

NRR-PMDAPEm Resource

From: Beltz, Terry
Sent: Monday, July 21, 2014 6:36 AM
To: Helen L Etheridge
Cc: Terry L Curtiss (tlcurtiss@aep.com); Joe Tanko (jmtanko@aep.com); 'mkscarpello@aep.com'; Danielle M Burgoyne (dmburgoyne@aep.com); Pelton, David; Fairbanks, Carolyn; Grover, Ravinder
Subject: D. C. Cook Nuclear Plant, Units 1 and 2 - Draft Requests for Additional Information re: Change to RCS P-T Limit Curves to Support Vacuum Fill (TAC Nos. MF4280 and MF4281)

Dear Ms. Etheridge:

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated April 9, 2014, Indiana Michigan Power Company (I&M, the licensee) submitted a license amendment request (LAR) proposing changes to Technical Specification 3.4.3, "RCS Pressure and Temperature (P/T) Limits," for the Donald C. Cook Nuclear Plant, Units 1 and 2. Specifically, the LAR addresses changes to Figures 3.4.3-1 and 3.4.2-2, providing graphical representation of vacuum conditions to support RCS vacuum fill evolutions.

The NRC staff in the Vessels & Internals Integrity Branch (EVIB) and the Technical Specifications Branch (STSB) of the Office of Nuclear Reactor Regulation is currently reviewing your submittal. The staff has determined that additional information is required to complete its review. Draft requests for additional information (RAIs) are provided below.

You may accept these draft RAIs as formal requests for additional information and respond to the questions by August 15, 2014. Alternatively, you may seek further clarification and discuss the contents of the RAIs with the NRC staff in a conference call, including any change to the proposed response date.

Please let me know if you have any questions or concerns.

Sincerely,

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DRAFT REQUESTS FOR ADDITIONAL INFORMATION

VESSELS & INTERNALS INTEGRITY BRANCH AND TECHNICAL SPECIFICATIONS BRANCH

OF THE OFFICE OF NUCLEAR REACTOR REGULATION

REGARDING THE DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST TO CHANGE

**REACTOR COOLANT SYSTEM PRESSURE AND TEMPERATURE LIMIT CURVES TO ADDRESS
VACUUM FILL OPERATIONS**

INDIANA MICHIGAN POWER COMPANY

DOCKET NOS. 50-315 AND 50-316

(TAC NOS. MF4280 AND MF4281)

By letter dated April 9, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14101A367), Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, submitted a license amendment request (LAR) which proposed changes to the CNP Technical Specifications (TSs) TS 3.4.3, "RCS Pressure and Temperature (P/T) Limits", to address an issue regarding the applicability of Figures 3.4.3-1 "Reactor Coolant System Pressure versus Temperature Limits - Heatup Limit, Criticality Limit, and Leak Test Limit (Applicable for service period up to 32 EFPY)" and 3.4.3-2 "Reactor Coolant System Pressure versus Temperature Limits - Various Cooldown Rates Limits (Applicable for service period up to 32 EFPY)" during vacuum fill operations of the Reactor Coolant System (RCS). These changes provide the graphical representation of vacuum conditions, which would be encountered during vacuum fill evolutions.

TECHNICAL SPECIFICATIONS BRANCH (STSB)

Regarding the vacuum fill operation, the licensee states, "Following the installation of Reactor Coolant Vacuum Refill System (RCVRS) connections to the Unit 1 and Unit 2 RCS, the RVCRS connections are used during each refueling outage, and the RCS is subjected to a pressure less than 0 psig (i.e. vacuum) via a temporary modification that is controlled by plant procedures.

As a part of technical assessment for the proposed changes, the application refers to the following documentation:

- "Westinghouse SECL-96-226, Reactor Coolant Vacuum Refill System Final SECL, Revision 0 (in its entirety) assessed the structural integrity of the Unit 1 and Unit 2 reactor vessels, SGs, RCPs, RCP seals, piping and components to determine if any detrimental impact would result from vacuum refill of the RCS.
- Per the licensee, Westinghouse's correspondence MCOE-LTR-14-17, "Applicability of the Pressure-Temperature (P/T) Limit Curve Figures During Vacuum Refill of the RCS in Mode 5 for Westinghouse and CE NSSS Plants, Revision 0," concluded that vacuum refill of the Unit 1 and Unit 2 RCS in Mode 5 does not violate the 10 CFR 50, Appendix G P/T requirements.

