

NRR-DMPSPeM Resource

From: Dietrich, Allison
Sent: Thursday, July 19, 2018 9:03 AM
To: Helen L Levendosky
Cc: Joe Tanko (jmtanko@aep.com)
Subject: D.C. Cook Unit No. 1 - RAI for Leak-Before-Break LAR (EPID L-2018-LLA-0054)
Attachments: DC Cook U1 RAI for LBB LAR.pdf

Follow Up Flag: Follow up
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By letter dated March 7, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18072A012), Indiana Michigan Power Company (I&M) submitted a license amendment request (LAR) for the Donald C. Cook Nuclear Plant (CNP), Unit No. 1. The proposed amendment would allow for the application of leak-before-break methodology to piping for the accumulator, residual heat removal, and safety injection systems at CNP, Unit No. 1.

The U.S. Nuclear Regulatory Commission staff has reviewed your submittal. The staff has determined that additional information is needed in order to complete the review, as described in the attached request for additional information (RAI). The draft RAI was sent to I&M via electronic mail on July 3, 2018. A clarification telephone conference was held on July 17, 2018. Please respond to this RAI by September 17, 2018.

Please feel free to contact me if you have any questions or concerns.

Sincerely,

Allison W. Dietrich, Project Manager
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REQUEST FOR ADDITIONAL INFORMATION REGARDING
LICENSE AMENDMENT REQUEST FOR APPLICATION OF
LEAK-BEFORE-BREAK EVALUATIONS FOR
ACCUMULATOR, SAFETY INJECTION, AND RESIDUAL HEAT REMOVAL PIPING
DONALD C. COOK NUCLEAR PLANT, UNIT NO. 1
DOCKET NO. 50-315

By letter dated March 7, 2018 (Reference 1), Indiana Michigan Power Company (I&M, the licensee) submitted a license amendment request (LAR) that would allow for the application of leak-before-break (LBB) evaluations for accumulator piping, safety injection piping, and residual heat removal piping at the Donald C. Cook Nuclear Plant (CNP), Unit No. 1. The NRC staff has determined that additional information is necessary in order to complete its review.

Request for Additional Information (RAI)-1

Two weld locations in pipe Segment III of the accumulator lines have lower maximum faulted stresses than 5 weld locations in pipe Segments I and II as shown in Table 5-1 of WCAP-18295 (Reference 2). However, Table 6-1 of WCAP-18295 shows that the 2 weld locations in Segment III have much larger leakage flaw sizes than the 5 weld locations in pipe Segments I and II.

Since it would be expected that weld locations having high faulted stresses would lead to a larger leakage flaw size than the weld locations with lower faulted stresses, explain why the 2 weld locations in pipe Segment III have larger leakage flaw sizes than the 5 weld locations in pipe Segments I and II.

RAI-2

Table 7-1 of WCAP-18295 shows that the 2 weld locations (2-SI-56-3-458F and 2-SI-56-3-456) in pipe Segment III have an exact margin of 2.0 between the critical crack size and leakage crack size. The weld locations in Segments I and II have much higher margins between the critical crack size and leakage crack size. The footnote to Table 7-1 states that the calculation for welds, 2-SI-56-3-458F and 2-SI-56-3-456, is based on the methodology in Section 7.2, which is the J-integral method. The critical crack size for the weld locations in pipe Segments I and II was calculated based on the limit load method.

- a) Explain why the critical crack size for welds 2-SI-56-3-458F and 2-SI-56-3-456 were calculated based on the J-integral method, whereas the critical crack size for the rest of welds were calculated based on the limit load methods.
- b) Section 7.2 of WCAP-18295 discusses the J-integral method in general, but does not present any details of the critical crack size calculation using the J-integral method. Provide the details of critical crack size calculation for welds 2-SI-56-3-458F and 2-SI-56-3-456, such as the Ramberg-Osgood parameter and exponent, load combinations, J applied, and J resistance.

RAI-3

Section 8 of WCAP-18295, WCAP-18302 (Reference 3), and WCAP-18309 (Reference 4) states that fatigue crack growth is not required based on the NRC Standard Review Plan (SRP). It is noted that in the LBB applications for the primary loop piping in 1999, and pressurizer surge line in 2000, the licensee performed fatigue crack growth calculation for the primary loop piping and pressurizer surge piping as shown in WCAP-15131, (Reference 5) and WCAP-15434 (Reference 6).

