

## Standard Authorization Request (SAR)

Complete and please email this form, with attachment(s) to: [sarcomm@nerc.net](mailto:sarcomm@nerc.net)

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Canadian-specific Revision to proposed standard TPL-007-2 (Transmission System Planned Performance for Geomagnetic Disturbance Events)		
Date Submitted:	February 27, 2018		
SAR Requester			
Name:	Helen Lainis (IESO) and Payam Farahbakhsh (Hydro One)		
Organization:	Canadian Electricity Association (“CEA”) Members from Ontario (IESO and Hydro One), with the support of additional CEA Members including Manitoba Hydro, Hydro Québec and SaskPower.		
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SAR Type (Check as many as apply)			
<input type="checkbox"/> New Standard	<input type="checkbox"/> Imminent Action/ Confidential Issue (SPM Section 10)	<input checked="" type="checkbox"/> Revision to Existing Standard	<input checked="" type="checkbox"/> Variance development or revision
<input type="checkbox"/> Add, Modify or Retire a Glossary Term	<input type="checkbox"/> Other (Please specify)	<input type="checkbox"/> Withdraw/retire an Existing Standard	
Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)			
<input type="checkbox"/> Regulatory Initiation	<input type="checkbox"/> NERC Standing Committee Identified	<input type="checkbox"/> Emerging Risk (Reliability Issues Steering Committee) Identified	<input type="checkbox"/> Enhanced Periodic Review Initiated
<input type="checkbox"/> Reliability Standard Development Plan	<input checked="" type="checkbox"/> Industry Stakeholder Identified		
Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):			
<p>The need for this SAR is to enable the option for Canadian Registered Entities to leverage operating experience, observed GMD effects and on-going research efforts for defining alternative Benchmark GMD Events and/or Supplemental GMD Events specific to their unique topology.</p> <p>Registered Entities from Ontario, Québec, Manitoba and Saskatchewan have indicated support for a revision to be included in TPL-007-2 as an option for Canadian Registered Entities to pursue. At a minimum, Registered Entities in Ontario (Hydro One and IESO) have indicated that this proposed</p>			

**Requested information**

revision would be used to define and implement an alternative Benchmark GMD Event and/or Supplemental GMD Event that appropriately reflects their specific geographical and geological characteristics.

**Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):**

The goal is to enable Canadian Registered Entities to define and implement alternative Benchmark GMD Events and/or Supplemental GMD Events that appropriately reflects the specific geographical and geological characteristics of the Canadian provinces, including those located on the Canadian Shield, a vast area of igneous rock exhibiting low electrical conductivity, through leveraging ongoing research efforts, operating experience, and observed GMD effects:

- Registered Canadian entities from Canadian provinces (most prominently Manitoba, Ontario and Québec) located on the Canadian Shield, are currently working to develop a Benchmark GMD Event and/or Supplemental GMD Event that takes into account their unique topology.
- These Canadian Registered Entities have been researching the impact of GMD on their power systems for several years now, and have been collaborating with Natural Resources Canada to collect and analyze Canadian magnetometer data for their respective provinces.

**Project Scope (Define the parameters of the proposed project):**

Reliability Standard TPL-007-2 should be revised to allow Canadian jurisdictions to define and implement alternative Benchmark GMD Events and/or Supplemental GMD Events that are different from the ones defined in TPL-007-2 appropriate for a continent wide standard.

The Benchmark GMD Event and/or Supplemental GMD Event described in TPL-007-2 should be options to pursue for Canadian Registered Entities for performing GMD Vulnerability Assessments.

Implementation of Benchmark GMD Events and/or Supplemental GMD Events by Canadian Registered Entities should be subject to approval by applicable regulatory authorities in Canada.

The drafting team should consider that the implementation of Corrective Action Plan(s) to mitigate GMD risks that require capital investment will be subject to approval by applicable regulatory authorities in Canada.

The project should consider whether Canadian-specific language is needed in Requirement R7 to align with the regulatory practices/processes in Canada for approving Corrective Action Plan(s) requiring capital investments.

### Requested information

Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification<sup>1</sup> which includes a discussion of the reliability-related benefits of developing a new or revised Reliability Standard or definition, and (2) a technical foundation document (e.g. research paper) to guide development of the Standard or definition):

NERC has spent a substantial amount of time and effort working with experts across the industry to develop scientifically sound Benchmark GMD Events defined in TPL-007-2 appropriate for a continent wide standard.

