NRR-DMPSPEm Resource

From: Sayoc, Emmanuel
Sent: Wednesday, December 27, 2017 9:22 AM
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Cc: RidsNrrDmlr Resource; RidsNrrDmlrMrpb Resource; RidsNrrPMRiverBend Resource; RidsOgcMailCenter Resource; Wilson, George; Donoghue, Joseph; Wong, Albert; Billoch, Araceli; Casto, Greg; Rogers, Bill; Burton, William; Alley, David; Martinez Navedo, Tania; Bailey, Stewart; Wittick, Brian; Ruffin, Steve; Bloom, Steven; Regner, Lisa; Turk, Sherwin; Sowa, Jeffrey; Parks, Brian; Pick, Greg; Kozal, Jason; Young, Cale; Young, Matt; Werner, Greg; McIntyre, David; Oesterle, Eric; Dricks, Victor; Moreno, Angel; Burnell, Scott; 'Broussard, Thomas Ray'; Lach, David J; SCHENK, TIMOTHY A; 'Coates, Alyson'; Alley, David; Lopez, Juan; Mink, Aaron
Subject: FINAL REQUESTS FOR ADDITIONAL INFORMATION FOR THE SAFETY REVIEW OF THE RIVER BEND STATION LICENSE RENEWAL APPLICATION (CAC NO. MF9757) - SET 6
Attachments: RAI Set 6 Enclosure - Final.docx

Importance: High

Docket No. 50-458

By letter dated May 25, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17153A282), Entergy Operations, Inc. (the applicant) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," to renew the operating license NPF-47 for River Bend Station.

On December 7, 11, and 15, 2017, the U.S Nuclear Regulatory Commission (NRC) staff sent Entergy Operations, Inc. the draft Requests for Additional Information (RAIs) for technical review packages (TRPs) 63 (Fatigue Analysis), 120.2 (High Energy Line Break), and 36 (Small Bore Piping) respectively. Entergy Operations, Inc. subsequently informed the NRC staff that a clarification call was needed to discuss the information requested. The clarification calls between NRC staff and Entergy Operations, Inc. representatives were held on December 12, 2017, for TRP 63, and December 20, 2017, for TRPs 120.2 and 36. During these calls the subject information requests were discussed. The draft RAIs were modified based on these discussions.

For TRP 63, RAIs 4.6-1, 4.6-2, 4.6-3, and 3.5.1.9-1 were discussed and modified. RAI 3.5.1.9-2, was discussed and no modifications resulted from the discussion. For TRP 120.2, RAI 4.7.2-1 was discussed and modified. For TRP 36, RAI B.1.33-1 was discussed and modified. The final RAIs are enclosed.

David Lach of your staff agreed to provide a response to the final RAIs within 30 days of the date of this email. The NRC staff will be placing a copy of this email in the NRC's Agencywide Documents Access and Management System.

Sincerely,

Emmanuel Sayoc, Project Manager
License Renewal Projects Branch (MRPB)
Division of Materials and License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-458

Enclosure:
As stated

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Hearing Identifier: NRR_DMPS
Email Number: 72

Mail Envelope Properties (Emmanuel.Sayoc@nrc.gov20171227092200)

Subject: FINAL REQUESTS FOR ADDITIONAL INFORMATION FOR THE SAFETY REVIEW OF THE RIVER BEND STATION LICENSE RENEWAL APPLICATION (CAC NO. MF9757) - SET 6
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REQUEST FOR ADDITIONAL INFORMATION
LICENSE RENEWAL APPLICATION
RIVER BEND STATION, UNIT 1
DOCKET NO.: 50-458
CAC NO.: MF9757
Office of Nuclear Reactor Regulation
Division of Materials and License Renewal

10 CFR § 54.21(a)(3) of 10 CFR requires an applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation. One of the findings that the staff must make to issue a renewed license (10 CFR § 54.29(a)) is that actions have been identified and have been or will be taken with respect to the managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under § 54.21, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis (CLB). As described in SRP LR, an applicant may demonstrate compliance with 10 CFR 54.21(a)(3) by referencing the GALL Report. In order to complete its review and enable making a finding under 10 CFR § 54.29(a), the staff requires additional information in regard to the matters described below.

