

February 24, 2020

VIA ELECTRONIC FILING

Mr. Patrick Wruck, Commission Secretary
British Columbia Utilities Commission
Box 250, 900 Howe Street
Sixth Floor
Vancouver, B.C.
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Re: *North American Electric Reliability Corporation*

Dear Mr. Wruck:

The North American Electric Reliability Corporation (“NERC”) hereby submits Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standard TPL-007-4. NERC requests, to the extent necessary, a waiver of any applicable filing requirements with respect to this filing.

Please contact the undersigned if you have any questions concerning this filing.

Respectfully submitted,

/s/ Lauren Perotti

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Enclosure

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**BEFORE THE
BRITISH COLUMBIA UTILITIES COMMISSION
OF THE PROVINCE OF BRITISH COLUMBIA**

**NORTH AMERICAN ELECTRIC)
RELIABILITY CORPORATION)**

**NOTICE OF FILING OF THE
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION
OF PROPOSED RELIABILITY STANDARD
TPL-007-4**

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February 24, 2020

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**NORTH AMERICAN ELECTRIC)
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**NOTICE OF FILING OF THE
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION
OF PROPOSED RELIABILITY STANDARD TPL-007-4**

The North American Electric Reliability Corporation (“NERC”) hereby provides notice of proposed Reliability Standard TPL-007-4 (*Transmission System Planned Performance for Geomagnetic Disturbance Events*) (**Exhibit A**), the associated implementation plan (**Exhibit B**), the Violation Risk Factors (“VRFs”) and Violation Severity Levels (“VSLs”) (**Exhibit C**), and the retirement of currently effective Reliability Standard TPL-007-3. The NERC Board of Trustees (“Board”) adopted proposed Reliability Standard TPL-007-4 on February 6, 2020.

Proposed Reliability Standard TPL-007-4 requires owners and operators of the Bulk Power System (“BPS”) to conduct initial and on-going vulnerability assessments of the potential impact of defined geomagnetic disturbance (“GMD”) events on BPS equipment and the BPS as a whole. The modifications in the proposed standard address the Federal Energy Regulatory Commission’s (“FERC”) directives in Order No. 851¹ related to requirements for Corrective Action Plans. Specifically, and as discussed further herein, the proposed modifications would: (i) require entities to develop Corrective Action Plans for vulnerabilities identified through supplemental GMD Vulnerability Assessments; and (ii) require entities to seek approval from the ERO of any extensions of time for the completion of Corrective Action Plan items. The proposed Reliability

¹ *Geomagnetic Disturbance Reliability Standard; Reliability Standard for Transmission System Planned Performance for Geomagnetic Disturbance Events*, Order No. 851, 165 FERC ¶ 61,124 (2018) (“Order No. 851”).

Standard and related elements is just, reasonable, not unduly discriminatory or preferential, and in the public interest. NERC also provides notice of the proposed implementation plan (**Exhibit B**).

This filing presents the technical basis and purpose of proposed Reliability Standard TPL-007-4, a summary of the development history (**Exhibit F**), and a demonstration that the proposed Reliability Standard meets the Reliability Standards criteria (**Exhibit E**).

I. SUMMARY

Proposed Reliability Standard TPL-007-4 requires entities to conduct initial and on-going assessments of the potential impact of two defined GMD events, the benchmark GMD event and the supplemental GMD event, on BPS equipment and the BPS as a whole. The benchmark GMD event is intended to simulate the wide area impacts of a severe GMD event. The supplemental GMD event is designed to account for the localized peak effects of severe GMD events on systems and equipment. In the standard, the assessments based on these defined events are referred to as benchmark GMD Vulnerability Assessments and supplemental GMD Vulnerability Assessments, respectively. If entities identify system performance issues through their GMD Vulnerability Assessments, they must take action to mitigate these issues.

Proposed Reliability Standard TPL-007-4 improves upon the currently effective version of the TPL-007 standard by enhancing requirements related to Corrective Action Plans as directed by FERC in Order No. 851. In this Order, FERC approved Reliability Standard TPL-007-2 but directed NERC to revise the TPL-007 standard as follows:

- revise the standard to require Corrective Action Plans for assessed supplemental GMD vulnerabilities;² and

² See Order No. 851 at PP 29 and 39.

- replace the provision in Requirement R7 Part R7.4 that would allow entities to self-extend Corrective Action Plan implementation deadlines with a process through which extensions of time are considered on a case-by-case basis.³

The proposed standard addresses FERC’s Order No. 851 directives by:

- requiring an applicable entity to develop a Corrective Action Plan if system performance issues are identified through the supplemental GMD Vulnerability Assessment; and
- requiring an applicable entity to seek approval for any requests to extend Corrective Action Plan implementation deadlines, requests that NERC and the Regional Entities would then consider on a case-by-case basis.

