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August 29, 2003

Honorable W. J. Tauzin  
Chairman, Committee on Energy and Commerce  
Room 2125 RHOB  
United States House of Representatives  
Washington, D.C. 20515

Re: Northeast Power Coordinating Council (NPCC) Response

Dear Chairman Tauzin:

The attached responses to your August 19<sup>th</sup>, 2003 inquiries are being provided by NPCC to assist the House Committee on Energy and Commerce in its work regarding Blackout 2003. Please recognize that information regarding the events of August 14<sup>th</sup> is still preliminary and that a full understanding of these events will come from careful review of all the data on a consistent basis.

As a follow-up to this disturbance, NPCC is leading a multi-regional MAAC-ECAR-NPCC Study team, working in collaboration with the NERC/DOE investigation, to provide analyses of Blackout 2003.

NPCC remains firmly committed to the reliability of the international, interconnected bulk power supply system and is available to provide additional assistance to you as appropriate.

Very truly yours,

*Edward A. Schwerdt*

Edward A. Schwerdt  
Executive Director

EAS:jm  
Attachment

**(1) What were the basic causes and contributing events that led to the August 14<sup>th</sup> blackout and its severity? Describe the following in your answer: (a) the location, character, and proximate cause of the initial disruption in the transmission and supply of electricity; and (b) the “cascading” effect of the disruption through multiple utility systems and States.**

The sequence of events experienced in the Northeast Power Coordinating Council (“NPCC”) region happened in a very short time period (seconds) and was initiated by events outside its boundary. A full understanding of these events will come from careful review of all the data, on a consistent basis.

What we know at the present time comes from information supplied by the operating entities within the affected areas. This information is still in the process of being reviewed and time-sequenced by NPCC and the North American Electric Reliability Council (“NERC”). The following information may be revised as the disturbance analysis continues.

The immediate electrical events observed in NPCC prior to the blackout occurred starting at approximately 16:10 p.m. EDT on Thursday, August 14, 2003. Within a few seconds, the NPCC region observed large onrushing power flows, reversals, and severe frequency and load oscillations. The first power swing caused the tripping of some inter-regional tie lines. Subsequent power swings islanded portions of the NPCC region from the eastern interconnection. As a result:

- Most of New England and the Maritimes Area successfully islanded from the rest of the eastern interconnection;
- The Quebec Area, because of its HVDC ties, was not affected;
- New York divided into two islands, northwest and southeast. The northwest island, connected to eastern Ontario and northern New York continued to serve load; the southeast island (temporarily connected to southwest Connecticut and Long Island) had insufficient generation to meet its load and blacked out.
- Northwest Ontario (west of Wawa, Ontario) separated from the rest of the Ontario system, but remained connected to the Manitoba and Minnesota systems and was not affected. Eastern Ontario separated from the rest of Ontario, but remained connected to the northwest New York island, which continued to serve load. The remaining portion of Ontario, which had separated from Michigan, had insufficient generation to meet its load and blacked out.

On August 15<sup>th</sup>, NPCC announced it was assembling an assessment team of regional experts to perform a detailed analysis of events within the Region. This activity, which will require significant effort, will be coordinated with the NERC, the DOE, Provinces and States. The analysis is expected to require extensive investigative work to determine the factors within NPCC that contributed to the wide spread blackout and to take several months to complete.

NPCC has adopted an aggressive three-phase approach in its internal analysis of the blackout; first, to develop a detailed sequence of events within NPCC; and second, to conduct a detailed analysis of the events that resulted in the cascading collapse of a major portion of the NPCC region and identify areas for analysis. Included in this analysis will be a review of the sequence of the restoration. The third phase of the analysis will develop findings, conclusions and recommendations for further study.

In addition, the Chairman of the Mid-Atlantic Area Council (“MAAC”), Mr. Peter Landrieu; Mr. Patrick Muchay, acting as the designated representative for the East Central Area Reliability Coordination Agreement Power Systems (“ECAR”) and the Chairman of NPCC, Mr. Charles J. Durkin, Jr. established a flexible coordination agreement with NERC as the analysis of the Blackout of 2003 moves forward.

Mr. Durkin serves as the Regional blackout investigation facilitator, working closely with the NERC blackout investigation steering group. NERC’s efforts will supplement and contribute to the Joint U.S. DOE – Canadian Task Force Investigation.

The Regions assigned an existing MAAC-ECAR-NPCC (“MEN”) interregional Study Committee the role of lead industry blackout study team and directed them to revise the MEN 2003 Summer load flow base case computer model to represent the system conditions that existed on August 14<sup>th</sup>. In addition, building on the dynamic analysis efforts already underway within NPCC, a Major System Disturbance Task Force (“MSDTF”) has been formed under the MEN Study Committee to develop a companion dynamics database. These cases will serve as the basis of the computer simulations of the events of August 14<sup>th</sup>.