RAI B.1.33-1 (TRP 36 - One-Time Inspection – Small-Bore Piping)

Background:

LRA Section B.1.33 states that the One-Time Inspection – Small-Bore Piping Program will be consistent with GALL Report AMP XI.M35. It also states that "this program provides a one-time volumetric or opportunistic destructive inspection of a 3-percent sample or maximum of 10 ASME Class 1 piping butt weld locations and a 3-percent sample or a maximum of 10 ASME Class 1 socket weld locations that are susceptible to cracking."

GALL Report AMP XI.M35 states that "This inspection should be performed at a sufficient number of locations to ensure an adequate sample."

Issue:

LRA Section B.1.33 does not appear to provide the total population of welds for each weld type or the total number of these welds that will be included in the volumetric examinations. Based on discussions with the applicant, it appears the number of socket welds estimated is unusually low compared to similar plants.

Request:

Please provide the total population for each weld type.

RAI 4.6-1 (TRP 63 Fatigue Analysis)

Background:

ASME Section III, Division 2, “Code for Concrete Reactor Vessel and Containments,” Subsection CC, “Concrete Containments,” and Division 1, Subsection NE, “Class MC Components,” require a fatigue analysis for liner plates, metal containments, and penetrations that considers all cyclic loads based on the anticipated number of cycles. Section 4.6 of the SRP LR states that if a plant’s code of record requires a fatigue analysis, then this analysis may be a time limited aging analyses (TLAA) and must be evaluated in accordance with 10 CFR 54.21(c)(1) to ensure that the effects of aging on the intended functions are adequately managed for the period of extended operation.

License renewal application (LRA) Section 4.6, “Containment Liner Plate, Metal Containments, and Penetrations Fatigue Analysis,” identifies (1) the fatigue analysis for the steel containment cylinder and dome as evaluated in accordance with ASME Section III, Division 1, Subsection NE, and (2) the fatigue analysis for the floor liner plate as evaluated in accordance with ASME Section III, Division 2. This LRA section appears to disposition these analyses in accordance with 10 CFR 54.21(c)(1)(iii) by stating that the Fatigue Monitoring Program will manage the aging effects due to cumulative fatigue. Section 6A.15.1.3.3 of the Updated Safety Analysis Report (USAR) describes the transients associated with the floor liner plate fatigue analysis.

Issue:

Section 4.6 of the LRA does not describe the transients considered for the steel containment cylinder and dome fatigue analysis, their design limits, and their calculated cumulative usage factor values. Additionally, it is not clear if the applicant's general disposition in LRA Section 4.6 was intended for these analyses.

Request:

1. Clarify the disposition, in accordance with 10 CFR 54.21(c)(1), for the steel containment cylinder and dome fatigue analysis and describe the following:
    a. list the transients considered in the analysis (event name),
    b. the design cycle limits of each transient, and
    c. the review of the calculated cumulative usage factor (CUF)

    Otherwise, provide technical justification for not requiring a disposition under 10 CFR 54.21(c)(1) and describe how the aging effect of cumulative fatigue damage due to cyclic loading will be adequately managed pursuant to 10 CFR 54.21(a)(3).

2. Clarify the disposition, in accordance with 10 CFR 54.21(c)(1), for the floor liner plate fatigue analysis.

3. Update the LRA and USAR supplement, as appropriate, to be consistent with the response to the above requests.

RAI 4.6-2 (TRP 63 Fatigue Analysis)

Background:

ASME Section III, Division 2, "Code for Concrete Reactor Vessel and Containments," Subsection CC, "Concrete Containment," and Division 1, Subsection NE, "Class MC Components," requires a fatigue analysis for liner plates, metal containments, and penetrations that considers all cyclic loads based on the anticipated number of cycles. Section 4.6 of the SRP LR states that if a plant's code of record requires a fatigue analysis, then this analysis may be a time limited aging analyses (TLAA) and must be evaluated in accordance with 10 CFR 54.21(c)(1) to ensure that the effects of aging on the intended functions are adequately managed for the period of extended operation.

