From: Mozafari, Brenda
Sent: Wednesday, January 18, 2012 7:36 PM
To: Leslie.Holden@exeloncorp.com
Cc: Lisa.Schofield@exeloncorp.com
Subject: Draft Balance of Plant RAIs related to MUR dated June 23, 2011

Leslie,

Pursuant to 10 CFR 50.90, by letter to the Nuclear Regulatory Commission (NRC) dated June 23, 2011, the Exelon Generation Company, LLC (the licensee), submitted a license amendment request (LAR) for the Byron Station Units 1 and 2 and Braidwood Station Units 1 and 2. The proposed measurement uncertainty recapture power uprate would increase the current licensed thermal power at Byron Station Units 1 and 2 and Braidwood Station Units 1 and 2, by approximately 1.63 percent. The NRC staff has identified additional information (shown below) that is needed to complete the technical review.

After you have had time to consider your response, we can schedule a call to provide any clarifications and discuss your planned response. I will provide the questions formally after our discussion, however we would expect the RAI questions to be responded to by letter within 30 days (by February 20, 2012). This is the third email on MUR RAIs today and the formal letter will be provided as soon as possible. Please let me know when you are ready for a telecom for clarification and discussion of the path forward.

Thanks,

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REQUEST FOR ADDITIONAL INFORMATION BYRON STATION, UNITS 1 AND 2 AND BRAIDWOOD STATION, UNITS 1 AND 2
LICENSE AMENDMENT REQUEST MEASUREMENT UNCERTAINTY RECAPTURE POWER UPRATE (TAC NOS. ME6587, ME6588, ME6589 AND ME6590)

BRAIDWOOD STATION, UNIT NOS. 1 & 2, AND BYRON STATION, UNIT NOS 1 & 2
REQUEST FOR FOLLOW-UP ADDITIONAL INFORMATION REGARDING MEASUREMENT UNCERTAINTY RECAPTURE (MUR) POWER UPRATE
TAC NOS. ME6587, ME6588, ME6589, ME6590

SBPB - RAI – 1

Technical Specification (TS) 3.7.4 for the steam generator (SG) power-operated relief valves (PORVs) currently allows 24 hours completion time to restore all but one of the four PORVs when two or more PORVs are inoperable. Hence, the TS action statement would allow all four PORVs to be inoperable for 24 hours.

The analysis for a steam generator tube rupture (SGTR) credits the use of two PORVs to cooldown the reactor coolant system (RCS) rapidly to achieve a subcooling margin in order to start depressurizing the RCS to stop the break flow. The analysis identifies the most limiting single failure as a failure of a SG PORV on an intact steam generator. Thus, the licensee credits the SG PORVs with a high significance for successfully mitigating a SGTR. The current TS that allows 24 hours for all four PORVs to be inoperable (loss of function) may not be appropriate.

Justify the current TS action statement that allows all four SG PORVs to be inoperable based on the new SGTR analysis.

SBPB - RAI – 2

The licensee identifies the SG PORVs as being a key component in mitigating a SGTR from an overfill condition. The licensee identified a SG PORV failing to open on one of the intact SGs as the most limiting failure for the margin to overfill (MTO) analysis. Modifications were made to reduce the current vulnerability of a single failure making two SG PORVs inoperable by installing an uninterruptible
power supply (UPS).

In Table I-2 “Steam Generator Tube Rupture Equipment List” the licensee states, “Table I-2 identifies the systems, components, and instrumentation which are credited for accident mitigation.” The Table I-2 does not list the SG PORV controllers.

Provide a description of the PORVs electrical systems, to include power supplies to the controllers and circuitry, and include any other circuits that would affect the SG PORV’s ability to perform its function; identify any shared components (electrical, mechanical, I&C, etc.); and justify not including the SG PORV controllers.

SBPB - RAI – 3

The licensee is making modifications to the auxiliary feedwater (AFW) flow control valves to include an air accumulator tank capable of supplying air for 30 minutes. In accordance with their analysis, AFW flow control is required longer than 30 minutes to mitigate the SGTR and for RCS cool down. In Attachment 5a, Section II.2.E, Single Failure Considerations, the licensee states:

> In addition, since the failure of an intact SG PORV scenario assumes a loss of offsite power
> with an associated loss of Instrument Air (IA), the modification described in Section II.2.F,
> Item 1, assures that AFW flow control is maintained throughout the event.

According to the licensee’s evaluation, a SGTR event continues until break flow is terminated at 3458/3258 seconds (Units 1/2).

Describe the basis for selecting 30 minutes, and explain how the amount of air that is required is determined and the amount of air available to support this function.

SBPB - RAI - 4

Figure II-5 of Attachment 5a shows the SG water volume on Unit 1 trending towards the maximum available quantity. At approximately 3200 seconds the trend tapers off, resulting in a

margin to overfill of approximately 94 cubic feet. At the same time other graphs show a sharp reduction in SG pressure, which logically corresponds to a second opening of the SG PORVs on the intact SGs. This action stops the upward trend and prevents the overfill condition. The licensee does not identify a critical operator action to open the SG PORVs a second time within a certain time period as a condition preventing an overfill of the SG.

In UFSAR Section 15.6.3.2, under the section describing major operator actions, the licensee's analysis credits operators reopening pressurizer PORV, four minutes after establishing normal charging and letdown, in order to equalize the RCS and SG pressures.

In Attachment 5a (page II-10), the licensee states that the SG PORVs on the intact SGs automatically open as necessary to maintain RCS subcooling margin. The abovementioned graph trend shows a sharp pressure reduction at 3200 seconds, which is not indicative of SG PORV automatically controlling pressure at a prescribed setpoint.

a) Evaluate whether this operator action is credited to be performed within a specific time in order to prevent an overfill condition.

b) If operator action is required, identify the action as a critical operator action.

c) Describe whether the new analysis changes the existing UFSAR analysis, and results in the major operator action opening a SG PORV rather than a pressurizer PORV after SI termination to stop an overfill condition from occurring.

SBPB - RAI - 5

Calculation Westinghouse commercial atomic power (WCAP) -10698-P-A provides a general assessment of the MTO for Westinghouse type reactors. There were instances where the licensee deviated from the input parameters selected in WCAP-10698-P-A as the most conservative.

a) Decay heat is one of the input factors that influence MTO analyses and Thermal/Hydraulic analyses during a tube rupture. For the MTO analysis, the licensee states that plant specific
sensitivities were performed for Bryon and Braidwood Units 1 and 2. These studies concluded that the 1979-2σ American Nuclear Society (ANS) decay heat factor was more conservative compared to the 1971 +20% ANS decay heat model specified in WCAP-10698-P-A.

Justify use of the 1979-2σ ANS decay heat factor was more conservative compared to the 1971 +20% ANS decay heat factor.

b) Similar to above, in determining the most conservative input values, the licensee chose to model the minimum AFW enthalpy of 0.03 Btu/lbm; whereas, WCAP-10698-P-A models the
maximum temperature of AFW (maximum enthalpy) as the most conservative parameter in
the analysis for MTO.

Justify how the use of the minimum AFW enthalpy is more conservative compared to using the maximum temperature (enthalpy) for AFW.