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Geomagnetic Disturbances (GMD) Rulemaking

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FERC Order No. 779

- Issued May 2013
- The Commission directed NERC to develop and submit for approval proposed Reliability Standards that address the impact of geomagnetic disturbances on the reliable operation of the Bulk-Power System.
- The Commission directed NERC to implement the directive in two stages.

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NERC EOP-010-1

- In response to the stage 1 directive from Order No. 779, NERC drafted EOP-010-1 - Geomagnetic Disturbance Operations.
  - Requires entities to "develop, maintain, and implement a GMD Operating Plan to coordinate GMD Operating Procedures".
- FERC Order 797
  - Issued June 2014.
  - Approved NERC Reliability Standard EOP-010-1, effective April 1, 2015.

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NERC TPL-007-1

- In response to the stage 2 directive from Order No. 779, NERC drafted TPL-007-1 - Geomagnetic Disturbance Mitigation.
  - Requires entities to perform GMD Vulnerability Assessments using studies based upon AC system models and geomagnetically-induced current (GIC) system models.
  - Entities with systems which do not meet the performance requirements of the standard must develop Corrective Action Plans.
  - Entities with transformers identified as vulnerable by the standard are required to conduct thermal assessments of those transformers.
  - All studies and assessments must be based on the NERC Benchmark GMD Event defined in the standard.

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NERC Proposed Benchmark GMD Event

- The Benchmark GMD Event defines a reference geoelectric field which is scaled to the peak electric field, EPEAK = α X β X 8 (V/km).
  - α is the local geomagnetic latitude scaling factor.
  - β is the local earth conductivity scaling factor.
  - The 8 V/km portion is based on a statistical study of IMAGE magnetometer data from 1993 to 2013 with spatial averaging over 500km squares to estimate a 1 in 100 year geoelectric field amplitude.

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FERC Notice of Proposed Rulemaking (NOPR) (RM15-11-000)

- NOPR issued on May 14, 2015, proposing to approve TPL-007-1. NOPR proposed modifications:
  - modify the "benchmark GMD event" so that the "reference peak geoelectric field amplitude" component of the definition is not based solely on spatially-averaged data.
  - develop revisions to the proposed Reliability Standard to require installation of monitoring equipment.
  - develop revisions to the proposed Reliability Standard to establish specific deadlines for the development of corrective action plans and the completion of activities called for in corrective action plans.
  - study and submit informational filings addressing areas including spatial averaging, earth conductivity models, and how data from geomagnetically-induced current monitors and magnetometers can be made available to researchers.