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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: Additional Information Supporting Request for License Amendment Regarding Measurement Uncertainty Recapture Power Uprate

References:

1. Letter from Craig Lambert (Exelon Generation Company, LLC) to U. S. NRC, "Request for License Amendment Regarding Measurement Uncertainty Recapture (MUR) Power Uprate," dated June 23, 2011 [ML111790030]
2. E-mail from B. Mozafari (U. S. NRC) to L. Holden (et. al.) (Exelon Generation Company, LLC), "Follow-up Question for MUR Electrical Review," dated March 22, 2012
3. E-mail from B. Mozafari (U. S. NRC) to L. Holden (et. al.) (Exelon Generation Company, LLC), "Draft Balance of Plant Request for Additional Information for MUR Review (TAC NOS. ME6587,ME6588, ME6589 AND ME6590)," dated March 29, 2012 [ML12089A490]
4. Letter from Kevin F. Borton (Exelon Generation Company, LLC) to U. S. NRC, " Supplemental Information Supporting Request for License Amendment Regarding Measurement Uncertainty Recapture Power Uprate," dated August 25, 2011 [ML11255A332].
5. Letter from N. J. DiFrancesco (U. S. NRC) to M. J. Pacilio (Exelon Generation Company, LLC), "Braidwood Station, Unit Nos. 1 and 2 and Byron Station, Unit Nos. 1 and 2 – Supplemental Information Needed for Acceptance of Licensing Action Regarding Measurement Uncertainty Recapture Power Uprate (TAC Nos. ME6587, ME6588, ME6589, and ME6590)," dated August 22, 2011 [ML112150563].

In Reference 1, Exelon Generation Company, LLC (EGC) requested an amendment to Facility Operating License Nos. NPF-72, NPF-77, NPF-37 and NPF-66 for Braidwood Station, Units 1

and 2, and Byron Station, Units 1 and 2, respectively. Specifically, the proposed changes revise the Operating License and Technical Specifications to implement an increase in rated thermal power of approximately 1.63% based on increased feedwater flow measurement accuracy. In References 2 and 3, the NRC provided requests for additional information (RAIs) to support review of the proposed changes.

Attachments 1 and 2 to this letter provide information in response to the RAIs in References 2 and 3, respectively. The requested information in Reference 2 is a follow-up to a previous response provided by EGC (Reference 4) to request number 4 from the Electrical Engineering Branch provided in Reference 5.

EGC has reviewed the information supporting a finding of no significant hazards consideration and the environmental consideration provided to the NRC in Reference 1. The additional information provided in this submittal does not affect the previously stated bases in Reference 1 for concluding that the proposed license amendment does not involve a significant hazards consideration. In addition, the information provided in this submittal does not affect the bases for concluding that neither an environmental impact statement nor an environmental assessment needs to be prepared in connection with the proposed amendment.

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this letter, please contact Leslie E. Holden at (630) 657-3316.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 27th day of April 2012.

Respectfully,

Kevin F. Borton
Manager, Licensing - Power Uprate

Attachment 1 Response to Request for Additional Information, NRC E-mail dated March 22, 2012 (Non-Proprietary)

Attachment 2 Response to Request for Additional Information, NRC E-mail dated March 29, 2012 [ML12089A490] (Non-Proprietary)

Braidwood and Byron Stations
Measurement Uncertainty Recapture License Amendment Request (MUR LAR)
April 27, 2012

ATTACHMENT 1

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
NRC E-Mail dated March 22, 2012

(NON-PROPRIETARY)

NRC Electrical Engineering Branch

NRC Request

In response to the staff's request for additional information, Question No. 4, dated August 25, 2011, regarding the post-trip voltage being less than the required minimum for one case (N-1), the licensee stated that there are sufficient existing transmission assets (capacitors) available to maintain Byron Station's post contingency voltage above the 339.8 kV minimum value and, if necessary, contingency actions are in place to utilize off-cost generation. Therefore, the licensee concluded that the offsite power source has adequate capacity and capability to meet the requirements of GDC 17.

The staff understands that, in accordance with transmission system protocol, the licensee needs to address any voltage violations identified in the Com Ed transmission planning study (an assessment to show the capability of the grid to ensure adequate post-trip and LOCA voltage levels). The staff requests the licensee to explain the actions that have been taken to address this single contingency voltage violation.

