

UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

Staff Technical Conference on Geomagnetic  
Disturbances to the Bulk Power System

Docket No. 12-13-000

STATEMENT OF FRANK KOZA  
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As PJM's Executive Director of Operations Support and having worked in operations for over 15 years, I am pleased to provide this statement on behalf of PJM Interconnection, LLC ("PJM") at the Commission's April 30 Technical Conference. In addition to my work at PJM, I was vice-chair of the NERC GMD Task Force; however, my comments today are on behalf of PJM Interconnection and not necessarily the Task Force as a whole.

It is appropriate to put in perspective the Geomagnetic Disturbance ("GMD") issue as well as the research work presently underway. There is no question that severe space weather has the potential to create serious problems on the bulk power system. The combination of half-cycle transformer saturation and increased reactive power consumption can lead to voltage collapse and blackouts if not properly managed. In addition, transformer saturation could cause a number of extra high voltage transformers to fail.

What is not well defined and requires more work is determining the magnitude and duration of space weather events that will cause failure of bulk power transformers and other components and the associated failure mechanisms. Space weather is complex and numerous factors can contribute to widely varying impacts. A number of preventative steps, including those I outline below, can be implemented today. Nevertheless, before any transmission asset owner can make an informed decision on deployment of mitigation measures, more analysis needs to be done.

Through our participation on the NERC GMD Task Force, we learned that substantial work is being done in this area by a number of organizations. The necessary tools to conduct such analyses are only now starting to become available, and PJM strongly supports the continuing work that is being undertaken through the sponsorship of NERC, ERPI, and a number of other organizations to better understand the risks associated with space weather and the specific threats to the reliability of the bulk power system.

As a transmission system operator, PJM will review and update its operating procedures and training based on the work of the NERC GMD Task Force. Also, PJM will participate with the other North American reliability coordinators in a dialogue with the space weather forecasting community to enhance the dissemination of space weather forecast information to the widest

possible audience in the most expeditious manner. PJM is not an owner of transmission assets – we operate the transmission assets of our members. The decisions about mitigation strategies for specific equipment that will need to be employed will necessarily be made by our members working in collaboration with PJM as we analyze the overall impacts to the bulk power system.

In the near term, PJM suggests the following implementation strategies, based on today's knowledge, given the attendant risks and the need for deliberate and timely action:

1. Assessment of EHV transformers – Each asset owner needs to determine the overall “health” of its EHV transformer fleet and develop strategies for GIC mitigation for identified vulnerable transformers, even before more detailed analysis capability is available.
2. Specification of GIC Withstand in New Transformers – Asset owners need to work with the transformer suppliers to set withstand capability into specifications for new transformers.
3. Operating Procedures – Systems in at least the northern tier of the US and all of Canada, who do not have operating procedures to respond to GMD events, need to develop them and deploy the associated detection and measurement devices to ensure an appropriate response, given their specific level of exposure.
4. Incorporate GMD Impacts into Power System Analysis – GMD impacts can be modeled and assessed as part of overall power system analysis performed by system planners and operators. While these tools are not yet mature, progress is steadily being made and planners and operators need to begin to acquire this knowledge and start the process of incorporating the many complex aspects of GMD into their planning and operating procedures and processes.

At the level of today's knowledge, no one can definitively say whether the above strategy will be sufficient to protect the transmission system from a severe space weather event. Conversely, no one can provide sufficient evidence that an immediate, large scale investment by the asset owners or government would adequately address the risk, let alone meet an appropriate cost/benefit ratio, given the state of today's research. In the interim, PJM suggests that the above intermediate steps be taken today while the industry and government support the ongoing work to better understand the vulnerability, develop tools to assess the vulnerability, and be prepared to act when the path forward becomes clearer.