NRR-PMDAPEm Resource

From: Kuntz, Robert
Sent: Friday, November 18, 2016 11:12 AM
To: 'Loeffler, Richard A.'
Subject: Monticello ILRT extension amendment Request for additional information (CAC No. MF7359)

Mr. Loeffler,

In a letter dated February 10, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16047A272) the Northern States Power Company, a Minnesota corporation, doing buiseness as Xcel Energy (hereafter "NSPM" or “the licensee”), requested an amendment to Renewed Facility Operating License No. DPR-22 in the form of changes to the Technical Specifications (TSs) for the Monticello Nuclear Generating Plant (MNGP).

The License Amendment Request (LAR) proposes changes to Appendix A, TSs, to allow extension of the 10-year frequency of the Type A Integrated Leak Rate Test (ILRT) that is required by TS 5.5.11 to 15 years on a permanent basis.

The Nuclear Regulatory Commission (NRC) staff is reviewing the submittal and has determined that the additional information below is needed to complete its review. Below is a request for additional information. As agreed upon, the NRC staff anticipates a response to the following by December 16, 2016.

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**DRAFT REQUEST FOR ADDITIONAL INFORMATION RELATED TO LICENSE AMENDMENT REQUEST FOR CHANGE TO TECHNICAL SPECIFICATION 5.5.11 TO PROVIDE A PERMANENT EXTENSION OF THE INTEGRATED LEAKAGE RATE (TYPE A) TEST FREQUENCY FROM TEN TO FIFTEEN YEARS
MONTICELLO NUCLEAR GENERATING PLANT
DOCKET NO. 50-263**

1. The license amendment request (LAR) Section 5.3.1 of Enclosure 2 provides the evaluation of external event contribution.

   a. The method used in the LAR to calculate the seismic change in large early release frequency (LERF) does not consider that pre-existing flaws in Class 3a (i.e., smaller flaws not considered LERF contributors) may grow due to a seismic initiating event and may not remain a Class 3a flaw type for some seismic initiators. Potential flaw growth may be a result of the initiating event rather than as a result of the accident sequence of events.

      Consider the potential for Class 3a flaw growth, given a seismic event, for the seismic risk contribution to the integrated leak rate test (ILRT) extension. Describe your method, technical justification, and results for the application. Alternatively, perform an appropriate sensitivity study to determine the risk significance of Class 3a flaw growth potential due to seismic events and provide the sensitivity analysis results impact on the risk metrics for the application.

b. The LAR references the results from the Individual Plant Examination of External Events (IPEEE) for high winds, tornadoes, external floods, transportation accidents, nearby facility accidents, and other external hazards which resulted in screening these events from further consideration. Since the IPEEE was completed in November 1995, assess the current plant for the external event contribution and discuss your assessment performed for the ILRT extension application.

c. Confirm that the fire probabilistic risk assessment (PRA) represents the as-built, as-operated plant. If there are plant modifications or procedures that are credited in the fire PRA but not completed, then remove them from the model so that the fire PRA represents the as-built, as-operated plant, and provide the updated core damage frequency (CDF) and LERF for the application.

2. The LAR provides the results of sensitivity analyses on steel liner corrosion in Tables 5-17, 5-18 and 5-19. According to the LAR, the likelihood on non-detected containment leakage due to corrosion is applied to "those core damage accidents that are not already independently LERF or that could never result in LERF". The steel liner corrosion likelihood is increased by a factor of 1000, 10000, and 100000 for the sensitivity analyses. It is not clear how these steel liner corrosion sensitivity analyses were performed. As reported in Table 5-17, instead of increasing, the Class 3b frequency appears to drop by two to three orders of magnitude when including the effects of corrosion.

   a. Explain how the steel liner corrosion sensitivity analyses were performed, and provide example(s).

   b. Table 5-17 shows a case, "corrosion likelihoodx100000," with an increase in LERF of 2.81E-9/yr for the ILRT frequency change from 3-in-10 years to 1-in-15 years. Clarify whether this is considered an "upper bound" case and explain why the LERF result is low if the case represents a significant increase in the likelihood of not detecting a flaw.