**(2) What efforts have been taken to secure the supply, transmission and distribution of electricity since the blackouts of 1965 and 1977 in the Northeast, and why were these efforts apparently inadequate to prevent the blackout or otherwise minimize the area affected?**

The Northeast Power Coordinating Council is an international electric regional reliability council that was formed in January 1966 shortly after the 1965 Northeast Blackout to promote the reliability and efficiency of the interconnected power systems within its geographic area through the coordination of their system planning and operating procedures. NPCC’s paramount function continues to be safeguarding the security, reliability and integrity of the integrated, international bulk power system.

NPCC has developed a number of fundamental Criteria Documents that clearly define the principles that need to be followed to assure that NPCC can accomplish its mission of promoting a reliable interconnected power system. These documents are reviewed periodically using the NPCC Open Process and revised when necessary to assure that they are current and meet the needs of the industry.

NPCC, through its Reliability Coordinating Committee (RCC) and its Task Forces & Working Groups, regularly conducts resource and transmission reliability assessments of its members' conformance to NPCC Criteria, Guides and Procedures.

## **NPCC Reliability Assurance Actions Following the 1965 Northeast Blackout**

A major lesson learned from the 1965 Northeast blackout was that Region-wide coordination is required for reliability. The resulting adoption of NPCC Criteria, Guides, and Procedures was aimed at reducing the likelihood of a cascading type of blackout. Recognizing the importance of close coordination of planning and operations among regional councils, NPCC entered into Inter-Area Agreements with MAAC (in 1968) and ECAR (in 1969) for periodic common planning and operating studies of resource and transmission reliability. A summary of selected criteria and NPCC reliability assurance actions following the November 1965 Northeast Blackout follows.

### Basic Criteria for the Design and Operation of Interconnected Power Systems

Initially adopted in 1967, this criteria is used in the coordinated design and operation of the bulk power system to promote the reliability and efficiency of electric service throughout Northeastern North America. The fundamental principles for design and operation of a reliable interconnected bulk power system include:

- A balanced relationship should be maintained among the type, size, capacity, and location of resources;
- A balanced relationship among transmission system elements should be maintained to avoid excessive dependence on anyone transmission circuit, structure, right-of-way, or substation; and,
- Transmission systems should provide flexibility in switching arrangements, voltage control, and other control measures to promote reliable system operation.

The criteria defines both resource and transmission design and operation criteria, and states that the bulk power system should be designed and operated to a level of reliability such that the loss of a major portion of the system, or unintentional separation of a major portion of the system, should not result from any reasonably foreseeable contingencies.

NPCC uses a design-basis approach for assuring the reliability of the bulk power system; i.e., to require that the system be designed and operated to withstand representative contingencies as specified in these criteria. Parameters for assessing system design and operation for normal transfers, emergency transfers and extreme contingency assessment are defined in the criteria.

### Bulk Power System Protection Criteria

Initially adopted in 1970, the intent of these criteria is to ensure that protection systems are designed to limit the severity and extent of system disturbances and possible damage to system equipment. This Criteria states that close coordination must be maintained

among planning, design, operating, maintenance and protection functions to ensure that modifications or additions to the bulk power system will result in facilities that are adequately protected and can be operated and maintained reliably and safely.

#### Maintenance Criteria for Bulk Power System Protection

Initially adopted in 1969, this criteria establishes the minimum maintenance objectives and recommends maintenance practices for protection of the NPCC bulk power system.

#### Operating Reserve Criteria

Initially adopted in 1972, this criteria establishes standard terminology and minimum requirements governing the amount, availability, distribution, and shared activation of operating reserve. Operating reserve is defined as the operating capacity in excess of that required for actual.

#### Emergency Operation Criteria

Initially adopted in 1972, the purpose of this criteria is to present the basic factors to be considered in formulating plans and procedures to be followed in an emergency or during conditions which could lead to an emergency, in order to facilitate mutual assistance and coordination within NPCC. Objectives, principles and requirements are presented to assist the Area formulating plans and procedures to achieve desired results.

## **NPCC Reliability Assurance Actions Following the 1977 New York City Blackout**

On July 13, 1977 New York City experienced a major blackout. As concluded by FERC in the June 1978 final staff report, the power failure was not due to a failure in system planning, but rather a failure of control and operation. FERC concluded “the single most important cause of the July 13, 1977 power failure was the failure of the system operator to take necessary action.” The 1977 New York City blackout demonstrated that reliability requires the system to be operated consistent with its design. A summary of selected NPCC actions following the July 1977 New York City Blackout follows.

