UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Reliability Standards for Geomagnetic Disturbances	**)** **)**	**Docket No. RM12-22-000**

COMMENTS OF ALBERTA ELECTRIC SYSTEM OPERATOR, CALIFORNIA INDEPENDENT SYSTEM OPERATOR, ELECTRIC RELIABILITY COUNCIL OF TEXAS, THE INDEPENDENT ELECTRICITY SYSTEM OPERATOR OF ONTARIO, INC., ISO NEW ENGLAND INC., MIDWEST INDEPENDENT TRANSMISSION SYSTEM OPERATOR, INC., NEW YORK INDEPENDENT SYSTEM OPERATOR, INC., AND SOUTHWEST POWER POOL, INC.

The Alberta Electric System Operator ("AESO"), California Independent System Operator ("CAISO"), Electric Reliability Council of Texas ("ERCOT"), the Independent Electricity System Operator of Ontario, Inc. ("IESO"), ISO New England Inc. ("ISO-NE"), Midwest Independent Transmission System Operator, Inc. ("MISO"), New York Independent System Operator, Inc. ("NYISO"), and Southwest Power Pool, Inc. ("SPP")[1] (collectively, "Joint ISOs/RTOs") submit the following comments in response to the Notice of Proposed Rulemaking (the "NOPR") regarding the development of Reliability Standards to address the potential risks to the Bulk-Power System from geomagnetic disturbances ("GMD") issued by the Federal Energy Regulatory Commission (the "Commission") on October 18, 2012, in this proceeding.[2]

[1] The IESO is not subject to the Commission's jurisdiction, and these comments do not constitute agreement or acknowledgement that it can be subject to the Commission's jurisdiction. The AESO is also non-jurisdictional members of the IRC, but is not joining in these comments.

[2] *Reliability Standards for Geomagnetic Disturbances*, 141 FERC ¶ 61,045 (2012).

I. BACKGROUND AND SUMMARY

A. Background

On April 20, 2012, the Commission issued a Technical Conference Agenda for a conference to be held on April 30, 2012, in Docket No. AD12-13-000. The Technical Conference Agenda invited comments on the Technical Conference discussions, which focused on the reliability of the Bulk-Power System as affected by GMD, including the risks and impacts from geomagnetically induced currents ("GIC") to transformers and other equipment on the Bulk-Power System and options for addressing or mitigating the risks and impacts. On May 21, 2012, the ISO/RTO Council ("IRC")[3] submitted the following comments on the issues presented in the Technical Conference:[4]

- Additional analysis of actual data observation is necessary before any reliability standards are proposed in this area given the need for additional information on GMD impacts and effective mitigation.
- In order to enable decisions on such standards, the North American Electric Reliability Corporation ("NERC") should work with its stakeholders to assemble a common repository on geomagnetically induced currents ("GIC") indicators (such as neutral currents at selected locations), such that researchers can correlate this phenomenon to actual observed impacts.
- NERC's interim report provides a sound framework for continuous improvement.
- The industry has made observable progress since the blackout in Quebec in 1989.
- The industry should work towards a manufacturers' technical standard that rates a transformer's estimated GIC resiliency.

[3] The IRC is comprised of AESO, CAISO, ERCOT, IESO, ISO-NE, MISO, NYISO, PJM Interconnection, L.L.C. ("PJM"), and SPP.

[4] *See Geomagnetic Disturbances to the Bulk-Power System*, Comments of ISO/RTO Council; Docket No. AD12-13-000 (filed May 21, 2012) ("Technical Conference Comments").

- The IRC supports the comments of PJM provided at the technical conference.

As noted above, on October 18, the Commission issued the NOPR proposing to address the vulnerabilities regarding GMD by directing NERC "to develop and file for approval Reliability Standards that address the potential severe, wide-spread impact of GMD events on the reliable operation of the Bulk-Power System."[5] Under the Commission's proposal, the GMD Reliability Standards would be filed in two phases.

In the first phase of the proposal, the Commission would direct NERC to submit:

> 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.[6]

NERC would be required to file the Phase I Reliability Standards with the Commission within 90 days of the effective date of a Final Rule in this proceeding.[7] In the NOPR, the Commission does not propose to require specific operational procedures, but offers guidance and identifies certain examples of existing operational procedures to mitigate GMD events.

In the second phase, the Commission would direct NERC to develop Reliability Standards that would set forth a multi-phase process.[8] More specifically, within six months of the effective date of a Final Rule in this proceeding, NERC would file the Phase II Reliability Standards requiring "owners and operators of the Bulk-Power

[5] NOPR at P 15.