For these reasons, and as discussed more fully in this filing, the proposed standard is just, reasonable, not unduly discriminatory or preferential, and in the public interest.

II. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to:

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III. BACKGROUND

A. NERC Reliability Standards Development Procedure

The proposed Reliability Standard was developed in an open and fair manner and in accordance with the Reliability Standard development process. NERC develops Reliability

³ *Id.* at P 54.

Standards in accordance with Section 300 (Reliability Standards Development) of its Rules of Procedure and the NERC Standard Processes Manual.⁴

NERC's proposed rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards, and thus satisfy certain of the criteria for approving Reliability Standards. The development process is open to any person or entity with a legitimate interest in the reliability of the BPS. NERC considers the comments of all stakeholders, and stakeholders must approve, and the NERC Board of Trustees must adopt, a Reliability Standard before the Reliability Standard is submitted to the applicable governmental authorities for approval.

A. Procedural History of Proposed Reliability Standard TPL-007-4

This section summarizes the history of the TPL-007 standard and the development of proposed Reliability Standard TPL-007-4.

1. Reliability Standard TPL-007-1

On March 3, 2015, NERC filed a Notice of Filing of Reliability Standard TPL-007-1, the second-stage GMD Reliability Standard contemplated by FERC in Order No. 779.⁵ FERC approved Reliability Standard TPL-007-1 in Order No. 830, issued on September 22, 2016.⁶ In its Order, FERC directed NERC to revise the TPL-007 standard as follows:

⁴ The NERC Rules of Procedure is available at <https://www.nerc.com/AboutNERC/Pages/Rules-of-Procedure.aspx>. The NERC *Standard Processes Manual* is available at https://www.nerc.com/comm/SC/Documents/Appendix_3A_StandardsProcessesManual.pdf.

⁵ *Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standard TPL-007-1 Transmission System Planned Performance for Geomagnetic Disturbance Events*, (March 3, 2015); See FERC Order *Reliability Standards for Geomagnetic Disturbances*, Order No. 779, 143 FERC ¶ 61,147 (2013), *reh'g denied*, 144 FERC ¶ 61,113 (2013) (directing the development of Reliability Standards to address GMDs in two stages).

⁶ *Reliability Standard for Transmission System Planned Performance for Geomagnetic Disturbance Events*, Order No. 830, 156 FERC ¶ 61,215 (2016) at P 1 ("Order No. 830").

- revise the benchmark GMD event definition so that the reference peak geoelectric field amplitude component is not based solely on spatially-averaged data;⁷
- revise Requirement R6 to require registered entities to apply spatially averaged and non-spatially averaged peak geoelectric field values, or some equally and efficient alternative, when conducting thermal impact assessments;⁸
- revise the standard to require entities to collect geomagnetically induced current monitoring and magnetometer data as necessary to enable model validation and situational awareness;⁹ and
- revise requirements for Corrective Action Plans to include: (i) a one-year deadline for the development of any necessary Corrective Action Plans; (ii) a two-year deadline for the implementation of non-hardware mitigation; and (iii) a four-year deadline for the implementation of hardware mitigation.¹⁰

In addition to these standard-modification directives, FERC directed NERC to undertake certain activities intended to enhance knowledge of GMDs and their potential impacts on reliability.¹¹

2. Reliability Standard TPL-007-2

On February 27, 2018, NERC submitted Reliability Standard TPL-007-2 for approval. Reliability Standard TPL-007-2 was developed in response to FERC’s directives in Order No. 830. The standard added new requirements for GMD Vulnerability Assessments and thermal impact assessments to be performed based on the supplemental GMD event, a second defined event that accounts for localized peak effects of GMDs and which was not based on spatially-averaged data. Reliability Standard TPL-007-2 included the deadlines specified by FERC in Order No. 830 for

⁷ *Id.* at P 44.

⁸ *Id.* at P 65.

⁹ *Id.* at P 88.

¹⁰ *Id.* at PP 101-102.

¹¹ *See* Order No. 830 at P 77 (directing NERC to submit a work plan describing how NERC would research specific GMD-related topics identified by FERC and other topics at NERC’s discretion) and PP 89, 93 (directing NERC to collect GIC and magnetometer data pursuant to Section 1600 of the NERC Rules of Procedure and to make the information available). FERC accepted NERC’s revised GMD research work plan in Order No. 851. *See* Order No. 851 at P 65. NERC provides periodic updates regarding work performed under this plan.

the development and completion of any necessary Corrective Action Plans to address system performance issues resulting from the benchmark GMD event. Additionally, Reliability Standard TPL-007-2 contained new requirements for obtaining GIC monitor and magnetometer data.