#### NPCC Reliability Assessment Program

Implemented during 1977, this is a comprehensive program of reliability assessments and criteria revision. It formalizes a schedule for Area Transmission Reviews and Area Resource Adequacy Assessments, and specifies required planning and operating surveys and assessments.

#### NPCC Reliability Compliance and Enforcement Program (RCEP)

Initially adopted in 2000, this criteria establishes and defines the requirements of the enforceable NPCC RCEP and establishes, for the first time, a mechanism to impose non-monetary sanctions for non-compliance to a specified set of reliability requirements.

Multiple NPCC Guidelines were established in the areas of:

- Application of Autoreclosing to the Bulk Power System
- Control Performance
- Inter-AREA Voltage Control
- Automatic Underfrequency Load Shedding Program Relaying
- Area Review of Resource Adequacy
- Special Protection Systems
- On-Line Computer System Performance During Disturbances
- Reporting System Disturbances
- Identifying Key Facilities and Their Critical Components for System Restoration
- Analysis and Reporting of Protection System Mis-operations

The development and implementation of the NPCC Criteria, Guides and Procedures define and direct the efforts of the Northeast Power Coordinating Council. Through adherence to the requirements of these documents, the security and adequacy of the interconnected bulk power supply system of NPCC is maintained.

**(2 - continued) What efforts have been taken in other parts of the country to prevent blackouts and how effective have these efforts been in preventing or minimizing blackouts?**

NPCC coordinates the Lake Erie Emergency Redispatch (“LEER”) activities and posts all LEER-related information on the NPCC web site. The objective of the LEER procedure is to facilitate emergency re-dispatch among Operating Authorities surrounding Lake Erie to avoid shedding of firm load resulting from a NERC Transmission Loading Relief (“TLR”) action. The LEER procedure is intended to be implemented for emergency re-dispatch to relieve transmission constraints that could otherwise require another Lake Erie Participant to shed firm load. The LEER procedure would only be fully executed when firm load curtailment is imminent. The choice of requesting the LEER procedure is a security decision of the Control Area.

In addition, within New York the mission of the New York State Reliability Council (“NYSRC”) is to promote and preserve the reliability of electric service on the Bulk Power System in New York State. To carry out this mission, the NYRSC is responsible for (1) establishing and maintaining Reliability Rules for use by the New York State Independent Operator (“NYISO”) and all entities engaging in electric power transactions on the Bulk Power System, and (2) along with NPCC and the NYISO, monitoring compliance with the Reliability Rules.

**(3) What equipment, measures or procedures worked as intended on August 14<sup>th</sup> to prevent even greater disruption to the supply of electricity, to prevent greater damage to the generation and transmission system, and to bring generation back on line after the disruption?**

Early indications are that systems in NPCC designed to protect power system equipment operated as expected. Very little power system equipment was damaged by the power surges that came crashing in over the NPCC tie lines.

In an occurrence such as this recent blackout, one of the greatest dangers to the restoration of electric service is the potential for damage to the system itself – the power plants and the transmission lines, and related equipment. If damage of this nature occurs, it potentially could take days, weeks, or months to complete restoration. Fortunately, the complex protective mechanisms installed on the NPCC system, its power plants and related equipment worked as intended and no serious equipment damage was reported.

**(4) How can the nation's electric system, including both transmission capacity and reliability, be improved to prevent a recurrence of the events of August 14<sup>th</sup>? Please identify what measures need to be taken by all involved in the governmental and nongovernmental sectors.**

With regard to actions that can be taken to reduce the potential for future blackouts, it is too early to speculate until the investigations currently underway are completed.

However, in the meantime, NPCC supports enactment of U.S. electric reliability legislation and prefers the language in section 16031 of H.R. 6 as previously passed by the House of Representatives. NPCC supports the provisions within this legislation, which authorize the establishment of industry-based reliability organizations, and advance NPCC's international reliability assurance efforts. NPCC prefers the language in section 16031 because it contains express acknowledgement of the necessity for more stringent criteria to address the unique reliability needs within New York.

The NPCC *Membership Agreement* obligates each member to plan, design and operate its bulk power system in compliance with regionally specific reliability criteria and broad-based industry-wide NERC standards. To assess and monitor compliance with NPCC and NERC reliability standards, NPCC has in place the Reliability Compliance and Enforcement Program.

The NPCC Compliance Monitoring and Assessment Subcommittee performs the independent compliance monitoring and assessment functions; the appropriate non-monetary sanctions are levied for instances of non-compliance.