[6] NOPR at P 16. For ease of reference, the comments hereinafter refer to the first phase of the Commission's proposal as "Phase I".

[7] NOPR at P 16.

[8] NOPR at P 25. For ease of reference, the comments hereinafter refer to the second phase of the Commission's proposal as "Phase 2".

System" to: (1) "conduct initial and on-going assessments of the potential impacts of GMDs on Bulk-Power System equipment and on the Bulk-Power System as a whole";[9] and, (2) "[b]ased on those assessments . . . develop and implement a plan so that instability, uncontrolled separation, or cascading failures of the Bulk-Power System, caused by damage to critical or vulnerable Bulk-Power System equipment, or otherwise, will not occur as a result of a GMD."[10] Although the Commission does not propose to require specific solutions, the Phase II Reliability Standards would require the plans to include "strategies for protecting against the potential impact of GMDs."[11]

B. Summary of the Joint ISOs/RTOs Comments

The Joint ISOs/RTOs generally support the Commission's multi-phased approach to address the vulnerabilities regarding GMD. To facilitate the development and implementation of the Phase I and Phase II Reliability Standards in a manner that achieve the intended reliability benefits, however, the Joint ISOs/RTOs offer the comments set forth in Section III, below.

To summarize, the Joint ISOs/RTOs' comments request that the Commission, in a Final Rule in this proceeding, direct NERC to develop GMD Reliability Standards that:

- Account for the applicability of existing Reliability Standards to the issues raised by GMDs before developing new GMD requirements to avoid the potential for duplicative requirements that provide no incremental reliability benefit.

- Achieve Adequate Level of Reliability by affording the relevant functional entities the authority and discretion to develop the Phase I operational procedures that meet the needs of their respective systems, and the flexibility

[9] NOPR at P 23.

[10] NOPR at P 23.

[11] NOPR at P 23.

necessary to determine the Phase II plans, solutions or means that are adequate and necessary to address the risks identified in the GMD vulnerability assessments.

- Consistent with NERC construct, define regional scope and responsibilities in the same terms as functional entities and areas and equipment as existing reliability operational and equipment protection requirements. For example, requirements for the Phase II primary assessments and mitigation plans associated with Bulk-Power System equipment should be the responsibility of equipment owners and Bulk-Power System as a whole assessments and mitigation should be assigned to other appropriate functional entities - *e.g.*, Transmission Operator.

In addition, with respect to the Phase I procedures, the Commission should clarify that the relevant functional entities - and not NERC - should have the authority and discretion to develop the Phase I procedures, as they have the detailed knowledge and information necessary to understand potential GMD impacts and to develop the appropriate operational procedures. However, NERC can play a valuable role that is consistent with the NOPR's approach[12] by developing non-binding best practices reference document based on existing operational procedures, *inter alia*, and a non-exclusive illustrative list of considerations to guide the development of Phase I procedures. Regarding Phase I, the Commission should also clarify the relationship between NERC's reporting requirement and NERC's role in reviewing the functional entities procedures. With respect to Phase II, the Commission should clarify certain aspects of the assessment parameters.

Finally, the Commission's Final Rule should allow a year for the Phase I and II Reliability Standard development to be completed, and direct NERC to develop an

[12] That is, not to dictate specific procedures or solutions, but to provide guidance and examples that support their development. *See* NOPR at PP 17-18, 26, 34.

implementation timeframe that accounts for the coordination between functional entities and prioritizes implementation schedules based on degrees of impacts.

II. COMMENTS

A. NERC Should be Required to Consider Existing Standards Prior to the Development of GMD Reliability Standards to Avoid the Potential for Duplicative Requirements

Existing NERC Reliability Standards establish a comprehensive set of Bulk-Power System operational and equipment protection requirements that may address the concerns with the impact of GMD events on the reliable operation of the Bulk-Power System. Among the Commission's concerns with the impacts of GMDs, for example, is the potential for GICs introduced by GMDs to cause voltage instability due to increased reactive power ("VAr") consumption and loss of VAr support.[13] Because GMD raises voltage concerns, existing NERC Reliability Standards like Voltage and Reactive Control, VAR-001-2 R2,[14] should be examined first to see if they can be used and/or modified rather than create a new standard to address GMD VAr control. Accordingly, the Joint ISOs/RTOs request that the Commission direct NERC to first consider the applicability of existing Reliability Standards (*e.g.*, Voltage and Reactive Control[15]) to

[13] *See* NOPR at P 25.