FERC approved Reliability Standard TPL-007-2 in Order No. 851, issued November 15, 2018.¹² In approving the standard, FERC found that it represented an improvement over TPL-007-1 and complied with several of FERC's Order No. 830 directives. FERC, however, directed NERC to develop and submit two sets of modifications to the standard relating to requirements for Corrective Action Plans.

First, FERC noted that Reliability Standard TPL-007-2 required applicable entities to assess supplemental GMD event vulnerabilities, but did not require entities to develop formal Corrective Action Plans to address those vulnerabilities. FERC stated that it saw “no basis, technical or otherwise, for not requiring corrective action plans for assessed supplemental GMD event vulnerabilities while requiring corrective action plans for assessed benchmark GMD event vulnerabilities consistent with the Commission's directions in Order Nos. 779 and 830.”¹³ FERC therefore directed NERC to revise the standard to require Corrective Action Plans for assessed supplemental GMD vulnerabilities.¹⁴

Second, FERC noted that Reliability Standard TPL-007-2, Requirement R7.4 would allow applicable entities, “under certain conditions, to extend corrective action plan implementation deadlines without prior approval.”¹⁵ FERC stated, “Based on our consideration of the record, we believe that the case-by-case review process contemplated by Order No. 830 is the appropriate

¹² *Geomagnetic Disturbance Reliability Standard; Reliability Standard for Transmission Planned Performance for Geomagnetic Disturbance Events*, Order No. 851, 165 FERC 61,124 (2018).

¹³ *Id.* at P 48.

¹⁴ *Id.*; *see also* Order No. 851 at PP 29 and 39.

¹⁵ *Id.* at P 54.

means for considering extension requests. Accordingly... we direct that NERC develop modifications to Reliability Standard TPL-007-2 to replace the time-extension provision in Requirement R7.4 with a process through which extensions of time are considered on a case-by-case basis.”¹⁶

FERC directed NERC to submit these modifications within 12 months of the effective date of Reliability Standard TPL-007-2,¹⁷ or by July 1, 2020. FERC also directed NERC to prepare and submit a report addressing how often and why entities are exceeding Corrective Action Plan deadlines as well as the disposition of extension requests.¹⁸ FERC directed that this report be submitted within 12 months from the date on which applicable entities must comply with the last requirement of Reliability Standard TPL-007-2.¹⁹

3. Reliability Standard TPL-007-3

On February 20, 2019, NERC submitted Reliability Standard TPL-007-3 for approval.²⁰ Reliability Standard TPL-007-3 added a regional Variance option for Canadian jurisdictions; no changes were made to any requirement or compliance element that would be mandatory and enforceable in the United States. To provide for consistency in standard versions used throughout North America, NERC transitioned all U.S.-based entities to Reliability Standard TPL-007-3 on July 1, 2019. All phased-in compliance dates for U.S.-based entities were carried forward unchanged from the TPL-007-2 implementation plan.

¹⁶ *Id.* at P 54.

¹⁷ *Id.* at P 4.

¹⁸ *Id.* at P 30.

¹⁹ *Id.*

²⁰ *Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standard TPL-007-3, (Feb. 20, 2019).*

4. Project 2019-01 Modifications to TPL-007-3

In February 2019, NERC initiated Project 2019-01 Modifications to TPL-007-3 to address FERC’s directives in Order No. 851. Following one 45-day formal comment period and initial ballot, proposed Reliability Standard TPL-007-4 was posted for a 10-day final ballot from November 13, 2019 through November 22, 2019. The proposed standard received a 78.95 percent approval rating, with 94.52 percent quorum. The NERC Board of Trustees adopted the proposed standard on February 6, 2020.

IV. JUSTIFICATION

As discussed below and in **Exhibits E and H**, proposed Reliability Standard TPL-007-4 addresses FERC’s directives from Order No. 851, satisfies Reliability Standards criteria, and is just, reasonable, not unduly discriminatory or preferential, and in the public interest.

The purpose of proposed Reliability Standard TPL-007-4, which remains unchanged from prior versions of the standard, is to “[e]stablish requirements for Transmission system planned performance during geomagnetic disturbance (GMD) events.” The applicability of the proposed standard also remains unchanged from prior versions: the proposed standard would continue to apply to: (1) Planning Coordinators and Transmission Planners whose planning areas have a Facility that includes a power transformer with a high side, wye-grounded winding with terminal voltage greater than 200 kV;²¹ and (2) Transmission Owners and Generator Owners that own a Facility that includes such equipment.