3. Table 5-2 of Enclosure 2 to the LAR shows that the total internal events LERF is 9.20E-7/yr. Table 5-5 shows that LERF (no bypass) is 6.6E-7/yr, and Table 5-7 shows that the containment bypass frequency is 2.88E-9/yr. The sum of frequencies from Tables 5-5 and 5-7 for LERF (no bypass) and bypass is less than the total internal events LERF reported in Table 5-2. Please clarify this discrepancy and its significance for the application.

4. According to the LAR containment over-pressure is required for Emergency Core Cooling System (ECCS) performance. Section 5.2.4 of Electric Power Research Institute (EPRI) Report No. 1009325, Revision 2 includes guidance for plants that rely on containment over-pressure for net positive suction head (NPSH) for ECCS injection. It is not clear how the analysis for containment accident pressure (CAP) provided in Section 5.3.4 of Enclosure 2 to the LAR is consistent with this guidance. The EPRI report provides the following examples of accident scenarios to be considered:

   - Loss of coolant accident (LOCA) scenarios where the initial containment pressurization helps to satisfy the NPSH requirements for early injection, and

   - Total loss of containment heat removal scenarios where gradual containment pressurization helps to satisfy the NPSH requirements for long-term use of an injection system from a source inside containment.

   The LAR refers to "LOCA initiators," which is not necessarily the same as a LOCA scenario (when the LOCA is not the initiating event). LOCA initiators, as shown in Table 5-1 of Enclosure 2 to the LAR, are a relatively small contributor to the internal events CDF. However, other internal events initiators (e.g., transients) or conditions (e.g., station blackout) could result in a consequential LOCA. In addition, it is not clear whether the scenarios involve early or long-term injection.

a. The EPRI guidance suggests a broader set of scenarios than those provided in the LAR. In fact, the EPRI guidance is to adjust the PRA model to account for CAP if accident scenarios could be impacted by a large containment failure that eliminates the necessary CAP. Explain how the two LOCA scenarios described in Section 5.3.4 of the LAR are sufficient for the CAP sensitivity analysis given the EPRI guidance, or perform an updated analysis using the PRA model. In any case, confirm that the PRA model used for the CAP risk assessment included all initiating events or conditions which correspond to the two EPRI guidance general event categories.

b. If an updated analysis is performed, describe this analysis and justify why it is sufficient to evaluate the risk due to the containment accident pressure for the application.

c. Confirm that PRA model changes did not result in CAP-related non-minimal cutsets (e.g., inappropriate combination of random and CAP-related failures).

d. The external events risk contribution described in the LAR does not include CAP-related risk. Include CAP-related risk in the evaluation of external events risk, and describe your approach.

e. The LAR uses a method of assuming that the CAP-related change in CDF is equal to change in LERF. Describe the method used for estimating the updated change in LERF if different from the LAR.

5. The NRC staff requests additional information for the following CAP-related key assumptions and uncertainties:

1) Existing plant conditions impacting NPSH;
2) Operator action to throttle low pressure ECCS flow;
3) High Pressure Injection (HPI) lube oil cooling;
4) Systems available following a loss of instrument air system initiating event;
5) Loss of Offsite Power (LOOP)/Station Blackout (SBO) PRA modeling; and,
6) Containment leakage rate that would impact CAP

a. Confirm the list above is a complete list of CAP-related key assumptions and sources of uncertainty.

b. The LAR applies PRA credit for existing plant conditions impacting NPSH. The probabilities are given to be 0.1 and 0.5 (Section 5.3.4 of the LAR). Address the following:

i. Clarify what the assumed probabilities of 0.1 and 0.5 represent and explain their technical basis.

ii. The ILRT frequency extension CAP risk assessment postulates a pre-existing flaw sufficient to defeat CAP. Explain why the NPSH justification provided above for these two probabilities is applicable given that CAP is defeated. If the justification is not applicable remove this PRA credit.

iii. EPRI guidance includes two general categories of events involving early injection or gradual containment heat up with long term injection. If PRA credit is determined to be applicable in part ii for plant conditions impacting NPSH, describe how the PRA model is adjusted to account for plant conditions challenging NPSH. Explain how it was determined to use the probabilities of 0.1 or 0.5 on a sequence-by-sequence basis for PRA sequences belonging to the two EPRI general event categories. Account for sequence timing with respect to NPSH conditions (e.g., LOCAs, SBO-recovery, etc). If sequences have not been analyzed in sufficient detail to distinguish between which probability applies to the PRA sequences, then describe how the PRA model is adjusted to account for plant conditions challenging NPSH.