Response

The Byron Grid voltage analysis documented in Attachment 10b, "ComEd: 2012 Power Grid Voltage Analysis For Byron Generating Station with MUR Power Uprate," of the Measurement Uncertainty Recapture (MUR) power uprate license amendment request (LAR) (Reference A1-1) postulated scenarios including a conservative scenario that identified a potential issue with low voltage in the Byron switchyard for the 75% of the 50/50 load case (i.e., one Byron unit offline and the trip of the operating unit). This postulated scenario is considered conservative because it does not take credit for other readily available transmission or generating assets.

Subsequent to the completion of the grid voltage analysis discussed above, ComEd performed an additional analysis, "Follow-up Analysis for Byron 2012 Grid Adequacy Study," (Reference A1-2). This action confirmed that there are sufficient transmission assets (i.e., existing capacitors that can be switched on remotely) that will maintain the lowest post contingency voltage above the Byron limit. The Transmission Operator (i.e., PJM) is responsible for implementing non-cost actions (i.e., switching on the existing capacitors or taking other actions) as needed to resolve the voltage concern. In addition, there are other generating assets available in the area and the Byron Sensitivity Study Summary (i.e., Appendix B to Attachment 10b (Reference A1-1)) shows that post contingency voltage in the Byron switchyard will remain above the Byron limit if some of these generating assets are placed in service.

PJM and ComEd continuously monitor post-contingency voltages regarding Byron Station. The normal PJM operating protocol is for the Transmission Operator (i.e., PJM) to notify the nuclear power plant operator (i.e., Exelon), through the Transmission Owner (i.e., ComEd), when the post contingency switchyard voltage is predicted to fall below the Byron Station minimum required voltage. PJM Operating Manuals and Byron Station procedures have been developed to control this operating protocol as follows:

- PJM Manual 39, "Nuclear Plant Interface Coordination," Revision 3, Section 2.4, "Notification and Mitigation Protocols for NPRI Voltage Limits," controls the notification and mitigation protocols for nuclear plant voltage limits.

- PJM Manual 3, Transmission Operations," Revision 38, Section 5, "Index and Operating Procedures for PJM RTO Operation," controls the Day-Ahead actions and Real-Time Operator actions for nuclear facilities.
    - If the Day-Ahead studies predict potential low voltage conditions at Byron Station, ComEd would add capacitors as needed to maintain the lowest post contingency voltage above the Byron Station limit and, if necessary, Exelon Generation Company, LLC (EGC) would be informed.
    - If necessary, EGC would authorize PJM to place other generating assets in the area online (i.e., redispatch/off-cost generation) to resolve the potential low voltage conditions.
- Byron Station Abnormal Operating Procedure 0BOA ELEC-1, "Degraded Swyd Voltage," would be entered if predicted or actual degraded grid voltage conditions exist.
    - 0BOA ELEC-1 directs the Byron Station Operator to perform evaluations based on actual Non-ESF 4 kV bus loading to determine if the predicted post Byron Station unit trip voltage or actual voltage is adequate.
- Technical Specifications 3.8.1, "AC Sources Operating," and 3.8.2, "AC Sources-Shutdown," would be entered and the appropriate limiting condition for operation (LCO) applied if the Byron Station Operator determines that the predicted or actual voltage is less than the procedurally specified limit.

Based on the discussion above, and the information provided in the MUR power uprate LAR submittal (Reference A1-1), as supplemented by Reference A1-3, EGC confirmed that the existing measures and resources in-place (i.e., protocols, procedures, and assets) are adequate to address the potential low voltage issue (N-1 case) identified in the ComEd Transmission Planning study (Attachment 10b (Reference A1-1)). Therefore, EGC's evaluations show the offsite power source for Byron Station is adequate and no further actions are necessary.

Referenences:

A1-1 Letter from Craig Lambert (Exelon Generation Company, LLC) to U. S. NRC, "Request for License Amendment Regarding Measurement Uncertainty Recapture (MUR) Power Uprate," dated June 23, 2011 [ML111790030]

A1-2 Letter from Tom Kay (ComEd) to Mark Murskyj (Exelon Generation Company, LLC), "Follow-up Analysis for Byron 2012 Grid Adequacy Study," dated August 11, 2011.