The research and development in this field continues to evolve, and more remains to be learned, new assessment tools need to be developed and assessment models need to be verified. In Canada, there is on-going work being done on this subject. We request that TPL-007-2 provide the flexibility for Canadian jurisdictions to leverage their expertise and to build on their research and on GMD impact assessment methodologies to define alternative Benchmark GMD Events and/or Supplemental GMD Events targeted to their unique topology.

The Canadian Shield is a sprawling rock formation that stretches across nearly all of Québec, much of Ontario and Manitoba, the northern portion of Saskatchewan and the northeast corner of Alberta. This geological formation blocks current from being dissipated into the Earth, making these Canadian provinces more susceptible to solar storms.

As such, Registered Entities from several Canadian shield provinces have been researching the impact of GMD on the reliable operation of their BES for years. For example, Hydro One Networks Inc., has been conducting this work in Ontario, Manitoba Hydro has been conducting this work in Manitoba and Hydro Québec has been conducting this work in Québec. A list of several technical publications could be provided upon request of the SDT to demonstrate the depth of Hydro One's, Manitoba Hydro's, Hydro Québec's and other jurisdictions' technical research and expertise in modeling and analyzing GMD impacts. These references also describe significant development efforts on tools and operating processes to support planned transmission system performance during GMD events.

Natural Resources Canada has published their calculations of extreme value statistics for a 1-50 and 1-100 year geomagnetic storm based on data from 13 Natural Resources Canada geomagnetic observatories, and Natural Resources Canada and Registered Entities from Canadian shield provinces have been collaborating to collect and analyze Canadian magnetometer data for their respective provinces.

Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):

<sup>1</sup> The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

<b>Requested information</b>
The cost implications of addressing a Benchmark GMD Event and/or Supplemental GMD Event is expected to be more significant for the Canadian shield provinces than for those registered entities in the lower 48 state portion of the United States. Furthermore, any capital investment must be approved by the applicable provincial regulatory authority. Consequently, it is essential that the requirements of the standard appropriately reflect conditions that exist in affected Canadian provinces. To this end, Registered Entities from these provinces are working with Natural Resources Canada and are using their own inputs to develop a Benchmark GMD Event and/or Supplemental GMD Event based on empirical data that will form the basis for seeking approval for any required investments with their respective regulatory authorities.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (e.g. Dispersed Generation Resources):
Not Applicable
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (e.g. Transmission Operator, Reliability Coordinator, etc. See the most recent version of the NERC Functional Model for definitions):
Canadian Registered Entities that meet the applicability specified in Sections 4.1 and 4.2 of the proposed TPL-007-2 Reliability Standard.
Do you know of any consensus building activities <sup>2</sup> in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
The revision would be used, at a minimum, by IESO and Hydro One to avoid needing to seek remand to TPL-007-2 in Ontario, Canada. Working with CEA, IESO and Hydro One have engaged other Canadian Registered Entities to solicit feedback. Registered entities from Manitoba, Québec and Saskatchewan are supportive of a revision to TPL-007-2 as an option for Canadian Registered Entities to pursue. No Canadian Entity has voiced opposition to such a revision.
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so which standard(s) or project number(s)?
No
Are there alternatives (e.g. guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives.

<sup>2</sup> Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles ( <a href="#">Reliability Interface Principles</a> )? Please check all those that apply.	
<input checked="" type="checkbox"/>	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
<input type="checkbox"/>	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
<input checked="" type="checkbox"/>	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
<input type="checkbox"/>	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
<input type="checkbox"/>	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
<input type="checkbox"/>	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
<input checked="" type="checkbox"/>	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
<input type="checkbox"/>	8. Bulk power systems shall be protected from malicious physical or cyber-attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following <a href="#">Market Interface Principles</a> ?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	YES
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	YES
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	YES
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	YES

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
<i>e.g.</i> NPCC	

**For Use by NERC Only**

SAR Status Tracking (Check off as appropriate)	
<input type="checkbox"/> Draft SAR reviewed by NERC Staff	<input type="checkbox"/> Final SAR endorsed by the SC
<input type="checkbox"/> Draft SAR presented to SC for acceptance	<input type="checkbox"/> SAR assigned a Standards Project by NERC
<input type="checkbox"/> DRAFT SAR approved for posting by the SC	<input type="checkbox"/> SAR denied or proposed as Guidance document

**Version History**

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template