Consistent with FERC’s directives in Order No. 851, proposed Reliability Standard TPL-007-4 reflects two sets of revisions related to requirements for Corrective Action Plans. First, proposed Reliability Standard TPL-007-4 adds a new Requirement R11 that would require an

²¹ A power transformer with a “high side wye-grounded winding” refers to a power transformer with windings on the high voltage side that are connected in a wye configuration and have a grounded neutral connection.

applicable entity to develop and implement a Corrective Action Plan if it determines that its system would experience performance issues from the supplemental GMD event. Second, proposed Reliability Standard TPL-007-4 revises Requirement R7 so that an applicable entity would be required to submit to its Compliance Enforcement Authority any request to extend a Corrective Action Plan deadline from the two and four years provided in the standard for non-hardware and hardware mitigation, respectively. NERC and Regional Entity staff would then consider each extension request on a case-by-case basis. The revisions, and how they address FERC's directives from Order No. 851, are discussed in detail in the following sections.

A. Corrective Action Plans to Address Vulnerabilities Identified through Supplemental GMD Vulnerability Assessments

Currently effective Reliability Standard TPL-007-3 Requirement R8 requires entities to perform a supplemental GMD Vulnerability Assessment at least once every 60 calendar months. Consistent with FERC's directive in Order No. 851,²² proposed Reliability Standard TPL-007-4 would require an applicable entity to develop a Corrective Action Plan if it determines, through this assessment, that its system would experience performance issues from the supplemental GMD event.

Proposed Reliability Standard TPL-007-4 addresses FERC's Order No. 851 directive by striking, in its entirety, Requirement R8.3 of the currently effective standard:

- 8.3.** If the analysis concludes there is Cascading caused by the supplemental GMD event described in Attachment 1, an evaluation of possible actions designed to reduce the likelihood or mitigate the consequences and adverse impacts of the event(s) shall be conducted.

²² See Order No. 851 at PP 29, 39.

In its place, a new Requirement, R11, is proposed.²³ Proposed Requirement R11 mirrors Requirement R7, which relates to Corrective Action Plans developed to address issues identified through benchmark GMD Vulnerability Assessments. Proposed Requirement R11 provides as follows:

R11. Each responsible entity, as determined in Requirement R1, that concludes through the supplemental GMD Vulnerability Assessment conducted in Requirement R8 that their System does not meet the performance requirements for the steady state planning supplemental GMD event contained in Table 1, shall develop a Corrective Action Plan (CAP) addressing how the performance requirements will be met. The CAP shall:

11.1. List System deficiencies and the associated actions needed to achieve required System performance. Examples of such actions include:

- Installation, modification, retirement, or removal of Transmission and generation Facilities and any associated equipment.
- Installation, modification, or removal of Protection Systems or Remedial Action Schemes.
- Use of Operating Procedures, specifying how long they will be needed as part of the CAP.
- Use of Demand-Side Management, new technologies, or other initiatives.

11.2. Be developed within one year of completion of the supplemental GMD Vulnerability Assessment.

11.3. Include a timetable, subject to approval for any extension sought under Part 11.4, for implementing the selected actions from Part 11.1. The timetable shall:

11.3.1. Specify implementation of non-hardware mitigation, if any, within two years of development of the CAP; and

11.3.2. Specify implementation of hardware mitigation, if any, within four years of development of the CAP.

11.4. Be submitted to the CEA with a request for extension of time if the responsible entity is unable to implement the CAP within the timetable provided in Part 11.3. The submitted CAP shall document the following:

²³ As shown in **Exhibit A**, currently effective Requirements R11 and R12 would become Requirements R12 and R13.

- 11.4.1.** Circumstances causing the delay for fully or partially implementing the selected actions in Part 11.1 and how those circumstances are beyond the control of the responsible entity;
 - 11.4.2.** Revisions to the selected actions in Part 11.1, if any, including utilization of Operating Procedures, if applicable; and
 - 11.4.3.** Updated timetable for implementing the selected actions in Part 11.1.
- 11.5.** Be provided: (i) to the responsible entity's Reliability Coordinator, adjacent Planning Coordinator(s), adjacent Transmission Planner(s), and functional entities referenced in the CAP within 90 calendar days of development or revision, and (ii) to any functional entity that submits a written request and has a reliability-related need within 90 calendar days of receipt of such request or within 90 calendar days of development or revision, whichever is later.
 - 11.5.1.** If a recipient of the CAP provides documented comments on the CAP, the responsible entity shall provide a documented response to that recipient within 90 calendar days of receipt of those comments.

Proposed Requirement R11 is intended to provide the same content, notification, and deadline requirements for Corrective Action Plans developed in response to the supplemental GMD Vulnerability Assessment that are required for Corrective Action Plans developed in response to the benchmark GMD Vulnerability Assessment. This includes the same provisions for seeking extensions of Corrective Action Plan deadlines. Proposed Requirement R11 Parts 11.3 and 11.4 therefore mirror the proposed revisions to Requirement R7 Parts 7.3 and 7.4, which are discussed more fully below.