Consistent with SRP, Section 3.6.3.III.11.C.v (Reference 7), demonstrate that the crack growth is stable and the final crack size is limited such that a double-ended pipe break will not occur. Alternatively, explain why fatigue crack growth analysis is not required for the accumulator, residual heat removal, and safety injection lines.

RAI-4

By letter dated November 8, 2000 (Reference 8), the NRC approved the LBB application for the pressurizer surge line for CNP Unit Nos. 1 and 2. In the corresponding safety evaluation, in accordance with SRP 3.6.3, the NRC staff reviewed the load combinations, including torsional moments, on the pressurizer surge line piping.

Consistent with SRP, Section 3.6.3.III.11.C.ii, explain how torsional moments were considered in the load combinations in WCAP-18295, WCAP-18302, and WCAP-18309 when calculating the critical crack size.

RAI-5

The NRC has approved the license renewal application for CNP Unit No. 1. In Section 3.3 of Enclosure 2 to the LAR, the licensee stated that the LBB analysis does not include any time dependencies, and the LBB application would not impact CNP Unit No. 1 license renewal.

Provide justification why the LBB analysis has no impact on CNP license renewal. Specifically, explain why the fatigue crack growth of postulated flaws in the subject piping was not performed for the period of extended operation.

RAI-6

By letter dated December 20, 2002 (Reference 9), the NRC approved a measurement uncertainty recapture power uprate for CNP Unit 1. The staff notes that pipe loads may be increased after implementing the power uprate.

Discuss whether the pipe loads used in the LBB analysis for the subject piping include the effects of power uprate. If not, explain.

REFERENCES

1. Letter from Q. Lies, I&M, to U.S. NRC, "Donald C. Cook Nuclear Plant Unit 1 Request for Approval of Application of Proprietary Leak-Before-Break Methodology for Reactor Coolant System Small Diameter Piping," March 7, 2018 (ADAMS Accession No. ML18072A012)

2. WCAP-18295, Revision 0, "Technical Justification for Eliminating Accumulator Line Rupture as the Structural Design Basis for the D.C. Cook Units 1 and 2, Using Leak-Before-Break Methodology," January 2018 (Proprietary: ADAMS Accession No. ML18072A016; Non-Proprietary: ML18072A013)
3. WCAP-18302, Revision 0, "Technical Justification for Eliminating Residual Heat Removal Line Rupture as the Structural Design Basis for the D.C. Cook Units 1 and 2, using Leak-Before-Break Methodology," (Proprietary: ADAMS Accession No. ML18072A017; Non-Proprietary: ML18072A014)
4. WCAP-18309, Revision 0, "Technical Justification for Eliminating Safety Injection Line Rupture as the Structural Design Basis for the D.C. Cook Units 1 and 2, using Leak-Before-Break Methodology," January 2018 (Proprietary: ADAMS Accession No. ML18072A018; Non-Proprietary: ML18072A015)
5. WCAP-15131, Revision 1, "Technical Justification for Eliminating large Primary Loop Pipe Rupture as the Structural Design Basis for the D.C. Cook Units 1 and 2 Nuclear Power Plants" (Proprietary)
6. WCAP-15434, Revision 1, "Technical Justification for Eliminating Pressurizer Surge Line Rupture as the Structural Design Basis for D.C. Cook Units 1 and 2 Nuclear Power Plants" (Proprietary)
7. NUREG-0800, U.S. NRC Standard Review Plan, Section 3.6.3, "Leak-Before-Break Evaluation Procedures," (ADAMS Accession No. ML063600396)
8. Letter from J. Stang, NRC, to R. Powers, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 – Review of Leak-Before-Break for the Pressurizer Sure Line Piping as Provided by 10 CFR Part 50, Appendix A, GDC 4 (TAC Nos. MA7834 AND MA7835)," dated November 8, 2000 (ADAMS Accession No. ML003767675)
9. Letter from J. Stang, NRC, to C. Bakken III, I&M, "Donald C. Cook Nuclear Plant, Unit 1 – Issuance of Amendment 273 Regarding Measurement Uncertainty Recapture Power Uprate (TAC NO. MB5498)," dated December 20, 2002 (ADAMS Accession No. ML023470126)