[14] The Voltage and Reactive Control Standard requires each Transmission Operator to acquire sufficient reactive resources - which may include, but are not limited to, reactive generation scheduling, transmission line and reactive resource switching, and controllable load - within its area to protect the voltage levels under normal and contingency conditions. This includes the Transmission Operator's share of the reactive requirements of interconnecting transmission circuits.

[15] Existing Reliability Standards and procedures associated with restoration are another example. The NOPR states that "the proposed Reliability Standards should also address operational procedures for restoring GMD impacted portions of the Bulk-Power System that take into account the potential for equipment that is damaged or out-of-service for an extended period of time." *See* NOPR at P 20. It is unclear how restoration procedures for GMD impacts would differ from restoration procedures that are already in place for existing exposure. Thus, existing restoration requirements and/or procedures should be examined before new requirements and/or procedures are developed.

the issues raised by GMDs before developing new GMD requirements. Such an analysis would avoid the potential for duplicative and/or redundant obligations that provide no incremental reliability benefit.

B. Phase I Comments

1. The Phase I Reliability Standards Should Provide for Procedures That Are Consistent With an Adequate Level of Reliability, Which May Differ by Region.

In Phase I, the Commission proposes to require NERC to develop Reliability Standards that would have "owners and operators" develop operating procedures to mitigate the effects of GMDs.

Any procedures developed should be required to support an Adequate Level of Reliability to be consistent with the reliability goals of Section 215 of the Federal Power Act.[16] However, it is notable that the need for, and the effectiveness of, the operational procedures that would be required by the proposed Phase I Reliability Standards will depend on the geographic location of the system and the structural make-up of the grid (*e.g*. type, location and operational characteristics of the Bulk-Power System equipment and load characteristics). The owners and operators of the Bulk-Power System have the detailed knowledge and information necessary to understand potential GMD impacts and to develop procedures to address them.[17] Accordingly, in order to achieve the intended

[16] *See* 16 U.S.C. § 824(o)(c)1 ("Section 215").

[17] As the Technical Conference Comments stated, significant progress has been made since the blackout in Quebec in 1989. *See* Technical Conference Comments at pp 3-4. GMD procedures already exist and are being utilized in PJM, ISO-NE, MISO and NYISO. *See id*. For example, because the Hudson Valley is particularly vulnerable to GMDs due to its geological composition, NYISO has been involved in GMD operational protocols for over 30 years. NYISO has incorporated guidance provided by NPCC operating procedures designed to protect its system against GMD and continuously monitors ground currents at susceptible facilities. Since adopting these procedures, NYISO has not experienced a significant disturbance caused by GICs. NYISO Transmission and Dispatching Operations Manual, Section 4.2.11,
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reliability benefits, the owners and operators should have authority and discretion under the Phase I Reliability Standards to develop the required operational procedures. This approach is consistent with the Commission's proposal and would facilitate more immediate development of Phase I procedures, as they would allow functional entities with varied topology and structure to more easily develop and garner industry-wide support for the GMD Reliability Standards proposed for development in Phase I.[18]

2. *The Relevant Functional Entities - and Not NERC - Should Have Authority and Discretion to Develop the Phase I Procedures*

The NOPR appears to provide NERC a direct role in the development of functional entities' operational plans and procedures. More specifically, the NOPR at P 19 provides:

> The Commission expects that the ERO and owners and operators of the Bulk-Power System will draw on industry's experience in developing and implementing existing operational procedures.

This appears to set an expectation that NERC, as the ERO, will have a direct role in the development and implementation of functional entities operational plans and procedures to address GMD and to ensure compliance with any GMD-related reliability standards.

As stated above, it is the owners and operators of the Bulk-Power System that have the detailed knowledge and information necessary to understand potential GMD impacts and to develop the appropriate procedures to address them. The insertion of a third-party with governmental authority and oversight into each functional entities' internal process and procedure planning and development will inhibit, rather than

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Solar Magnetic Disturbances, *available at*: http://www.nyiso.com/public/webdocs/markets_operations/documents/Manuals%20and%20Guides/Manuals/Operations/trans_disp.pdf.

[18] *See* NOPR at PP 18 and 19.

enhance, such development for a number of reasons, *e.g.,* the time and resources that would be necessary to educate the ERO on each transmission system, its topology, equipment, etc. and the potential difficulties and conflicts that could occur where the ERO and a functional entity disagree on the rigor of proposed plans and procedures. In order to achieve the intended reliability benefits within the intended time frame, the owners and operators should have authority and discretion under the Phase I Reliability Standards to develop the required operational procedures. Accordingly, the Joint ISOs/RTOs respectfully request that the Commission provide such clarification in its Final Rule.

