup>43</sup> *Id.*

“Reliability Standard EOP-010-1 does not preclude users, owners and operators of the Bulk-Power System from taking additional steps that are designed to mitigate the effects of GMD events, provided those additional steps are not inconsistent with the Commission-approved Reliability Standards.”<sup>44</sup>

The Commission orders:

The Commission hereby denies rehearing, for the reasons discussed in the body of this order.

By the Commission.

Kimberly D. Bose,  
Secretary.

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<sup>44</sup> Order No. 797, 147 FERC ¶ 61,209 at P 44.