B. Corrective Action Plan Deadline Extensions

Currently effective Reliability Standard TPL-007-3 Requirement R7 Part 7.3 provides that an entity shall include in its Corrective Action Plan a timetable for implementing selected mitigation actions that: (i) specifies implementation of non-hardware mitigation, if any, within two years of development of the Corrective Action Plan; and (ii) specifies implementation of hardware

mitigation, if any, within four years of development of the Corrective Action Plan. Requirement R7 Part 7.4 specifies the steps that the entity must follow should situations beyond the control of the entity prevent implementation within that timetable. Consistent with FERC's directive in Order No. 851,²⁴ proposed Reliability Standard TPL-007-4 Requirement R7 Part 7.4 would no longer allow entities to extend the two and four-year implementation deadlines without prior approval. Instead, the entity would be required to submit a detailed request for extension to its Compliance Enforcement Authority. Such extensions would then be considered, prospectively, on a case-by-case basis.

Proposed Reliability Standard TPL-007-4 addresses FERC's directive by revising Requirement R7 Parts 7.3 and 7.4 of the currently effective standard as follows:

R7. Each responsible entity, as determined in Requirement R1, that concludes through the benchmark GMD Vulnerability Assessment conducted in Requirement R4 that their System does not meet the performance requirements for the steady state planning benchmark GMD event contained in Table 1, shall develop a Corrective Action Plan (CAP) addressing how the performance requirements will be met. The CAP shall:

7.3. Include a timetable, subject to ~~revision by the responsible entity in approval for any extension sought under~~ Part 7.4, for implementing the selected actions from Part 7.1. The timetable shall:

7.3.1. Specify implementation of non-hardware mitigation, if any, within two years of development of the CAP; and

7.3.2. Specify implementation of hardware mitigation, if any, within four years of development of the CAP.

7.4. Be ~~revised if situations beyond~~ submitted to the control Compliance Enforcement Authority (CEA) with a request for extension of time if the responsible entity ~~determined in Requirement R1 prevent implementation of~~ is unable to implement the CAP within the timetable ~~for implementation~~ provided in Part 7.3. The ~~revised~~ submitted CAP shall document

²⁴ Order No. 851 at P 54.

the following, ~~and be updated at least once every 12 calendar months until implemented.~~

- ~~7.4.1.~~ 7.4.1. Circumstances causing the delay for fully or partially implementing the selected actions in Part 7.1 and how those circumstances are beyond the control of the responsible entity;
- ~~7.4.2.~~ 7.4.2. ~~Description of the original CAP, and any previous changes to the CAP, with the associated timetable(s) for implementing the selected actions in Part 7.1; and~~
- ~~7.4.3.~~ 7.4.2. Revisions to the selected actions in Part 7.1, if any, including utilization of Operating Procedures, if applicable;₂ ~~and the updated timetable for implementing the selected actions.~~
- 7.4.3. Updated timetable for implementing the selected actions in Part 7.1.

As noted in the previous section, these revisions are also reflected in new Requirement R11 Parts 11.3 and 11.4 pertaining to Corrective Action Plans for the supplemental GMD Vulnerability Assessment.

As with currently effective Reliability Standard TPL-007-3, proposed Reliability Standard TPL-007-4 Requirement R7 Part 7.4 would continue to require entities to explain how the circumstances for the implementation delay are due to factors outside of the entity's control. Such circumstances could include, but are not limited to, delays resulting from: (i) regulatory or legal processes, such as permitting; (ii) stakeholder processes required by tariff, (iii) equipment lead times; or (iv) inability to acquire necessary right-of-way. Proposed Reliability Standard TPL-007-4 Requirement R7 Part 7.4 would also continue to require the entity to include revisions to mitigation actions and an updated timetable for implementation. The notable difference from the currently effective standard to the proposed standard is that an applicable entity may no longer extend an implementation deadline on its own; rather, it would be required to submit a request for a deadline extension to its Compliance Enforcement Authority.

While proposed TPL-007-4 properly focuses on the responsibilities of applicable entities, NERC is mindful of FERC’s expectation in Order No. 851 that the process for considering such extensions “will be timely and efficient such that applicable entities will receive prompt responses” after submitting their requests.²⁵ To this end, NERC Compliance Assurance staff has developed a draft process document to address how NERC and Regional Entity Compliance Monitoring and Enforcement staff will jointly review requests for extensions to TPL-007-4 Corrective Action Plans. The purpose of this process document is to promote a timely, structured, and consistent approach to extension request submittals and processing.²⁶ NERC Compliance Assurance staff will maintain this process document under existing ERO Enterprise processes and will review and update it as needed. As directed by FERC in Order No. 851, NERC will prepare and submit a report addressing how often and why applicable entities are exceeding Corrective Action Plan deadlines and the disposition of extension requests within 12 months from the date on which applicable entities must comply with the last requirement of Reliability Standard TPL-007-4.²⁷

C. Revisions to the Regional Variance for Canadian Jurisdictions

NERC has also proposed a series of revisions to Section D.A., Regional Variance for Canadian Jurisdictions. The purpose of these revisions is to help ensure that the TPL-007 standard continues to account for the different regulatory approval and compliance monitoring processes in place in Canadian jurisdictions with respect to Corrective Action Plans and implementation of Corrective Action Plan mitigation measures. The Variance would continue to

²⁵ Order No. 851 at PP 55.