3. NERC Should Develop a Non-Binding Best Practices Reference Document to Support the Development of Phase I Operating Procedures

As discussed above, the relevant functional entities should have the authority and discretion to develop Phase I operational procedures that meet the needs of their respective systems. However, NERC can play a valuable role in supporting the development of the operational procedures by maintaining a non-binding best practices reference guide that can be used by the functional entities in developing their procedures. As noted by the Commission, the NERC Interim GMD Report[19] already provides examples of operational procedures for this purpose.[20] In addition, the NOPR notes that some areas already have GMD operating procedures in place. Collectively, these, as well as any other relevant information and procedures, could serve as the basis for such a reference document, which would be similar to a NERC Guideline, which is intended to

[19] *See* North American Electric Reliability Corp., 2012 Special Reliability Assessment Interim Report: Effects of Geomagnetic Disturbances on the Bulk Power System (February 2012 ("NERC Interim GMD Report"), *available at* http://www.nerc.com/files/2012GMD.pdf.

[20] *See* NOPR at P 19.

provide guidance on a particular topic for use by Bulk-Power System users, owners, or operators and are not intended to provide binding norms, to create reliability standards, or to create parameters by which compliance to standards is enforced. This could provide significant value to the functional entities and would facilitate the more immediate development of Phase I operational procedures by functional entities.[21]

4. NERC Should Define the Regional Scope and Responsibility for the Phase I Reliability Standard(s) Procedures in the Same Terms of Functional Entities and Their Respective Areas and/or Equipment as Existing Reliability Operational and Equipment Protection Requirements

The NOPR discusses assigning the obligations under the proposed GMD Reliability Standards in terms of owners and operators of the Bulk-Power System. Under the NERC construct, owners and operators are assigned responsibility based on their functional status.[22] As discussed above, existing NERC Reliability Standards establish a comprehensive set of Bulk-Power System requirements based on functional entity and/or traditionally defined coordination areas and footprints, *e.g.*, reliability coordination area, balancing authority area, etc. Accordingly, the Commission should clarify that any additional operational procedures defined by NERC for the Phase I Reliability Standards should ensure that the responsibilities assigned therein are consistent with existing NERC Reliability Standards in terms of the role of each of these entities.[23]

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[21] The NOPR supports this approach and distinction between the substantive and informational support roles of the functional entities and NERC, respectively. *See* NOPR at P 20:

> While the proposed Reliability Standards should not necessarily specify what operational procedures must be adopted, the ERO should give owners and operators of the Bulk-Power System guidance as to what procedures have been or are expected to be effective in mitigating the effects of GMDs consistent with the reliable operation of the Bulk-Power System.

[23] For purposes of GMD Reliability Standards, the key reliability functional entities from an operational perspective may include: Reliability Coordinator ("RC"), Balancing Authority ("BA"), Transmission Operator ("TOP") and Generator Operator ("GOP") functions. From a planning perspective, the standards

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More specifically, the scope of the area operational procedures should be defined in terms of functional entity equipment for the relevant functional entity equipment owners - *e.g*. TOs/GOs/GOPs - and by functional area for the relevant operational functional entities - *e.g*. RCs, TOPs and BAs. The relevant functional areas are the logical areas for developing and applying GMD mitigation procedures. Presumably, current Reliability Standards requirements and the traditional approach utilized in existing Reliability Standards would be considered, but given that the NOPR discusses responsibilities in terms of owners and operators generally, the Commission should provide clarification in this regard to avoid the potential that the applicable area for procedures developed pursuant to the Phase I Standards be defined in a different manner.

Applying the above concepts, with respect to Phase I procedures and Phase II assessments and plans, responsibility should align with function - equipment owners should be responsible for procedures, assessments and plans for their equipment, and functional operational entities should be responsible for procedures/assessments and plans for their functional areas, with appropriate coordination with equipment owners and any other relevant functional entities (*e.g.*, TOPs and BAs within an RC area may coordinate their procedures/assessments/plans with the RC in the development of its plan). For example, for equipment procedures, each generator owner and operator could be tasked with developing procedures for their generation equipment, and could coordinate as necessary given the common interests. The same could apply to TOs and

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may include: Planning Authority ("PA"), Planning Coordinator ("PC") and Transmission Planner ("TP"). With respect to the Bulk-Power System, the standards may include: Transmission Owners ("TO") and Generation Owners ("GO").