Explain which sequences are credited. If the PRA credit does not have technical justification for plant conditions which challenge NPSH, remove this PRA credit.

c. The LAR applies PRA credit for operator action to throttle low pressure ECCS flow. Describe the technical basis supporting ECCS throttling as a success criteria for containment conditions which defeat CAP for the PRA mission time. Describe which PRA sequences are credited and not credited.

d. Explain how the PRA model was adjusted to account for CAP-related impact on high pressure injection (HPI) lube oil cooling, and discuss the justification for PRA credit taken for HPI. If credit is taken for injection from other sources (e.g., condensate storage tank) confirm that it reflects plant operating procedures and is a PRA success criteria for the PRA mission time.

e. For the loss of instrument air system initiating event explain which systems the PRA credits as available for CAP-related mitigation. Include a discussion on how the Residual Heat Removal (RHR) Service Water system is credited in the PRA model for CAP-related CDF and LERF. Explain whether or not the RHR Service Water system is a risk-significant system for CAP-related risk and provide justification for your conclusion.

f. Discuss how the PRA modeled LOOP and SBO-related loss of CAP for the CAP-related CDF and LERF. Explain whether or not LOOP/SBO are risk-significant contributors for CAP-related risk and provide justification for your conclusion.

g. Discuss how the containment leakage rate that would fail CAP is considered in the CAP risk assessment. Discuss the basis for this assumption and explain how it impacts the CAP risk assessment.

h. If the PRA was adjusted to account for key assumptions or sources of uncertainties, or otherwise changed for the CAP risk assessment, describe these PRA changes. Provide updated results (change in CDF and change in LERF) for the CAP risk assessment.

i. Provide sufficient technical justification for any PRA credits which are significant in addressing any of the key assumptions/sources of uncertainties for the CAP risk assessment. Include in the discussion how the key assumptions/ sources of uncertainty are addressed, if necessary, for CAP to help ensure that the overall plant risk metrics for the ILRT frequency extension request would be within acceptance guidelines.

6. The results of the ILRT extension risk assessment are given in Table 6-1 of the LAR for the change in population dose, change in percent dose, change in LERF, and change in conditional containment failure probability (CCFP). These results appear to be based on internal events only.

a. In addition to the internal events risk, the risk contribution from external events, steel liner corrosion, and CAP, should also be included in the overall plant results for the risk metrics (change in population dose, change in percent dose, change in LERF, and change in CCFP), as appropriate. Accordingly, provide updated results for the LAR which reflect changes made for the ILRT frequency extension risk assessment.

b. Provide the overall plant results (the change in population dose, change in percent dose, change in LERF, and change in CCFP) for a sensitivity analysis in which PRA credit is removed from the CAP risk assessment for 1) plant conditions impacting NPSH, and 2) operator action to throttle low pressure ECCS flow.

c. Evaluate the need to decrease the change in LERF to account for key assumptions and uncertainties. Discuss any potential measures to decrease the change in LERF if necessary.

d. The LAR Section 5.3.1 of Enclosure 2 shows that the total LERF for the plant is 9.08E-6/yr, which is close to the Regulatory Guide (RG) 1.174 acceptance guideline of 1E-5/yr for LERF. Due to the small margin to 1E-5/y for total baseline LERF, the NRC staff requests that if the total LERF is above the RG 1.174 acceptance criteria of 1E-5/yr as a result of updated analyses, then discuss measures which may be taken to address this acceptance guideline. In addition, confirm that the total baseline CDF remains below the RG 1.174 guideline of 1E-4/yr, or, if this is not the case, address measures to reduce the total CDF also.

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