NRR-DMPSPEm Resource

From: Wengert, Thomas
Sent: Tuesday, September 11, 2018 1:48 PM
To: PYLE, STEPHENIE L
Cc: BICE, DAVID B (ANO); Pascarelli, Robert
Subject: ANO-2 - Final RAI #2 RE: LAR to Update the RCS Pressure-Temperature Limits (EPID L-2017-LLA-0396)
Attachments: ANO-2 Final RAI #2 for P-T Limits LAR.pdf

On September 6, 2018, the U.S. Nuclear Regulatory Commission (NRC) staff sent Entergy Operations, Inc. (the licensee) the draft Request for Additional Information (RAI) identified below. This RAI relates to the license amendment request to update the reactor coolant system (RCS) pressure-temperature limits for Arkansas Nuclear One, Unit 2 (ANO-2), as described below.

On September 11, 2018, the licensee informed the NRC staff that a clarification conference call was not necessary. The licensee agreed to provide a response to this RAI within 30 days. A publicly available version of this final RAI (attached with "Draft" removed) will be placed in the NRC's Agencywide Documents Access and Management System (ADAMS).

From: Wengert, Thomas
Sent: Thursday, September 06, 2018 2:00 PM
To: PYLE, STEPHENIE L
Cc: BICE, DAVID B (ANO) ; Pascarelli, Robert
Subject: ANO-2 - Draft RAI RE: LAR to Update the RCS Pressure-Temperature Limits (EPID L-2017-LLA-0396)

By letter dated November 20, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17326A387), as supplemented by letter dated August 1, 2018 (ADAMS Accession No. ML18215A198), Entergy Operations, Inc. submitted a license amendment request (LAR) to update the reactor coolant system (RCS) pressure-temperature limits for Arkansas Nuclear One, Unit 2 (ANO-2). The U.S. Nuclear Regulatory Commission (NRC) staff has determined that additional information, as described in the attached request for additional information (RAI), is required for the staff to complete its review of this request.

This RAI is identified as draft at this time to confirm your understanding of the information that the NRC staff needs to complete the evaluation. Please contact me if you would like to set up a conference call to clarify this request for information. In addition, let's discuss the timing for your response.

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Options
Priority: Standard
Return Notification: No
Reply Requested: No
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REQUEST FOR ADDITIONAL INFORMATION (RAI)

REGARDING LICENSE AMENDMENT REQUEST TO

UPDATE REACTOR COOLANT SYSTEM PRESSURE-TEMPERATURE LIMITS

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 2

DOCKET NUMBER 50-368

By application dated November 20, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17326A387), as supplemented by letter dated August 1, 2018 (ADAMS Accession No. ML18215A198), Entergy Operations, Inc. (the licensee), submitted a license amendment request (LAR) to revise the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TSs) by replacing the current Reactor Coolant System (RCS) Pressure-Temperature (P-T) Limits, applicable to 32 Effective Full Power Years (EFPY), with new P-T limits applicable to 54 EFPY (approximately 60 calendar years). The U.S. Nuclear Regulatory Commission (NRC) staff has determined that the following additional information is needed in order to complete its review.

RAI-1 - Low Temperature Overpressure (LTOP) Peak Pressure Determination

On Page 9 of the RAI response dated August 1, 2018, the licensee states that in the LTOP analyses for the most limiting mass and energy addition events, the maximum inlet piping pressure drop was added to a pressure equal to 110 percent of the relief valve setpoint to obtain the peak transient pressure at the pressurizer location.

Please clarify the basis to support the licensee's determination that peak transient pressures are based on 110 percent of the relief valve setpoint plus a maximum piping pressure drop. The information provided should include the following:

- Use of RELAP5-Based Data

  The 3rd paragraph on Page 9 of the RAI response states, in part, that "The current mass and energy addition events used explicit LTOP relief valve upstream and downstream pressure values as a function of relief valve flow based on RELAP5."

  Please explain how the RELAP5-based pressures versus relief valve flow were used in the LTOP reanalyses for the mass and energy addition events. If the RELAP5-based pressure-flow data for both steam and liquid discharge were used in the peak pressure determination as an input to CENTS or RELAP5, please explain the criteria used to determine when to switch-over from the pressure-flow data for the steam discharge to the pressure-flow data for the liquid discharge. During the transition from the steam discharge to the liquid discharge, the discharge of the mixture of the steam and liquid

may occur. Please discuss and justify how the RELAP5-based pressure-flow data were used in the LTOP for the discharge of the steam-liquid mixture.

- Computer Code Used for the Reanalysis of the Mass Addition Event and the Calculated Peak Pressure

  Please identify: (1) the computer code (CENTS or RELAP5) used for the reanalysis of the mass addition event, and (2) the peak pressure from the calculation using CENTS or RELAP5 for the mass addition event. Also, please show that the calculated peak pressure is less than 110 percent of the relief valve setpoint.

- Maximum Inlet Pressure Drop Calculation

  The 4th paragraph on Page 9 of the RAI response states, in part, that "The relief valve inlet piping pressure drop was calculated based on this equilibrium flow rate."

  Please justify that the "equilibrium flow" is the maximum flow and results in the maximum relief valve inlet piping pressure drop.

- Primary Temperature vs. Pressurizer Conditions

  Please identify and justify T_{hot} conditions that were used in the mass addition and energy addition analyses in combination with initial pressurizer saturation conditions corresponding to 300 pounds per square inch – absolute (psia) and 400 psia, respectively.

- Energy Addition Transient Peak Pressure

  Please identify the calculated peak pressure from the CENTS calculation for the energy addition event, and show that the peak pressure is less than 110 percent of the relief valve setpoint.

RAI-2 - Compliance with 10 CFR 50.36(c)(2)(ii)(B) for the Operating Limit of Steam Generator (SG) Water Temperature Assumed in the Analysis of the Limiting Energy Addition Event

Page 8 of the RAI response dated August 1, 2018, indicates that for the analyses of the most limiting mass and energy addition events, a maximum nominal pressurizer level of 910 cubic feet (ft^3) was assumed as an initial pressurizer water level during LTOP operation. The NRC staff notes that the operating limit of the pressurizer water volume of 910 ft^3 assumed in the LTOP analyses is included in a footnote to the APPLICABILITY of ANO-2 Technical Specification (TS) LCO 3.4.12, "Low Temperature Overpressure Protection."

Also, Page 11 of the RAI response states, in part, that the limiting energy addition event assumed that the SGs are filled with water at the initial temperature of 100°F above the primary system T_{cold}. However, it is not clear whether this limitation is identified in the ANO-2 TSs.

Please identify the location in the ANO-2 TSs where the operating limit for the SG water temperature difference of 100°F referenced above is specified and assumed as an initial condition in the LTOP analyses of the limiting energy addition event. If this limitation is not

currently defined in TSs, please address compliance with the requirements of 10 CFR 50.36(c)(2)(ii)(B), Criterion 2, which requires inclusion of an LCO in TSs for plant process variables, design features, or operating restrictions that are used as an initial condition of a design transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.