TOPs for transmission equipment. With respect to operational procedures, RCs, TOPs and BAs could develop procedures for their respective areas.

Finally, any necessary coordination should also be appropriately scoped and defined. For example, the existing Reliability Standards often have a maximum functional area limit such as a reliability coordination area or a balancing authority coordination area. These also represent a logical limit to the boundaries for the application of the operational procedures for GMD mitigation. Nonetheless, it is important to note that areas that are not synchronously connected should not be required to coordinate, because there is no risk of cross-regional GMD impacts if areas are only connected by asynchronous DC tie connections.

Related to the issue of assigning responsibility to the appropriate functional entity, at footnote 48 in the NOPR, the Commission states the Phase II assessments should consider the impact to the Bulk-Power System from GMD effects on non-Bulk Power System facilities. Non-Bulk Power System equipment interconnects with Bulk-Power System at distinct interfaces that are comprised of the non-Bulk-Power System equipment and specific Bulk-Power System equipment. The assessment responsibility of the impact of non-Bulk-Power System facilities to the Bulk-Power System should lie with the functional entities that own and operate the Bulk-Power System equipment that interconnects with the non-Bulk-Power System equipment. These entities are in the best position to assess that operational relationship.

In all cases, the requirements for the Phase I Reliability Standards - whether for individual operating procedures or plans or for plans or procedures addressing

coordination -should harmonize and be consistent with the existing Reliability Standards and their existing equipment protection and other requirements.

5. NERC Should Establish a Non-Exclusive Illustrative List of Considerations to Guide the Development of Phase I Standard Operating Procedures

Given the potential impact to equipment, the NOPR states that:

> the proposed Reliability Standards should also address operational procedures for restoring GMD impacted portions of the Bulk-Power System that take into account the potential for equipment that is damaged or out-of-service for an extended period of time.[24]

The Standards should not mandate any particular procedures or considerations regarding system restoration because they may not be relevant depending on the regional conditions. Requiring implementation and/or consideration of inapplicable procedures or inputs/considerations into the development of procedures may undermine the effectiveness of the procedures and would not provide any benefit to overall Bulk-Power System reliability.

6. NERC Should Establish a Phase I Standard Implementation Timeframe that Accounts for the Relationship Between the Operational Procedures Developed by the Different Functional Entities

The NOPR does not mandate a particular implementation timeline for the Phase I Reliability Standards, but does recommend 90 days after Commission approval.[25] Although expeditious development of the Phase I Reliability Standard procedures is desirable, 90 days is ambitious given the potential need to coordinate between multiple entities. In other contexts, the Commission has allowed a year for the NERC standards drafting process to promulgate and submit a standard. As the Technical Conference

[24] NOPR at P 20.

[25] NOPR at P 21.

Comments indicate, there is a great deal of data on GICs, geological variations, and differing regional system needs that should be considered in creating NERC Reliability Standards in this area. The Phase I Standards will also serve as the foundation for Phase II. Accordingly, the Commission should allow a year for the Phase I and Phase II Reliability Standards development to be completed, and direct NERC to develop the implementation timeline once it has a better idea of the degree of coordination that will be needed between the different functional entities.

In establishing the implementation timeframes, the coordination procedures and related implementation timeline should account for the sequential nature of the responsibilities related to the development of the procedures. For example, if the RC Area procedures require inputs based on other functional entity procedures, the standards would have to account for that in setting compliance timelines. Setting a general single period - *e.g*. six months - may prove unworkable if the operational procedure inputs to the RC Area procedures take 5 months to develop. In that example, the RC would have to wait for the procedures of the other relevant functional entities, which would put it in the untenable position of having to develop its procedures in 1 month especially given the stakeholder process requirements of some organizations.

7. The Commission Should Clarify the Relationship of the NERC Reporting Requirements for Phase I Reliability Standard Procedure Effectiveness and NERC's Role in Reviewing the Functional Entity Procedures

The NOPR proposes that, after implementation of the Phase I Reliability Standards, NERC would be required to provide periodic reports on the effectiveness of

the operational procedures.[26] In addition, NERC would be required to periodically review the procedures and make recommendations to the relevant functional entities that they incorporate lessons-learned and new research findings.[27]

As an initial matter, it is unclear how these reports and reviews relate to Phase II. Specifically, Phase II appears to require a more thorough assessment of GMD issues/impacts. Based on those assessments, entities are required to develop plans to manage GMD impacts "so that instability, uncontrolled separation, or cascading failures of the Bulk-Power System, caused by damage to critical or vulnerable Bulk-Power System equipment, or otherwise, will not occur as a result of a GMD." These plans will include operational procedures, among other things. Presumably, given the more thorough analysis in Phase II, the Phase II operating procedures would replace the Phase I procedures, which appear to be more of a temporary means to achieve some degree of GMD mitigation in the more immediate timeframe pending compliance with Phase II. If that is the case, it is not clear that the Phase I reporting and effectiveness review provide any value.