²⁶ Two drafts of the draft process document, titled the TPL-007-4 Corrective Action Plan Extension Review Process, were posted for information alongside the draft TPL-007-4 standard. See Ex. F (Summary of Development and Complete Record of Development) at items 15 and 31.

²⁷ Order No. 851 at P 25. As noted in Section V below, the implementation plan for proposed Reliability Standard TPL-007-4 carries forward the existing phased-in compliance schedule established by the TPL-007-2 implementation plan.

be applicable only in those Canadian jurisdictions where the Variance has been approved for use by the applicable governmental authority or has otherwise become effective in the jurisdiction.

In proposed Reliability Standard TPL-007-4, the Variance is revised to replace additional Requirement Parts of the continent-wide standard relating to implementation of Corrective Action Plan mitigation measures. In Reliability Standard TPL-007-3, Requirement R7 Part 7.3 is replaced in the Variance with Requirement Part D.A.7.3. In proposed Reliability Standard TPL-007-4, the Variance would also replace Requirement R7 Parts 7.4 and 7.5 of the continent-wide standard with Variance provisions. New Variance Requirement Part D.A.7.4 would maintain, for entities in those Canadian jurisdictions where the Variance is effective, the ability they would have in Reliability Standard TPL-007-3 to extend Corrective Action Plan implementation deadlines without prior ERO approval where circumstances beyond the entity's control prevent implementation within the original timeframe. Variance Requirement D.A.7.5 would require each entity revising a Corrective Action Plan implementation deadline under D.A.7.4 to submit the revised plan to its Compliance Enforcement Authority or Applicable Governmental Authority within 90 calendar days of revision and to respond to any comments that are submitted. This is in addition to the required communications to the Reliability Coordinator, adjacent Planning Coordinator(s), adjacent Transmission Planner(s), and any functional entities referenced in the Corrective Action Plan.

The Variance also contains new provisions D.A.11.3 through D.A.11.5, which are identical to the provisions noted above. These new provisions are intended to correspond to new Requirement R11 in the continent-wide standard relating to Corrective Action Plans for the supplemental GMD event.

The proposed Variance provisions for Corrective Action Plans recognize that a case-by-case exception process overseen by the ERO, such as that directed by FERC for U.S. entities, may not be practical or possible in Canadian jurisdictions. The Variance instead proposes an alternative mechanism for providing visibility and accountability for the appropriate authorities when entities need to delay implementation of GMD corrective measures due to circumstances outside their control.

D. Enforceability of Proposed Reliability Standard TPL-007-4

Proposed Reliability Standard TPL-007-4 includes measures in support of each requirement to ensure that requirements are enforced in a clear, consistent, non-preferential manner, without prejudice to any party. The proposed standard also includes VRFs and VSLs for each requirement, which are used to help determine appropriate sanctions if an applicable entity violates a requirement. VRFs assess the impact to reliability of violating a specific requirement, while VSLs provide guidance on the way that NERC will enforce requirements.

The proposed standard includes VRFs and VSLs for Requirements R1 through R10, R12 (formerly R11), and R13 (formerly R12) that are substantively the same as those which were approved by FERC in Order Nos. 830 and 851.²⁸ The proposed VRF assignment for new Requirement R11 is High, to promote consistency among the standard's requirements for Corrective Action Plans. Similarly, the proposed VSL assignment for new Requirement R11 mirrors the existing VSLs for Requirement R7. As discussed in **Exhibit C**, these VRFs and VSLs comport with NERC and FERC guidelines related to their assignment.

²⁸ The VSL for Requirement R7 was modified slightly to more closely reflect the language of the Requirement. The VSL for Requirement R8 was modified to eliminate reference to the stricken subpart.

V. EFFECTIVE DATE

NERC's proposed implementation plan is attached to this filing as **Exhibit B**. Under this plan, where approval by an applicable governmental authority is required, the standard shall become effective on the first day of the first calendar quarter that is six (6) months after the effective date of the applicable governmental authority's order approving the standard, or as otherwise provided for by the applicable governmental authority. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter that is six (6) months after the date the standard is adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction. Reliability Standard TPL-007-3 will be retired immediately prior to the effective date of TPL-007-4.

