NRR-PMDAPEm Resource

From: Kuntz, Robert
Sent: Tuesday, July 26, 2016 2:49 PM
To: Hazelhoff, Amy (Amy.Hazelhoff@xenuclear.com)
Cc: Eckholt, Gene F.; Robinson, Jay
Subject: Prairie Island Nuclear Generating Plant - Requests for Additional Information re: LAR to Adopt NFPA 805 (CAC Nos. ME9734 and ME9735)

Ms. Hazelhoff,

By letter dated September 28, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12278A405), Northern States Power Company, a Minnesota corporation (NSPM, the licensee), doing business as Xcel Energy, submitted a license amendment request (LAR) to transition its fire protection licensing basis at the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2, from paragraph 50.48(b) of Title 10 of the Code of Federal Regulations (10 CFR) to 10 CFR 50.48(c), National Fire Protection Association Standard NFPA 805 (NFPA 805). Supplemental information has been requested by the NRC staff and provided NSPM.

The latest supplemental information was provided by NSPM in letter dated May 24, 2016 (Accession No. ML16152A046). Enclosure 1 to the letter provides NSPM's response to PRA RAI 03, including the response to PRA RAI 01.h. Enclosure 2 provides licensee identified LAR changes. Enclosure 3 provides an updated LAR Attachment M, License Condition Changes. Enclosure 4 provides an updated LAR Attachment S, Plant Modifications and Items for Implementation. Enclosure 5 provides an updated LAR Attachment W, Fire PRA Insights. The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the May 24, 2016, letter and determined that additional information is required to complete its technical review.

A requests for additional information (RAI) is provided below. As discussed, the staff requests a response to the RAI by August 19, 2016.

If you have any comments or questions on this request let me know.

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PRA RAI 01.h.01

The response to PRA RAI 01.h demonstrated through a sensitivity analysis that the total plant-level core damage frequency (CDF) for PINGP, Units 1 and 2, as well as the total delta (Δ) CDF for PINGP, Unit 1 exceed RG 1.174, Revision 2, “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant Specific Changes to the Licensing Basis” (ADAMS Accession No. ML100910006), risk acceptance guidelines should the generic fire ignition frequencies be based upon those in Table 6-1 of NUREG-CR-6850, “EPRI/NRC-RES Fire PRA [FPRA] Methodology for Nuclear Power Facilities, Volume 2: Detailed Methodology.” However, inconsistent with accepted guidance in Chapter 10 of NUREG/CR-6850, Supplement 1, “Fire Probabilistic Risk Assessment Methods Enhancements,” the response did not describe fire protection, or related, measures that can be taken to provide additional defense-in-depth (DID); rather, the response only indicated that DID was already evaluated as part of the fire risk evaluations (FREs) for each fire area. Moreover, while the response identified the general conservatisms in the analysis, it did not discuss the risk significance of these conservatisms for those fire scenarios or areas most impacted by the sensitivity analysis. Therefore, as originally requested in PRA RAI 01.h, and commensurate with any potential increase in

risk significance associated with use of generic fire ignition frequencies based upon those in Table 6-1 of NUREG/CR-6850, provide the following: (1) describe the fire protection, or related, measures that will be taken to provide additional DID, and (2) discuss relevant conservatisms in the analyses for those scenarios most impacted by the sensitivity studies and the risk significance of those conservatisms.

PRA RAI 20

The discussion provided under Item 14 of Licensee-Identified Issue 5, included in Enclosure 2 to the letter dated May 24, 2016 (see page 68 of 74 of Enclosure 2), explains that the scope of modifications described in LAR Attachment S, Table S-2, Modification Item S2-10 has been reduced. As a result, the FPRA appears to have been updated to explicitly model the risk of the resulting breaker coordination and cable protection vulnerabilities and associated variance from deterministic requirements (VFDRs). Item 22 of Licensee-Identified Issue 5 (see page 70 of 74) discusses similar issues. In particular to circuit overcurrent protection inadequacies, the letter discusses that they are associated with fire damage to external direct current (DC) control cables that support overcurrent protection for medium voltage (4.16KV) switchgear breakers. While Items 14 and 22 of Licensee-Identified Issue 5 provide some discussion of how these inadequacies are modeled in the FPRA, this discussion is limited and does not provide sufficient detail for the NRC staff to complete its review. Provide the following information:

a) Explain how inadequate coordination and overcurrent protection was modeled in the FPRA, and justify that this treatment addresses the failures that could occur as a result of the identified circuit inadequacies.

b) Include a description of the circuit failure modes addressed and how associated component failures were modeled in the FPRA. Also, describe and justify assumptions made in the FPRA about how fire-induced faults associated with inadequately coordinated/protected circuits impact upstream and downstream components from the fault.

c) Given the lack of electrical coordination and cable protection as a result of the reduced scope of modifications discussed in Items 14 and 22 of Licensee-Identified Issue 5, include an explanation of how the potential for secondary fires was addressed in the FPRA. If secondary fires were not modeled and fire-induced faults in inadequately protected circuits could lead to secondary fires, then justify this modeling exclusion.

d) In line with the issues described above, the NRC staff also notes that a risk-informed (RI) approach was used in association with a reduction in scope of circuit-protection-related modifications (e.g., Item S2-10 of LAR Attachment S, Table S-2) by modeling overcurrent failure modes and secondary fires. These modifications would have provided overcurrent trip protection for certain circuits. As a result,

    i. Describe how the plant response model addresses fire-induced faulting of one or more load circuits at the same time that DC control power has been lost due to fire damage.

    ii. Explain how the lack of circuit protection and the resulting potential for common enclosure issues are analyzed.

    iii. Discuss the potential for secondary fires and describe how secondary fires are modeled (e.g., fire size, zone of influence, propagation, etc.).

    iv. Discuss the potential for high energy arcing faults to be created as a result of the inability to clear fire-induced load faults at the load breaker, and describe how such faults are modeled (fault location, zone of influence, fire propagation, etc.). Without DC control power being available at the switchgear, circuit breakers upstream may have to clear the fault and those

breakers will very likely have a much higher overcurrent setpoint than that required to protect the integrity of the cables being faulted.

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