Assuming the Phase I operating procedures are different than the Phase II plans and, therefore, the Phase I reports and effectiveness reviews proposed in the NOPR have merit, absent experiencing actual GMD events, it is unclear how the effectiveness will be measured. If an event does occur, the functional entities are in the best position to assess the effectiveness of their GMD mitigating measures.[28] Accordingly, to the extent NERC

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[26] *See* NOPR at P 21.

[27] NOPR at P 21.

[28] As discussed in Section III.C.1, below, the effectiveness of GMD mitigating measures can be determined through the installation of monitoring equipment. Monitoring equipment should be recognized as

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provides the periodic reports described in the NOPR, they should be based on assessments provided by the relevant functional entities. Similarly, the functional entities are in the best position to review their procedures and assess the value of incorporating best practices/lessons learned and/or new research findings. Finally, it is notable that, since effectiveness can only be reviewed and assessed following a GMD occurrence or event, NERC has already established an event analysis program, through which it could perform any necessary reviews and assessments.

8. NERC Should Coordinate the Initial Actions Proposed in the NOPR with the Phase II Equipment Assessments

Simultaneous with the development and implementation of the Phase I Reliability Standards, the Commission is proposing to require NERC to identify facilities most atrisk from GMD and to conduct wide-area GMD assessments. The Commission notes certain characteristics that would scope these activities - *i.e.*, critical transformers (*e.g.*, step-up transformers at large generating facilities) and Bulk-Power System facilities that serve critical and priority loads.

These actions appear similar to the requirements in the Phase II Standards, which require Bulk-Power System equipment and system assessments, and it is likely that NERC will rely on information from the entities that will be performing the Phase II assessments. Thus, practically speaking, the relevant functional entities will likely be required to begin performing the Phase II assessments before the standards are in place, and they will be doing that analysis at the same time they are focused on complying with the Phase I Reliability Standards.

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providing a mechanism to measure the effectiveness of mitigating plans, and as an acceptable solution to second stage needs assessments.

As such, the Commission should ensure that any such overlap of responsibilities is coordinated and does not undermine the effectiveness of the proposed phased process. Granted, the results from this analysis could be used in Phase II, but effectively requiring it during Phase I may distract necessary resources from Phase I compliance, thereby defeating the intent of the phased approach to GMD mitigation. At a minimum, the results of this analysis should be complementary to the Phase II equipment and system assessments to ensure the actions are coordinated and do not overlap or conflict with Phase II tasks.

C. Phase II Comments

1. The Phase II Reliability Standards Should Provide for Plans that Are Consistent With an Adequate Level of Reliability

The proposed Phase II Reliability Standards would require the relevant owners and operators to conduct assessments of GMD impacts on the Bulk-Power System equipment and on the Bulk-Power System as a whole.[29] Based on those assessments, they would develop a plan "so that instability, uncontrolled separation, or cascading failures of the Bulk-Power System, caused by damage to critical or vulnerable BulkPower System equipment, or otherwise, will not occur as a result of a GMD."[30] The NOPR, however, states that "the plan cannot be limited to operational procedures or enhanced training alone, but should, subject to the needs identified in the assessments," protect equipment from the effects of GMDs.[31]

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[29] *See* NOPR at P 23.

[30] NOPR at P 23.

[31] NOPR at P 23. The NOPR does not propose any specific solutions, but references different approaches to equipment protection. *See* NOPR at PP 23, 34. The means noted included automatically blocking geo-magnetically induced currents from entering the Bulk-Power System, instituting specification requirements

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The Phase II Reliability Standards should be results-based and should establish a non-exclusive means of being compliant. They should not mandate a plan or solution to protect equipment because such measures may not be relevant or applicable given regional conditions or the results of the GMD vulnerability assessments. While some Phase II assessments may demonstrate the need for costly measures, others may show that significant GMDs are so infrequent in nature and pose fewer risks such that operational protocols may be adequate and necessary measures. Accordingly, the Phase II Reliability Standards should afford functional entities the flexibility necessary to determine the plans, solutions or means that are adequate and necessary to address the risks identified in the GMD vulnerability assessments.

