Final NERC TPL-007-4 Benchmark and Supplemental Geomagnetic Disturbance (GMD) 2026 Needs Assessment - August 2022

1. Background and Objective

The objective of the NERC TPL-007-4 Benchmark and Supplemental Geomagnetic Disturbance (GMD) Vulnerability Assessment was to determine whether the New England system meets the performance requirements for the steady state planning GMD event specified in Table 1 of the TPL-007-4 standard.[1] The NERC TPL-007-4 Benchmark and Supplemental Geomagnetic Disturbance (GMD) Vulnerability Assessment is referred to as the GMD 2026 Needs Assessment throughout the document.

This GMD 2026 Needs Assessment was initiated as a follow-up to the Notice of Initiation of NERC TPL-007-4 Benchmark and Supplemental Geomagnetic Disturbance (GMD) 2026 Needs Assessment posted on the PAC website on April 19, 2022[2] and the NERC TPL-007-4 Benchmark and Supplemental Geomagnetic Disturbance (GMD) 2026 Needs Assessment – Scope of Work posted on the PAC website on May 25, 2022.[3]

The area studied, study horizon, and analysis description described in the GMD 2026 Scope of Work remains unchanged.

2. Study Assumptions

No changes were made to the study assumptions that were described in the GMD 2026 Scope of Work.

The case summaries for the GMD 2026 Needs Assessment peak and off-peak load dispatches are available in Appendix A.

[1] NERC Standard TPL-007-4, Transmission System Planned Performance for Geomagnetic Disturbance Events link: https://www.nerc.com/_layouts/15/PrintStandard.aspx?standardnumber=TPL-007-4&title=Transmission%20System%20Planned%20Performance%20for%20Geomagnetic%20Disturbance%20Events&Jurisdiction=United%20States

[2] https://www.iso-ne.com/static-assets/documents/2022/04/gmd_2026_needs_assessment_study_initiation_pac_notice.pdf

[3] https://www.iso-ne.com/static-assets/documents/2022/05/final_gmd_2026_na_sow.pdf

3. Analysis Methodology

No changes were made to the analysis methodology that were described in the GMD 2026 Scope of Work, other than the addition of the steady state voltage criteria for Sandy Pond. The updated steady state voltage criteria for the GMD Study is shown below.

Facility	Voltage Level (kV)	Bus Voltage Limits		
		Normal Conditions (N-0) (p.u)	GMD Event (Post-Contingency) [4]	
			Pre-Switching (p.u)	Post-Switching (p.u)
Transmission/Generation	200 and above and less than 345	$0.95\overline{0} - 1.05\overline{0}$	$0.8\overline{0} - 1.05\overline{0}$	$0.8\overline{0} - 1.05\overline{0}$
	345	$0.95\overline{0} - 1.0492\overline{0}$	$0.8\overline{0} - 1.0492\overline{0}$	$0.8\overline{0} - 1.0492\overline{0}$
Millstone/Seabrook[5]	345	$1.\overline{0} - 1.0492\overline{0}$	$1.\overline{0} - 1.0492\overline{0}$	$1.\overline{0} - 1.0492\overline{0}$
Sandy Pond	345	$1.\overline{0} - 1.0492\overline{0}$	$1.\overline{0} - 1.0492\overline{0}$	$1.\overline{0} - 1.0492\overline{0}$

4. Results

There were no N-0 (also known as "all-lines-in") thermal or voltage violations under peak and off-peak load conditions in New England for both Benchmark and Supplemental GMD events.

In addition, there were no N-1 thermal or voltage violations under peak and off-peak load conditions in New England for both Benchmark and Supplemental GMD events. The GMD 2026 Needs Assessment peak and off-peak load N-0 and N-1 testing results are available in Appendix B.

Time-sensitivity testing analysis was not performed because no needs were identified in the GMD 2026 Needs Assessment.

The GMD 2026 Needs Assessment appendices and study files are posted under the New England-Wide Geomagnetic Disturbance on the ISO-NE external website.

5. Conclusion

The New England transmission system meets the performance requirement R4 for the steady state Benchmark GMD event. Hence, no Corrective Action Plans are needed and Requirement R7 is automatically met.

The ISO New England transmission system meets the performance requirement R8 for the steady state Supplemental GMD event. Hence, no Corrective Action Plans are needed and Requirement R11 is automatically met.

[4] Table 1 of the NERC TPL-007-4 standard requires that 'Voltage collapse, Cascading, and uncontrolled islanding shall not occur'.

[5] This is in compliance with NUC-001-3, *"Nuclear Plant Interface Coordination Reliability Standard,"* effective 01/01/2016. Further information is documented in the appendices to the Master/Local Control Center Procedure 1.

With this GMD 2026 Needs Assessment, the ISO established compliance with R4, R7, R8 and R11 requirements of NERC TPL-007-4.

6. Appendices

The appendices are included in the zip file titled "final_ceii_gmd_2026_na_appendices.zip" which is posted on the ISO website under the New England-Wide Geomagnetic Disturbance Key Study Area. [6]

Appendix A: Case Summaries

The case summaries for the GMD 2026 Needs Assessment peak and off-peak load dispatches are available in Appendix A. Appendix A is included in the zip file and titled "Appendix_A_Case_Summary.xlsx".

Appendix B: Steady-State N-0 and N-1 Testing Results

The steady state N-0 and N-1 testing results are available in Appendix B. Appendix B is included in the zip file and titled "Appendix_B_2026_GMD_NA_N-0_N-1- Results.xlsx".

Appendix C: TARA Options and Process Used for Analysis

The TARA Options and Process Used for Analysis is available in Appendix C. Appendix C is included in the zip file and titled "Appendix_C_TARA_Options_and_Process_Used_for_Analysis.pdf".

[6] https://www.iso-ne.com/system-planning/key-study-areas/new-england-wide-geomagnetic-disturbance-key-study/