The proposed TPL-007-4 implementation plan is intended to integrate the new and revised Corrective Action Plan requirements in proposed Reliability Standard TPL-007-4 with the existing phased-in compliance date timeframe under the TPL-007-3 implementation plan.²⁹ NERC's intent is that applicable entities would be required to develop any required Corrective Action Plans under new Requirement R11 (supplemental GMD Vulnerability Assessment) by the same date presently required for Corrective Action Plans under existing Requirement R7 (benchmark GMD Vulnerability Assessment).

²⁹ For U.S.-based entities, the TPL-007-3 implementation plan carried forward the phased-in compliance dates approved by FERC in the TPL-007-2 implementation plan.

Respectfully submitted,

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EXHIBITS A - D and F - H

Exhibit E — Reliability Standards Criteria

Reliability Standards Criteria

The discussion below explains how the proposed Reliability Standard has met or exceeded the Reliability Standards criteria.

1. Proposed Reliability Standards must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve that goal.

Proposed Reliability Standard TPL-007-4 addresses the unique risks posed by a high-impact, low-frequency geomagnetic disturbance (“GMD”) event on the reliable operation of the Bulk-Power System (“BPS”) and is responsive to FERC’s directives in Order No. 851. As with prior versions of the TPL-007 standard, the proposed standard is based on sound scientific and technical principles.

Currently effective Reliability Standard TPL-007-3 requires applicable entities to conduct initial and on-going assessments of the potential impact of two defined GMD events, the benchmark GMD event and the supplemental GMD event, on BPS equipment and the BPS as a whole. The standard presently requires entities to develop and implement Corrective Action Plans to protect against instability, uncontrolled separation, and cascading failures of the BPS identified through benchmark GMD Vulnerability Assessments. The standard also contains requirements for implementing processes to collect GMD monitoring data.

Proposed Reliability Standard TPL-007-4 improves upon the current version of the standard and addresses the Order No. 851 directives by: (i) requiring entities to develop Corrective Action Plans for vulnerabilities identified through supplemental GMD Vulnerability

Assessments;¹ and (ii) requiring entities to seek approval from the ERO of any extensions of time for the completion of Corrective Action Plan items.²

2. Proposed Reliability Standards must be applicable only to users, owners, and operators of the bulk power system, and must be clear and unambiguous as to what is required and who is required to comply.

The proposed Reliability Standard is clear and unambiguous as to what is required and who is required to comply. Consistent with currently effective Reliability Standard TPL-007-3, proposed Reliability Standard TPL-007-4 is applicable to: (1) Planning Coordinators with a planning area that includes a power transformer(s) with a high side, wye-grounded winding with terminal voltage greater than 200 kV; (2) Transmission Planners with a planning area that includes a power transformer(s) with a high side, wye-grounded winding with terminal voltage greater than 200 kV; (3) Transmission Owners that own a Facility or Facilities that include a power transformer(s) with a high side, wye-grounded winding with terminal voltage greater than 200 kV; and (4) Generator Owners that own a Facility or Facilities that include a power transformer(s) with a high side, wye-grounded winding with terminal voltage greater than 200 kV.³ The proposed Reliability Standard clearly articulates the actions that such entities must take to comply with the standard.

¹ *Geomagnetic Disturbance Reliability Standard; Reliability Standard for Transmission System Planned Performance for Geomagnetic Disturbance Events*, Order No. 851, 165 FERC ¶ 61,124 (2018) at PP 29 and 39.

² *Id.* at P 54.

³ A power transformer with a “high side wye-grounded winding” refers to a power transformer with windings on the high voltage side that are connected in a wye configuration and have a grounded neutral connection.

- 3. A proposed Reliability Standard must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.**

The Violation Risk Factors (“VRFs”) and Violation Severity Levels (“VSLs”) for the proposed Reliability Standard comport with NERC and FERC guidelines related to their assignment. The assignment of the severity level for each VSL is consistent with the corresponding requirement and the VSLs should ensure uniformity and consistency in the determination of penalties. The VSLs do not use any ambiguous terminology, thereby supporting uniformity and consistency in the determination of similar penalties for similar violations. For these reasons, the proposed Reliability Standard includes clear and understandable consequences.

- 4. A proposed Reliability Standard must identify clear and objective criterion or measure for compliance, so that it can be enforced in a consistent and non preferential manner.**

The proposed Reliability Standard contains measures that support each requirement by clearly identifying what is required and how the requirement will be enforced. These measures help provide clarity regarding how the requirements will be enforced and help ensure that the

requirements will be enforced in a clear, consistent, and non-preferential manner and without prejudice to any party.

