UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Staff Technical Conference on Geomagnetic Disturbances to the Bulk-Power System — Docket No. AD12-13-000

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Good afternoon. I am Steve Naumann from Exelon. Exelon is a holding company headquartered in Chicago. Our retail utilities, BGE in Baltimore, ComEd in Chicago and PECO in Philadelphia, serve 6.6 million electric customers, or over 15 million people – more than any other company – with a peak load of over 40 GW. Our generation subsidiary owns approximately 35 GW of generating facilities, including fossil, hydro, nuclear and renewable facilities.

I am appearing today on behalf of the Edison Electric Institute (EEI), of which Exelon is a member. EEI is the trade association of U.S. shareholder-owned electric companies and has international affiliate and industry associate members worldwide. EEI's U.S. members serve 95% of the ultimate customers in the shareholder-owned segment of the industry and represent about 70% of the U.S. electric power industry. Thank you for inviting me to speak at this conference.

First, EEI supports the Commission holding a technical conference on these important issues. EEI members support the NERC report on the effects of geomagnetic disturbances (GMD) and the recommendations made by the report. In general, EEI agrees that the primary risks associated with GMD-related activity are:

- Potential for voltage collapse due to increased reactive loading;

- Possibility of damage to certain physical assets such as transformers.

We also agree that the NERC report is interim, and thus there is significant merit in conducting additional careful technical analysis and, based on the results of such analysis, taking cost-effective actions. Such actions could involve operating procedures, installation of monitoring equipment, recommendations for transformers to withstand certain levels of GMD, and where appropriate, mitigation measures for existing transformers.

That said, the purpose of this panel is to discuss moving forward on GMD issues. EEI agrees generally with the NERC GMD report recommendations for next steps, including:

- Developing tools and methods to support industry analysis of technical issues;
- Improving existing notification procedures for GMD watches and alerts;
- Conducting various training and communications-related activities;
- Evaluating the potential need for mandatory requirements;
- Exploring with EPRI, equipment manufacturers, and industry participants a broad range of technical issues related to transformer design specifications.

Next Steps – System Analysis of Severe GMD Events

We believe that the development of effective preventative tools and methods will depend on the confidence that can be placed in additional study and modeling work. Performing system studies to determine potential broad system effects and impacts on transformers is a necessary condition before NERC can recommend what, if any,

mitigation strategies should be used to ameliorate the impacts of severe GMD events. The studies, and the underlying models, must be open for review by experts from all parts of the industry. If NERC is to make recommendations for the reliability of the North American continent, and this Commission is to review NERC recommendations, possibly including proposed standards, we all must have confidence in the modeling, the data and the analysis and that confidence is best achieved by means of an open process subject to peer review.

To accomplish this goal, EEI recommends that this analytical work take place under the direction of the NERC Planning Committee (PC) as a special study assessment. The technical expertise and diversity of the NERC PC and the members of any special study group would be invaluable for defining the assumptions and parameters of such study, including specifications of any additional data that might be needed to support a strong technical study and ultimately conducting the analysis. The collection of data and information should be conducted using methods similar to those used by NERC committees to obtain data for assessments, including protection of such data as CEII. However, subject to appropriate protection of CEII information, these PC and any study group meetings, as all NERC meetings, would be open.

We anticipate that the studies will analyze in more detail the response of the North American bulk power system following severe GMD events. The analysis would determine among other results whether and at what GMD levels any potential voltage collapse might occur and if so, how broad an area would be affected. The analysis also would determine the magnitude of geomagnetic induced currents at different GMD levels and this data in turn would be used for further analysis by asset owners to

determine impacts on their transformers.

Next Steps – Transformer Analysis of Severe GMD Events

EEI also shares concerns regarding the potential vulnerabilities of transformers of a certain age and design to severe GMD events. As stated above, after NERC completes the development of additional methods and tools and the PC completes its analysis, asset owners will conduct detailed technical analysis of transformers, especially those that have the greatest vulnerability to GMD effects, using the technical expertise from the North American Transmission Forum, the Spare Transformer Equipment Program (STEP), transformer manufacturers and others. Under the direction of the PC, the asset owners will develop a project plan and communicate this plan to the NERC and to the Commission. The need to perform the studies sequentially is important. As Mark Lauby of NERC explained this morning, voltage instability caused by a severe GMD event takes place over a period of tens of seconds. Thermal damage to transformers takes longer – on the order of tens of minutes to hours. The two effects are interrelated and must be studied in sequence. Once more data is received from the analysis of transformer response, EPRI, manufacturers and STEP also can develop transformer specifications regarding GMD.

Partnership with Government

As part of the NERC GMD report recommendations for improving education and training, and for improved information exchanges, EEI believes the Joint Statement of the Prime Minister of the United Kingdom and President Obama (May 25, 2011) promising collaboration on assessments of mitigating effects of space weather is an important step. In this country, EEI looks forward to continued collaboration among

government and the electric sector, and other affected infrastructure industries, including transportation and communications. In addition, improvements in space weather prediction and monitoring are needed. One example of such collaboration was the tabletop exercise, Secure Grid '11, conducted in conjunction with Department of Homeland Security and US Northern Command. These exercises, and exchanges of information and learning from such exercises, must continue.

Potential NERC GMD Standard

As I have discussed above, system-wide studies are needed to determine the impacts of severe GMD events, in particular on transformers. Until those studies are completed, it is premature to determine whether NERC should advance development of mandatory requirements to address GMD-related issues. While the analysis is taking place, there is merit in embracing a "do no harm" approach to ensure that various potential solutions do not inadvertently cause new problems. Especially with regard to geomagnetic induced current (GIC) blocking devices, we believe that additional analysis discussed above is required to ensure that any such devices both are effective and do not cause additional reliability problems, especially if applied to selective transformers. Even where such devices or other solutions are shown to be effective, the cost and the practicality of such potential solutions need to be addressed.

Industry Actions Already Underway

While longer term or standards-related activities are an important part of the overall plan, in the shorter term it is important for the Commission to realize that companies, ISOs and RTOs, and NERC regions, have already developed communications and mitigation procedures for this vulnerability, as shown in the NERC

interim report. A number of companies have installed or are installing GIC monitoring equipment. In addition, a number of asset owners have or are in the process of modeling and analyzing their transformers to assess their vulnerabilities. It may be useful for the Commission to seek in a final NERC report a more detailed listing on the broad range of activities already underway or in place to address GMD vulnerability.

Thank you and I look forward to the question and answer period.