

December 15, 2000

NOTE TO: J. Calvo, Chief, EEIB:DE:NRR
J. Rosenthal, Chief. REAHFB:DSARE:RES

FROM: R. Jenkins, Electrical Engineer, NRR /RA/
W. Raughley, Senior Electrical Engineer, RES /RA/

SUBJECT: DECEMBER 7, 2000, NRC MEETING WITH NORTH AMERICAN ELECTRIC
RELIABILITY COUNCIL

A meeting took place between the Nuclear Regulatory Commission (NRC) and North American Electric Reliability Council (NERC) on December 7, 2000 at NERC offices in Princeton, N.J. The NRC attendees were Messrs. Holden, Lazevnick, Jenkins, and Raughley and the NERC attendees were Mr. Nevius, Vice President and members of his technical staff. The meeting was requested by the NRC in order to obtain NERC insights regarding the current status of grid legislative and technical issues, and to understand make better use of NERC information for developing and assessing grid reliability trends.

Background

NERC is a non-profit organization that was created after the Northeast blackouts in the 1965 to develop and promote reliability standards/guidelines for the bulk power system. NERC defines grid reliability in terms of the (a) "adequacy" of the generation system as measured by the electric power (megawatt and megavar) margins to provide for uninterrupted electric service, and (b) the "security" of the transmission system to withstand voltage and frequency changes. NERC oversees the implementation of its standards and guidelines by security coordinators in each of the ten NERC geographic areas in the United States. The following provides some of the potential impacts of deregulation to better understand the technical content in meeting notes

The grid and nuclear plant electric design and operating configurations and response to anticipated transients were established before the electric power industry was deregulated to ensure the correct voltages and frequencies on the system and loads. Deregulation may result in unanalyzed grid operating configurations from (a) daily changes in the operable generators from implementing the power market, and (b) power flow changes from the power transaction between distant suppliers and loads. Once the grid (a large electric circuit) configuration is defined, laws of electricity, not the power market or transmission companies, determine how the current divides among the different grid paths under each operating configuration and how the grid responds to anticipated transient. Failure to analyze the grid under for planned or under changing conditions caused by the faults or deregulation, and reconfigure the grid to avoid adverse configurations could result in the following:

- Transmission line congestion, that is, individual transmission current flows that exceed previously established limits and cause abnormal voltages at the nuclear plant(s) while the plants are operating.
- Unexpected responses of the grid following faults on the generation or transmission system, or following a nuclear unit or large plant trip, that cause abnormal voltages and frequencies at the nuclear plant(s).
- Defaults on generation bids may erode reserve capacity margins that are needed to maintain system frequency and voltage stability following a disturbance such as the trip of a large nuclear unit from the grid.

Meeting Highlights

Restructuring Legislation Containing a Reliability Title Delayed and Interim Plan Developed

Congress has been reviewing comprehensive restructuring legislation that contains a reliability title that would authorize creation of a independent, industry national self-regulated electric reliability organization (North American Electric Reliability Organization (NERO) which is likely to be a reorganization of NERC) to ensure the reliability of the interstate and international high voltage transmission grids in a deregulated electric utility industry. The Federal Energy Regulatory Commission (FERC) and the Canadian Provinces would provide oversight of NERO. NERC was informed that the NRC has commented only on the recent OMB bill and Mr. Holden took the action to obtain a contact.

As a result of delays in the legislation, NERC and FERC have developed and implemented "Plan B" in the interim. Plan B features include a memorandum of understanding between FERC and NERC defining consultation and communication protocols; a reorganization of NERC into a 10 member board of trustees elected by a stakeholder committee that also advises on policy and technical matters; and compliance to three NERC standards that require the balancing of generation and demand. The NERC regions have the responsibility for ensuring compliance to these standards.

Technical Issues

NERC and the NRC discussed several operating events. The discussion included the 8/1999 Callaway event involving sustained degraded voltage following a unit trip and 2/2000 Callaway reactor trip as a remote grid disturbance lasting eight minutes that was not isolated. NERC explained 8/1999 event in terms of large power flows from cooler Manitoba Province to the hotter southern U.S. states resulting in transmission congestion lines near Callaway. The 8/1999 Callaway reactor trip exacerbated the condition and resulted in sustained low voltages at Callaway.

Transmission loading relief (TLR's) trends were also discussed. NERC, its regions in cooperation with the transmission companies post TLRs when a transmission line operation exceeds the planned or design limits. High level TLRs require corrective action such as a curtailment of the power transaction. The TLR trends were discussed, noting that the numbers and sources of TLRs was much more in August 2000 than August 1999 in three areas in the

Mid-west. NERC provided a detailed breakdown of TLRs for Year 2000 from which the same observation could be made. The TLR data appeared to support a previous NRC observation based on survey of 17 grid control centers in the U.S. The survey found that in four NERC regions in the Mid-west (3 of areas with increasing TLR trends and in the same area as Callaway) that the implementation of standards, procedures, and contracts had not advanced. NERC stated it would be difficult to draw conclusions without more detail but noted that the TLR is generally an indication that transmission line limits have been exceeded, possibly that schedules are not being coordinated, or real time analysis are not being done.

The apparent generation shortage on the West coast was also discussed, noting that many gas fueled generators may have defaulted on contracts due to unplanned outages. The price of gas natural gas was also discussed noting that market gas prices were above previously established fixed contracted amounts making it uneconomical for some gas powered generators to run. NERC viewed the West coast situation as an isolated case due to the uniqueness of its power market.

NERC Suggestions to the NRC

Based on the operating experience NERC emphasized that potential areas for follow-up include (a) accountability for purchase of the service, (i.e, knowing that the nuclear plant has made the transmission company aware of and made arrangements to meet its steady state and transient offsite power requirements), and (b) verify for each plant the operating voltage limits for the plant auxiliaries, under the conditions being currently experienced, to assure they fall within the operating guides of the system. It was also discussed that the response of the offsite power system to a nuclear plant trip under conditions being currently experienced may change, i.e result in degraded voltage. NERC also suggested training for plant operators relative to grid reliability and simulator inputs that would allow the plant operators to experience low voltage conditions.

NERC concerns for the future were with real time, wider area analysis under conditions being experienced, and real time monitoring and coordination of power system operation to ensure the security of the transmission system. The NRC also solicited suggestions for the upcoming industry workshop and NERC reiterated its suggestions topics that would place emphasis on (a) and (b) above.

Conclusion

This meeting provided an excellent vehicle for information exchange and should be continued on a routine basis, perhaps every 6–12 months. In addition, the operating experiences discussed should heighten the need to fulfill the recommendations in SECY-99-129 that have been endorsed by the Commission. The NERC reliability concerns and grid operating experience appears to support a need for NRR and RES to take on additional initiatives.

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