License renewal application (LRA) Section 4.6, "Containment Liner Plate, Metal Containments, and Penetrations Fatigue Analysis," identifies the fatigue analyses for the following containment structural components: personnel airlock, polar crane, equipment hatch, drywell airlock, drywell combination door/hatch assembly, and drywell head. The LRA generally describes the normal and upset loading conditions considered in the analyses as to include earthquakes and safety relief valves (SRV) lifts. The applicant dispositioned these analyses in accordance with 10 CFR 54.21(c)(1)(iii) by stating that the Fatigue Monitoring Program will manage the aging effects due to cumulative fatigue.

Issue:

Section 4.6 of the LRA does not clearly identify the transients considered for each of the containment structural components analyses referenced above, the design cycle limits for each transient, and any analyzed cumulative usage factor against which the transients will be monitored. Additionally, based on the staff review of the components specifications during the audit, the staff is not clear whether earthquakes and SRV lift are the only transients considered in the fatigue analyses.

Request:

1. For each of the fatigue analyses dispositioned under LRA section 4.6 for the containment structural components listed in the "Background" section above, describe the following:
    a. identify the transients considered in each analysis (event name),
    b. the design cycle limits of each transient against which they will be monitored by the Fatigue Monitoring Program, and
    c. the review of the calculated cumulative usage factor (CUF)

2. Clarify if earthquakes and SRV lifts are the only transients considered for all the fatigue analyses referenced above. Otherwise, state any other transient(s) evaluated.

3. Update the LRA and USAR supplement, as appropriate, to be consistent with the response to the above requests.

RAI 4.6-3 (TRP 63 Fatigue Analysis)

Background:

Section 4.6 of the SRP-LR states that penetration bellows may be designed and/or analyzed in accordance with ASME code requirements. The SRP-LR also states that if a plant's code of record requires a fatigue analysis, then this analysis may be a time-limited aging analyses (TLAA) and must be evaluated in accordance with 10 CFR 54.21(c)(1) to ensure that the effects of aging on the intended functions are adequately managed for the period of extended operation.

License renewal application (LRA) Section 4.6, "Containment Liner Plate, Metal Containments, and Penetrations Fatigue Analysis," identifies the fatigue analyses for expansion joints (bellows) in sleeved penetrations, and fuel transfer tubes bellows. The LRA states that transient cycles for plant startups, operating basis earthquake (OBE) cycles, and safety relief valves (SRV) lifts are tracked for these expansion joints (bellows) as shown in LRA Section 4.3.2. The LRA also states that these analyses remain adequate for the period of extended operation. For the fuel transfer tube bellows, the LRA states that the bellows is designed for seismic events that are tracked and 150 cycles of flexing.

Issue:

Based on the information provided in LRA Section 4.6, it is not clear what is the applicant's disposition under 10 CFR 54.21(c)(1) for the fatigue analyses of expansion joints (bellows) in sleeved penetrations, and the fatigue analysis for the fuel transfer tube bellows. Additionally, the staff is not clear where the "cycles of flexing" is considered in LRA Table 4.3-1 for tracking purposes under the Fatigue Monitoring Program, and what is the designed cycle limit considered for earthquakes in the fatigue analysis of the fuel transfer tube bellows.

Request:

1. State, with supporting justification, the disposition under 10 CFR 54.21(c)(1) for the fatigue analyses of expansion joints (bellows) in sleeved penetrations

2. State, with supporting justification, the disposition under 10 CFR 54.21(c)(1) for the fatigue analyses of fuel transfer tube bellows.

3. Clarify the following for the fatigue analysis of fuel transfer tube bellows:
    a. how the "cycles of flexing" is considered in LRA Table 4.3-1 and how they are tracked under the Fatigue Monitoring Program,
    b. list any other transients considered in the analysis (e.g. temperatures cycles), and
    c. specify the design cycle limits for seismic OBE.

4. Update the LRA and USAR supplement, as appropriate, to be consistent with the response to the above requests.

RAI 3.5.1.9-1 (TRP 63 Fatigue Analysis)

Background:

Section 4.6 of the SRP-LR states that dissimilar metal welds that connect the piping penetrations to the bellows or stainless steel plates provides a leak-tight penetration, and they may be designed in accordance with the requirements of Section III of the ASME Code. The SRP-LR also states that if a plant's code of record requires a fatigue analysis, then this analysis may be a time-limited aging analyses (TLAA) and must be evaluated in accordance with 10 CFR 54.21(c)(1) to ensure that the effects of aging on the intended functions are adequately managed for the period of extended operation. GALL Report item II.B4.C-13, associated with SRP Table 3.5.1, item 9, addresses, in part, the cumulative fatigue damage due to fatigue for penetrations with dissimilar metal welds.