A1-3 Letter from Kevin F. Borton (Exelon Generation Company, LLC) to U. S. NRC, " Supplemental Information Supporting Request for License Amendment Regarding Measurement Uncertainty Recapture Power Uprate," dated August 25, 2011 [ML11255A332]

Braidwood and Byron Stations
Measurement Uncertainty Recapture License Amendment Request (MUR LAR)
April 27, 2012

ATTACHMENT 2

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION [ML12089A490] NRC E-Mail dated March 29, 2012

(NON-PROPRIETARY)

NRC Balance of Plant Branch

NRC Request

Section 3.6.1.1 of the Braidwood and Byron Updated Final Safety Analysis Report (UFSAR), "Design Basis," contains the criteria related to the classification of high energy and moderate energy fluid systems at Braidwood and Byron. Further, Section 3.6.1.1.1 of the Braidwood and Byron UFSAR, "Definitions," defines a high energy fluid system at these facilities as one where either or both of the following requirements are met: maximum operating temperature exceeds 200 °F or maximum operating pressure exceeds 275 psig. Additionally, Section 3.6.1.1.1 of the Braidwood and Byron UFSAR defines a moderate energy fluid system as those systems which are either in operation or maintained pressurized (above atmospheric pressure) during normal plant conditions and meet the following requirements: maximum operating temperature is 200 °F or less and maximum operating pressure is 275 psig or less. However, Section VII.6.B of Attachment 7 to the Braidwood and Byron measurement uncertainty recapture (MUR) power uprate submittal states:

> *High-energy pipe breaks are analyzed for piping for which the maximum operating pressure exceeds 275 psig and the maximum operating temperature equals or exceeds 200 deg F. High-energy pipe cracks are postulated in piping for which either the operating pressure exceeds 275 psig or the operating temperature equals or exceeds 200 deg F.*

a) *Address the apparent discrepancy between the MUR power uprate license amendment request submittal and the UFSAR criteria related to the classification of high and moderate energy systems at Braidwood and Byron.*

b) *Confirm that the evaluations performed to support the implementation of the MUR power uprate at Braidwood and Byron appropriately considered the criteria stipulated in the UFSAR related to high and moderate energy fluid system classification and high energy line break and moderate energy line crack postulation.*

Response

a) The referenced statement from Section VII.6.B, "High Energy Line Break Program," of the Measurement Uncertainty Recapture (MUR) power uprate license amendment request (LAR) (Reference A2-1) was not intended to define what constitutes high and moderate energy line systems. The correct definition is defined in UFSAR section 3.6.1.1.1. The MUR evaluation for high energy lines used the definition in the UFSAR.

b) The MUR power uprate evaluations were performed using the same classification criteria for high and moderate energy fluid systems as in UFSAR Sections 3.6.1, "Postulated Piping Failures in Fluid Systems Outside the Containment," 3.6.2, "Determination of Break Locations and Dynamic Effects Associated with the Postulated Break of Piping," and 3.11.10, "High Energy Line Breaks (HELB)." The MUR power uprate evaluations appropriately considered the UFSAR criteria related to high and moderate energy fluid system classification, and high energy line break and moderate energy line crack postulation.

The high energy line break evaluations were performed consistent with the Byron/Braidwood UFSAR by evaluating the high energy systems for potential increases in stress. As discussed in LAR Section IV.1.B.vii, “High-Energy Line Break,” the evaluations concluded that the total pipe stresses were not significantly impacted. As such, no new break locations were added due to the MUR power uprate. The evaluations also considered whether MUR power uprate operating conditions resulted in any new high energy systems. No new high or moderate energy systems were added as a result of evaluation at MUR power uprate conditions, and no new high energy line break or moderate energy line crack locations were identified.

Subsequent to the submittal of the MUR power uprate LAR, Byron and Braidwood identified a discrepancy between UFSAR Section 3.6.2.1.2.1 and the site design specification regarding the need to postulate high energy leakage cracks. This issue has been entered into the corrective action program at both sites and resolution and corrective actions are in progress. As discussed above, since the MUR power uprate did not result in any new high energy line breaks, it is expected that there will be little or no impact on high energy line leakage cracks due to the MUR power uprate. This information is being provided for completeness.

Referenence:

A2-1 Letter from Craig Lambert (Exelon Generation Company, LLC) to U. S. NRC, "Request for License Amendment Regarding Measurement Uncertainty Recapture (MUR) Power Uprate," dated June 23, 2011 [ML111790030]