In a similar vein, the Commission should clarify that the use of automatic protection measures, such as automatic blocking devices, is not a required solution under the proposed Phase II Reliability Standards. As the NOPR states, "some assessments will demonstrate that automatic blocking is necessary in some instances."[32] Likewise, some assessments may show that the risks are so minimal that only operational protocols are warranted. The needs assessments should inform whether measures are needed and, to the extent they are, which measures are adequate and necessary to protect against the risks identified.

For example, a GMD vulnerability assessment may indicate that an Adequate Level of Reliability could be achieved through the installation of monitoring equipment. Monitoring equipment is a key component to achieving a comprehensive and effective

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for new equipment, inventory management, and isolating certain equipment that is not cost effective to retrofit.

[32] NOPR at P 34.

program to mitigate GMD risks on the Bulk-Power System and, according to the NERC Interim Report:

> Monitors are a key source of real-time information that can guide system operators in determining real-time response. The monitors can also provide valuable historical records of previous storm activity that can be evaluated and factored into power system planning and analysis.[33]

Because the NERC Interim Report recommends monitoring equipment to arm system operators with information that can help them assess imminent transformer impacts due to GICs and take appropriate actions to prevent damage to equipment and a system blackout, it is important to recognize that the installation of such equipment and associated measures may be an appropriate solution depending upon the results of an entity's of a GMD assessment.[34]

Accordingly, the Joint ISOs/RTOs request that the Commission clarify the requirements of the Phase II Reliability Standards to recognize that these standards should: (1) focus on the criteria for the GMD assessments, provided that the scope of criteria must remain flexible to enable functional entities to apply all relevant criteria regardless of whether they are established in the standards; (2) provide that the results of the GMD assessments should dictate the identified solutions; and, (3) be designed with the intent of achieving an Adequate Level of Reliability, which, depending on the results of the GMD assessments, may not require development and implementation of plans or solutions to protect equipment.

[33] NERC GMD Interim Report at p 71.

[34] *Id*.

2. NERC Should Define the Scope and Responsibility for the Phase II Procedures in the Same Terms of Functional Entities and Their Respective Areas and/or Equipment as Existing Reliability Operational and Equipment Protection Requirements.

The Phase II proposal, as described above, creates two distinct tasks - one for Bulk-Power System equipment assessment and GMD mitigation and one for Bulk-Power System as a whole assessment and mitigation. As explained earlier, under the NERC construct, owners and operators are assigned responsibility based on their functional status. Accordingly, as with the Phase I Reliability Standards, the Phase II Reliability Standards should be clear in assigning the assessment responsibilities.

By way of example, Bulk-Power System equipment is generally under the purview of the equipment owners. Because the Commission makes clear in the NOPR that the final Reliability Standard must contain "uniform evaluation criteria", *see* P28, equipment owners are capable of assessing possible negative impacts on Bulk-Power System equipment. Hence, it would follow that requirements for the primary assessment and mitigation plans associated with Bulk Power System equipment should be the responsibility of the equipment owners and Bulk-Power System as a whole assessment and mitigation should be assigned to other appropriate functional entities - *e.g*. TOP.

More specifically, with respect to the system assessment, although the details will be developed in the Standards development process, similar to the Phase I scope and coordination, it is logical to define scope in terms of existing functional entities' requirements and functional areas, and to require coordination between the relevant functional entities in the same manner as discussed above - *e.g*. equipment owner assessment and mitigation plans could be inputs into BA and TOP assessments and plans, which could then be inputs into the RC assessment and plans. Consistent with the Phase

I comments, it is reasonable to cap the Phase II assessments in terms of area scope based on RC Areas. The relevant existing, functional areas are the logical areas for developing and applying GMD standards and requirements. Presumably, current Reliability standards requirements and the traditional approach utilized in existing Reliability Standards would continue to be considered, but the Commission should provide clarification in this regard to avoid the potential that the applicable area for procedures developed pursuant to the Phase II Standards be defined in a different manner and result in inconsistent or duplicative responsibilities when coupled with existing Reliability Standards and requirements.