The NRC staff's review of the licensee's application determined a need for additional information:

RAI-STSB-1

The NRC staff previously reviewed WCAP-15878, "D.C. Cook Unit 1 Heatup and Cooldown Limit Curves for Normal Operation for 40 Years and 60 Years," Revision 0 (ADAMS Accession No. ML023460503) and WCAP-15047, "D.C. Cook Unit 2 WOG Reactor Vessel 60-Year Evaluation Minigroup Heatup and Cooldown Limit Curves for Normal Operation," Revision 2 (ADAMS Accession No. ML022110334), and approved P/T curves for CNP Units 1 and 2 in safety evaluations (SEs) dated July 18, 2003, and March 20, 2003 (ADAMS Accession Nos. ML031600548 and ML03220073), respectively. These SEs addressed the ferritic components of the reactor coolant pressure boundary as described in Appendix G to 10 CFR Part 50 and approved P/T curves for 32 effective full power years (EFPY).

Please provide a technical basis addressing the impact of operating under a vacuum on systems and components not covered by 10 CFR Part 50, Appendix G, such as (but not limited to) fuel and instrumentation associated with such operation. Include the referenced documentation (as stated above) or excerpted text which provides the basis of the technical assessment.

RAI-STSB-2

Please apprise the staff whether CNP's current licensing basis addresses the Reactor Coolant Vacuum Refill System (RCVRS) as stated in the application.

Regarding the proposed TS change, it should be noted that technical specifications are derived from the analyses and evaluation included in licensee's safety analysis report as stated in Title 10 of Code of Federal Regulation 50.36(a)(2)(b).

Regulatory Basis

The regulations under 10 CFR 50.36(c)(2)(i) state that limiting conditions for operation (LCOs) are the lowest functional capability of performance levels of equipment required for safe operation of the facility (emphasis added). When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met. Per the licensee, the proposed changes to TS Figures 3.4. 3-1 and 3.4.3-2 reflect RCS pressure conditions experienced during RCS vacuum fill operation. The requirements of 10 CFR 50.36 would continue to be met with the NRC staff's review and approval of the proposed change.

VESSELS & INTERNALS INTEGRITY BRANCH (EVIB)

Background

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix G, "Fracture Toughness Requirements," states, *"this appendix specifies fracture toughness requirements for ferritic materials of pressure-retaining components of the reactor coolant pressure boundary (RCPB) of light water nuclear power reactors to provide adequate margins of safety..."* In addition, 10 CFR Part 50, Appendix G, Paragraph IV.A states that, *"the pressure-retaining components of the RCPB that are made of ferritic materials must meet the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), supplemented by the additional requirements set forth in [paragraph IV.A.2, "Pressure-Temperature (P/T) Limits and Minimum Temperature Requirements"]..."* Therefore, 10 CFR Part 50, Appendix G requires that P/T limits be developed for the entire RCPB, consisting of ferritic RCPB materials in the reactor vessel (RV) beltline (neutron fluence $\geq 1 \times 10^{17}$ n/cm², E > 1 MeV), as well as ferritic RCPB materials not in the RV beltline (neutron fluence < 1×10^{17} n/cm², E > 1 MeV).

RAI-EVIB-1

The P-T limit calculations for ferritic RCPB components that are not RV beltline shell materials may define P/T curves that are more limiting than those calculated for the RV beltline shell materials due to the following factors:

1. RV nozzles, penetrations, and other discontinuities have complex geometries that may exhibit significantly higher stresses than those for the RV beltline shell region. These higher stresses can potentially result in more restrictive P-T limits, even if the reference temperature (RT_{NDT}) for these components is not as high as that of RV beltline shell materials that have simpler geometries.

2. Ferritic RCPB components that are not part of the RV may have initial RT_{NDT} values, which may define a more restrictive lowest operating temperature in the P-T limits than those for the RV beltline shell materials.

Please describe how the P/T limit curves in Technical Specification Figures 3.4.3- 1, "Reactor Coolant System Pressure versus Temperature Limits – Heatup Limit, Criticality Limit, and Heat Test Limit (Applicable for service period up to 32 effective full power years [EFPY])" and 3.4.3-2, "Reactor Coolant System Pressure versus Temperature Limits – Various Cooldown Rates Limits (Applicable for service period up to 32 EFPY)" submitted for CNP Units 1 and 2, and the methodology used to develop these curves, considered all RV materials (beltline and non-beltline) consistent with the requirements of 10 CFR Part 50, Appendix G.

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