5. Proposed Reliability Standards should achieve a reliability goal effectively and efficiently, but do not necessarily have to reflect “best practices” without regard to implementation cost or historical regional infrastructure design.

The proposed Reliability Standard achieves its reliability goals effectively and efficiently. The proposed Reliability Standard clearly enumerates the responsibilities of applicable entities with respect to conducting initial and on-going assessments of the potential impact of defined GMD events on BPS equipment and the BPS as a whole and provides entities the flexibility to select appropriate mitigation strategies to address identified vulnerabilities.

6. Proposed Reliability Standards cannot be “lowest common denominator,” i.e., cannot reflect a compromise that does not adequately protect Bulk-Power System reliability. Proposed Reliability Standards can consider costs to implement for smaller entities, but not at consequences of less than excellence in operating system reliability.

The proposed Reliability Standard does not reflect a “lowest common denominator” approach. To the contrary, the proposed Reliability Standard contains significant reliability benefits for the BPS and addresses directives and concerns identified by FERC in Order No. 851. The provisions of the proposed standard raise the level of preparedness by requiring applicable entities to develop Corrective Action Plans to address system performance issues identified through supplemental GMD Vulnerability Assessments. The proposed standard also revises requirements for Corrective Action Plans so that entities would be required to submit any requests to extend Corrective Action Plan deadlines to NERC and the Regional Entities, so that such requests may be considered on a case-by-case basis.

7. **Proposed Reliability Standards must be designed to apply throughout North America to the maximum extent achievable with a single Reliability Standard while not favoring one geographic area or regional model. It should take into account regional variations in the organization and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard.**

The proposed Reliability Standard applies consistently throughout North America and does not favor one geographic area or regional model. The proposed standard includes technically-justified scaling factors that allow for entity-specific tailoring of the benchmark and supplemental GMD events. This approach provides for consistent application of the proposed Reliability Standard throughout North America while still accounting for the varying impact GMD events may have on each region.

The proposed Reliability Standard, like the currently effective standard, also contains a regional Variance option for Canadian entities. This Variance accounts for differences in regulatory processes in some Canadian jurisdictions with respect to implementation of Corrective Action Plans. This Variance also provides an option which would allow Canadian entities to perform assessments using regionally specific information where such information provides a technically justified means to re-define one or more 1-in-100 year GMD planning event(s) within its planning area.

8. Proposed Reliability Standards should cause no undue negative effect on competition or restriction of the grid beyond any restriction necessary for reliability.

Proposed Reliability Standard TPL-007-4 has no undue negative effect on competition and does not unreasonably restrict the available transmission capacity or limit the use of the BPS in a preferential manner. The proposed standard requires the same performance by each of the applicable entities. The information sharing required by the proposed standard is necessary for reliability and can be accomplished without presenting any market or competition-related concerns.

9. The implementation time for the proposed Reliability Standard is reasonable.

The proposed effective date for proposed Reliability Standard TPL-007-4 is just and reasonable and appropriately balances the urgency in the need to implement the standard against the reasonableness of the time allowed for those who must comply to develop necessary procedures, software, facilities, staffing, or other relevant capability. The proposed TPL-007-4 implementation plan is intended to integrate the new and revised Corrective Action Plan requirements in proposed Reliability Standard TPL-007-4 with the existing phased-in compliance date timeframe under the TPL-007-3 implementation plan.⁴ NERC's intent is that applicable entities would be required to develop any required Corrective Action Plans under new Requirement R11 (supplemental GMD Vulnerability Assessment) by the same date presently required for Corrective Action Plans under existing Requirement R7 (benchmark GMD Vulnerability Assessment). The proposed implementation plan is attached as **Exhibit B** to this filing.

⁴ For U.S.-based entities, the TPL-007-3 implementation plan carried forward the phased-in compliance dates approved by FERC in the TPL-007-2 implementation plan.

10. The Reliability Standard was developed in an open and fair manner and in accordance with the Reliability Standard development process.

The proposed Reliability Standard was developed in accordance with NERC's ANSI-accredited processes for developing and approving Reliability Standards. **Exhibit F** includes a summary of the Reliability Standard development proceedings, and details the processes followed to develop the proposed Reliability Standard. These processes included, among other things, multiple comment periods, pre-ballot review periods, and balloting periods. Additionally, all meetings of the standard drafting team were properly noticed and open to the public.

11. NERC must explain any balancing of vital public interests in the development of proposed Reliability Standards.

NERC has identified no competing public interests regarding the request for approval of this proposed Reliability Standard. No comments were received that indicated the proposed Reliability Standard conflicts with other vital public interests.

12. Proposed Reliability Standards must consider any other appropriate factors.

No other negative factors relevant to whether the proposed Reliability Standard is just and reasonable were identified.