

**Background on Solar Storm Reliability Standard for U.S. Electric Grid
Approved by Federal Energy Regulatory Commission on June 19, 2014**

In a 2010 report, the Oak Ridge National Laboratory concluded that a severe solar storm could leave 130 million Americans without power for 1-2 years. In March 1989, a moderate solar storm blacked out the province of Quebec, Canada.

Key Non-Technical Facts

- The solar storm standard approved on June 19th was written not by the federal government, but a private corporation governed by vote of its members, the North American Electric Reliability Corporation (NERC).
- 70% of NERC members are electric utilities; of those voting on the standard, 92% were in favor.
- Of approximately 2,000 electric utilities, 90% are exempted from the solar storm standard, including nuclear power plants and all other generation plants.
- Under the government-approved solar storm standard, electric utilities need to monitor space weather reports from the government, have a paper plan on file, and document self-determined actions during solar storms.
- In return for these mostly paperwork tasks, electric utilities get liability protection in many states.
- According the official Federal Energy Regulatory Commission estimate in the approval order, utilities are expected to spend only 20 hours per year complying with the standard, at an estimated cost of \$1,200 per year per utility.
- The entire electric utility industry would be expected to expend only \$238,800 per year to protect the American public under this solar storm standard.
- In comparison, the cost of an extended blackout for 130 million Americans would be in the trillions of dollars, with substantial loss of life.

Additional Technical Information

- The purpose of the solar storm standard is to allow electric utilities to operate through solar storms.
- Electric utilities need to monitor induced current in their equipment in order to make good operational decisions during storms.
- The solar storm standard does not require installation of current monitors; as a result, electric utilities could be “flying blind” during solar storms.
- Induced current monitors for solar storms cost only \$15,000 per site.
- The North American Electric Reliability Corporation proposes that generation plants pay up to \$250,000 for a technical study to see if their equipment might be vulnerable to solar storms rather than install a monitor for \$15,000 and find out for sure.
- For roughly the same cost as a paper study, electric utilities could install a blocking system that includes storm monitoring equipment, providing highly reliable and automated protection.

What can you do?

- Complain to your U.S. Senators and Representatives
- Write President Obama
- Contact your state’s public utility commission
- Email FERC at customer@ferc.gov

“Requirements and Measures” in NERC Standard EOP-010-1 are:

B. Requirements and Measures

R1. Each Reliability Coordinator shall develop, maintain, and implement a GMD Operating Plan that coordinates GMD Operating Procedures or Operating Processes within its Reliability Coordinator Area. At a minimum, the GMD Operating Plan shall include: [Violation Risk Factor: Medium] [Time Horizon: Long-term Planning, Operations Planning, Same-day Operations, Real-time Operations]

1.1 A description of activities designed to mitigate the effects of GMD events on the reliable operation of the interconnected transmission system within the Reliability Coordinator Area.

1.2 A process for the Reliability Coordinator to review the GMD Operating Procedures or Operating Processes of Transmission Operators within its Reliability Coordinator Area.

M1. Each Reliability Coordinator shall have a current GMD Operating Plan meeting all the provisions of Requirement R1; evidence such as a review or revision history to indicate that the GMD Operating Plan has been maintained; and evidence to show that the plan was implemented as called for in its GMD Operating Plan, such as dated operator logs, voice recordings, or voice transcripts.

R2. Each Reliability Coordinator shall disseminate forecasted and current space weather information to functional entities identified as recipients in the Reliability Coordinator's GMD Operating Plan. [Violation Risk Factor: Medium] [Time Horizon: Same-day Operations, Real-time Operations]

M2. Each Reliability Coordinator shall have evidence such as dated operator logs, voice recordings, transcripts, or electronic communications to indicate that forecasted and current space weather information was disseminated as stated in its GMD Operating Plan.

R3. Each Transmission Operator shall develop, maintain, and implement a GMD Operating Procedure or Operating Process to mitigate the effects of GMD events on the reliable operation of its respective system. At a minimum, the Operating Procedure or Operating Process shall include: [Violation Risk Factor: Medium] [Time Horizon: Long-term Planning, Operations Planning, Same-day Operations, Real-Time Operations]

3.1. Steps or tasks to receive space weather information.

3.2. System Operator actions to be initiated based on predetermined conditions.

3.3. The conditions for terminating the Operating Procedure or Operating Process.

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M3. Each Transmission Operator shall have a GMD Operating Procedure or Operating Process meeting all the provisions of Requirement R3; evidence such as a review or revision history to indicate that the GMD Operating Procedure or Operating Process has been maintained; and evidence to show that the Operating Procedure or Operating Process was implemented as called for in its GMD Operating Procedure or Operating Process, such as dated operator logs, voice recordings, or voice transcripts.

Estimate of Compliance Costs for Utilities, Taken from Page 33 of FERC Order 797

49. The Commission estimates an increased burden for each requirement, as explained in the chart below, for a total estimated burden of \$238,800. The Commission based the burden estimates on staff experience, knowledge, and expertise:

Burden Estimate for Implementation of Reliability Standard EOP-010-1						
Reliability Standard Number	Type of Respondents	Number of Respondents (1)	Number of Responses per Respondent (2)	Average Burden Hours Per Response (3)	Total Annual Burden Hours (1)x(2)x(3)	Total Annual Cost⁶²
EOP-010-1 (R1)	Reliability Coordinator	16	1	20	320	\$19,200 (\$60/hr)
EOP-010-1 (R3)	Transmission Operator	183	1	20	3660	\$219,600 (\$60/hr)
TOTAL					3980	\$238,800

⁶² The estimated hourly loaded cost (salary plus benefits) for an engineer is assumed to be \$60/hour, based on salaries as reported by the Bureau of Labor Statistics (BLS) (http://bls.gov/oes/current/naics2_22.htm). Loaded costs are BLS rates divided by 0.703 and rounded to the nearest dollar (<http://www.bls.gov/news.release/ecec.nr0.htm>). While the BLS figures have been updated since the issuance of the NOPR, the new BLS figures are not significantly different. For consistency, the Commission continues with the same loaded cost figure used in the NOPR.