3. The Commission Should Clarify Certain Aspects of the Proposed Parameters that Should be Considered in the Phase II Standard Development Process

In the NOPR, the Commission proposes to require NERC to consider specific parameters in the Phase II Standards development process. Specifically, in Paragraphs 28 to 32, the NOPR proposes the following parameters:

1. Uniform evaluation criteria for owners and operators to follow when conducting their assessments;

2. Assessments should evaluate the primary and secondary effects of GICs on Bulk-Power System transformers, including the effects of GICs originating from and passing to other regions;

3. Assessments should evaluate the effects of GICs on other Bulk-Power System equipment, system operations, and system stability, including the anticipated loss of critical or vulnerable devices or elements resulting from GIC-related issues;

4. Wide-area or Regional assessments of GIC impacts should be performed in conjunction with assessments by owners and operators of their own Bulk-Power System components;

5. Assessments should be periodically updated, taking into account new facilities, modifications to existing facilities, and new information, including new research on GMDs, to determine whether there are resulting changes in

GMD impacts that require modifications to Bulk-Power System mitigation schemes.

The proposal to establish uniform assessment criteria will facilitate the effectiveness of the resulting procedures and plans, and the proposed criteria are reasonable. However, the list should not be exhaustive, nor should entities be required to act on the basis of each parameter if their reviews/assessments show no reliability impacts. As discussed above, GMD impacts will vary between regions based on several factors. Accordingly, while a uniform set of parameters may assist entities in conducting analyses and provide a base for reliability analyses, they should be considered factors rather than separate requirements, and entities should have the discretion to consider any and all parameters that are relevant for their particular characteristics that define their systems. For this same reason, assessment of a particular parameter may not result in an actionable issue. In those circumstances, entities should not be required to develop plans to address that parameter - a determination of no impact should be acceptable.

With respect to the second and third parameters, without commenting on the proposed substance, similar to prior comments, the responsibility for the proposed assessment parameter should lie with the equipment owner when equipment related, and with the relevant functional entity when related to Bulk-Power System operation. Again, there should be appropriate coordination between assessments as necessary.

With respect to the fourth parameter, it is reasonable to expect that the relevant functional entities would engage in an iterative process that would allow for coordination of their respective assessments, ultimately leading to a wide-area assessment.

Finally, the fifth parameter would require periodic assessments. This is reasonable and advisable, but it appears to overlap with the proposal in Phase I to require

NERC to do periodic reviews of entities GMD mitigation procedures. As discussed in relation to that aspect of the NOPR, the relevant functional entities are best suited to review and assess their plans and procedures, which is what appears to be contemplated by the fifth recommended parameter. The Commission should clarify that the functional entities should perform these reviews, and should reconcile this with the Phase I proposal to have NERC perform periodic reviews. The Joint ISOs/RTOs believe the proposed NERC reviews are likely unnecessary because they will be redundant with these reviews, the functional entities are better situated to perform these assessments, which could then be provided to NERC for their input, and, in the event that a GMD occurrence or event occurred, the NERC event analysis program is already established and could be utilized to evaluate the plans and procedures utilized to respond.

4. The Commission Should Allow Sufficient Time for Establishing Phase II Reliability Standards and Prioritize the Implementation Schedule Based on Degrees of Impact

In the NOPR, the Commission proposes to require NERC to submit Phase II Reliability Standards within six months of the date of a Final Rule. As with the Phase I Standards, although speedy development of the Phase II Reliability Standard procedures is desirable, six months is ambitious given the potential need to coordinate between multiple entities. In other contexts, the Commission has allowed a year for the NERC standards drafting process to promulgate and submit a standard. As the Technical Conference Comments state, there is a great deal of data on GICs, geological variations, and differing regional system needs that should be considered in creating NERC standards in this area. Moreover, Phase II Reliability Standards need to be built upon completed Phase I Standards, and allowing only three months between the Phase I and Phase II standards will not allow sufficient time for the NERC Standards development

process to address all of the Phase II issues adequately. Accordingly, the Commission should allow a year for the Standards development process for both phases to be completed, and direct NERC to develop the implementation timeline once it has a better idea of the degree of coordination that will be needed between the different functional entities.

In the NOPR, the Commission also proposes an implementation schedule that prioritizes implementation based on relative impacts to the reliable operation of the BulkPower System in order to provide equipment that presents greater risk with necessary protection measures as soon as possible. This proposal is logical and should facilitate appropriate focusing of resources in the most efficient and effective manner.

The implementation schedule also should allow for the completion of GMD vulnerability assessments before requiring owners and operators of the Bulk-Power System to develop solutions. This will ensure that solutions are adequate and necessary to mitigate the risks identified in the needs assessments.

III. CONCLUSION

The Joint ISOs/RTOs respectfully request that the Commission formulate the Final Rule in this proceeding in a manner consistent with the comments submitted herein.

Respectfully submitted,

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Dated: December 21, 2012