Section 3.5.2.2.1.6 of the license renewal application (LRA) states that there are dissimilar metal welds associated with stainless steel bellows welded to carbon steel penetration sleeves.

Issue:

It is not clear to the staff if dissimilar metal welds were considered in the fatigue analyses of piping penetrations and whether they were properly evaluated in accordance with 10 CFR 54.21(c)(1) to ensure that the aging effects of cumulative fatigue damage due to cyclic loading are adequately managed for the period of extended operation. The staff notes that LRA Section 4.6, "Containment Liner Plate, Metal Containments, and Penetrations Fatigue Analysis," item 3.5.1-9 of LRA Table 3.5.1, and LRA Section 3.5.2.2.1.5, "Cumulative Fatigue Damage," do not address dissimilar metal welds.

Request:

1. Clarify if dissimilar metal welds were considered in the fatigue analyses of piping penetrations.

2. If considered, address the disposition under 10 CFR 54.21(c)(1) for dissimilar metal welds in piping penetration. If not considered, how will the aging effect of cumulative fatigue damage due to cyclic loading be adequately managed for dissimilar metal welds pursuant to 10 CFR 54.21(a)(3).

3. Update the LRA and USAR supplement, as appropriate, to be consistent with the response to the above requests.

RAI 3.5.1.9-2 (TRP 63 Fatigue Analysis)

Background:

Section 4.6 of the license renewal application (LRA) identify the following components as being managed for fatigue by the Fatigue Monitoring Program: steel containment cylinder and dome, floor liner plate, personnel airlocks, polar crane, equipment hatch, drywell airlock, drywell combination door/hatch assembly, drywell head, expansion joints (bellows) from sleeved penetrations, and fuel transfer tube bellows.

LRA Table 3.5.2-1 provides, in part, aging management review results for the following components associated with LRA Table 3.5.1 item 3.5.1-9: sleeved penetrations, penetration bellows, accessible steel elements, and steel components: drywell personnel airlock, drywell combination equipment hatch and personnel door.

Issue:

The staff did not find aging management review results in LRA Table 3.5.2-1 for the following steel components associated with TLAAs being dispositioned under LRA Section 4.6 as being managed by the Fatigue Monitoring Program:

- polar crane
- equipment hatch
- drywell airlock
- drywell head
- fuel transfer tube bellows

Request:

1. Clarify whether the components listed in the “Issue” section above will be managed for cracking due to cumulative fatigue damage by the Fatigue Monitoring Program as dispositioned in LRA Section 4.6.

2. Update LRA Table 3.5.2-1 as necessary to be consistent with response.

RAI 4.7.2-1 (TRP 102.2 - High Energy Line Break)

Background:

LRA Section 4.7.2 describes the applicant's TLAA for the Class 1 systems associated with the high energy line break (HELB) analysis, which is also discussed in USAR Section 3.6. The disposition for this TLAA is in accordance with 10 CFR 54.21 (c)(1)(iii), which requires the applicant to demonstrate that the effects of aging on the intended functions will be adequately managed for the period of extended operation. The applicant credits the Fatigue Monitoring Program for tracking transient cycles and determining the necessary corrective actions if transient cycle limits are reached.

USAR Section 3.6 provides the applicant's basis for the HELB analysis and how it complies with general design criteria No. 4, "Dynamic Effects." USAR Table 3.6A-21 identifies the high-energy piping inside containment. USAR Section 3.9 and Table 3.9A-1 provide a summary of the design basis transients and the cycle limits that are applicable to Class 1 piping systems.

Issue:

a. LRA Section 4.7.2 does not appear to identify which high energy piping systems are within the scope of the Fatigue Monitoring Program's cycle counting activities.
b. LRA Section 4.7.2 does not appear to identify the HELB component transients that are tracked by the Fatigue Monitoring Program.

Request:

a. Identify the high energy piping systems subject to the HELB TLAA that are within the scope of the Fatigue Monitoring Program's cycle counting activities.
b. Identify the HELB component transients that are tracked by the Fatigue Monitoring Program.