

DRAFT Scope:

Geomagnetic Disturbance Task Force (GMDTF)

Summary

Severe-impact geomagnetic disturbance (GMD) events present risks and vulnerabilities that are not fully addressed in conventional bulk power system planning, design, and operating processes. The Geomagnetic Disturbance Task Force (GMDTF) will investigate bulk power system reliability implications of these risks and develop solutions to help mitigate this risk.

Background

Geomagnetic storms emanating from the sun can produce an impulsive disturbance to earth's geomagnetic field over wide geographic regions. This field disturbance causes induced ground currents (geomagnetically induced currents or GIC), which can saturate and severely damage bulk power system equipment that may be difficult to replace, such as high voltage transformers.

Industry has known, for many years, that these storms have the potential to pose operational threats to bulk power systems. Most well-known in North America was the March 13-14, 1989 geomagnetic storm,¹ which led to the collapse of the Hydro Québec system in the early morning hours of March 13, 1989. The threat from GMD events are gaining renewed attention as studies suggest that more severe solar storms could occur, as well as reach lower geographic latitudes than formerly expected. NERC's recently released report on High-Impact, Low-Frequency Event Risk to the North American Bulk Power System (HILF).²

Scope

The GMDTF will address the implications of severe GMD events.³ This includes assessing existing GMD studies developed after the 1989 GMD storm, performing an analysis of GMD scenarios as laid out in the HILF report, and reporting on the engineering impacts that a GMD event would have on the bulk power system. The GMDTF will also focus on enhancing and improving existing prevention, mitigation and restoration approaches. Further, analysis of impacts are needed to determine their effects on bulk power system planning, design, and operations and provide engineering data and analysis input into multiple NERC distribution platforms such as operating guidance documents and NERC's Reliability Standards. The GMDTF will review how

¹ <http://www.nerc.com/files/1989-Quebec-Disturbance.pdf>

² <http://www.nerc.com/files/HILF.pdf>

³ Supports the Electricity Sub-sector Coordinating Council (ESCC) Critical Infrastructure Strategic Roadmap (Scenario 3, Items M, N, O and P)

enhancements to prevention, mitigation and restoration approaches mitigate the effects of electromagnetic pulse and intentional electromagnetic interference, but given the unique planning and operational challenges these threats pose, a more detailed analysis may need to be conducted by an additional task force at a later date.

Assumptions and Limitations

The basis for assessment will be the GMD scenario outlined in the ESCC Critical Infrastructure Protection Roadmap, and the technical committees' Critical Infrastructure Protection Strategic Coordinated Action Plan.

Membership

This is a joint task force reporting to the Planning Committee and Operating Committees with support from the Critical Infrastructure Protection Committee. Given the challenging nature of this work, efforts will be made to reach out to include the contribution of experts beyond the scope of the technical committees. The task force is comprised of the following:

- chair and vice chair
- Industry representatives (including NERC member entities, equipment suppliers and manufacturers)
- GMD experts
- Federal, Provincial, and State Government partners (including Department of Energy, Department of Homeland Security, Natural Resources Canada, Public Safety Canada)
- NERC staff

The Planning and Operating Committee chairs appoint the GMDTF chair and vice chair.

Resources

Face-to-face meetings once a quarter and two conference calls per month (two hours each).

Deliverables

Review current GMD⁴ planning and operating criteria and propose enhancements as necessary; evaluate and prioritize mitigation and restoration options; develop industry guidance, and provide engineering data and analysis into multiple NERC platforms (operating guidance, reliability standards, etc...).

Work Plan

2010

- September 2010 – Draft GMDTF Scope approved, chair, vice chair, and NERC staff assigned.
- November 2010 – Draft Project Specification complete.

⁴ Supports the Electricity Sub-sector Coordinating Council (ESCC) Critical Infrastructure Strategic Roadmap (Scenario 3, Items M, N, O and P)

2011

- **1st Quarter**
 - Whitepaper outlining the current industry experience and capability and identifies opportunities, options and alternatives to enhanced how the industry manages GMD risks, including recommendations for new industry guidance and enhanced NERC Reliability Standards.
 - Identify modeling requirements to support planning and operating simulations and improve understanding of how GMD events affect reliability and equipment. Evaluate GMD impacts for multiple intensity levels, up to a maximum of a 1 in 100 year storm
- **2nd Quarter**
 - Whitepaper on current warning limitations, the ability of operators to take mitigating action, and areas for improvement.
 - Develop system models for simulating GMD impacts.
- **3rd Quarter**
 - Whitepaper on restoration abilities and areas for improvement.
 - Simulate impacts, based on the GMD scenario outlined in the ESCC Critical Infrastructure Protection Roadmap, and the technical committees' Critical Infrastructure Protection Strategic Coordinated Action Plan.
- **4th Quarter**
 - Whitepaper that reviews industry prevention approaches to GMD events.
 - Complete a final report incorporating the findings of the whitepapers and simulations.

Monitoring Progress

The results of the GMDTF's efforts will be reviewed periodically by the leadership of the technical committees, in coordination with the Electricity Sub-Sector Coordinating Council. In particular, the GMDTF will focus on three key milestones:

1. Scope and Resources

- Determine assumptions and limitations
- Identify and recruit industry resources
- Develop project plan and timelines

2. Comprehensive Assessment

- Define specific objectives
- Identify options and alternatives with pros and cons

- Propose results and timelines

3. Results

- Final report with action items and next steps
- Develop new or enhance existing industry guidance
- Propose new or revised standards, where necessary and appropriate