NRR-PMDAPEm Resource

From: Singal, Balwant
Sent: Thursday, July 02, 2015 9:19 AM
To: 'Hope, Timothy' (Timothy.Hope@luminant.com)
Cc: 'Jack.Hicks@luminant.com' (Jack.Hicks@luminant.com)
Subject: Request for Additional Information - License Amendment Request for Extension of Containment Leakage Rate Testing Program (TAC Nos. MF5621 and MF5622)
Attachments: MF5621-APLA-RAI.docx; MF5621-EMCB-RAIs.docx; MF5621-SCVB-RAIs.docx

Tim,

By letter dated January 28, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Number No. ML15036A032), Luminant Generation Company LLC (Luminant) submitted a License Amendment Request for a permanent extension of the frequency for Comanche peak Nuclear Power Plant, Units 1 and 2 containment Type A Integrated Leak Rate Test from ten-years to fifteen years. The licensee also requested for extension of containment isolation valves leakage test (Type C tests) from its current 60 month frequency to 75 months in accordance with Nuclear Energy Institute (NEI) 94-01, Revision 3-A, "Industry Guidance for Implementing Performance Based Option to 10 CFR 50, [Title 10 of the *Code of Federal Regulations*, Part 50], Appendix J," July 2012 (Agencywide Documents Access and Management System (ADAMS) Accession Number No. ML12221A202).

The U.S. Nuclear Regulatory Commission (NRC) staff requires the attached additional information to complete its review.

Draft request for additional information (RAI) were transmitted via e-mail on June 11, June 19, and June 29, 2015 and a clarification call was held on June 30, 2015. Jack Hicks of Luminant agreed to provide the response within 30 days from the date of this e-mail.

Also, please note that Draft RAI SCVB RAI-1 has been withdrawn and rest of the SCVB RAIs have been renumbered.

Please treat this e-mail as formal transmittal of RAI.

Thanks.

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APLA RAI-1

Electric Power Research Institute (EPRI)TR-1009325, Revision 2-A[1], "Risk Impact Assessment of Extended Integrated LeakRate Testing Intervals", states:

> [w]here possible, the analysis should include aquantitative assessment of the contribution of external events (e.g., fire andseismic) in the risk impact assessment for extended ILRT[Integrated Leak Rate Test] intervals. For example, where a licensee possesses a quantitative fire analysis and thatanalysis is of sufficient quality and detail to assess the impact, the methods used toobtain the impact from internal events should be applied for the external event.

Theexternal events analysis is provided in Section 7.3 of Attachment 6 to the LicenseAmendment Request (LAR), dated January 28, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15036A032).

a. The LAR states the following, in part, regarding the fire risk assessment:

   Comanche Peak iscurrently performing a Fire-PRA to update the risk associated with fire. Until thoseresults are available the ILRT guidance provides a method to estimate a fire LERF[large early release frequency] by using the most recent internal events CDF [core damage frequency] to LERF ratio. Using that methodology a bounding fireinduced CDF was calculated as 2.09E-05/[year].

   Please clarify where the fire CDFand LERF were taken from and what were their values.

b. The LAR did not provide the seismic risk values. The Attachment 7 to the LAR states the following,in part, regarding the seismic risk:

   Given that CPNPP's[Comanche Peak Nuclear Power Plant's] updated Ground Motion Response Spectrum (GMRS) is well below the SSE [Safe Shutdown Earthquake] at all frequencies, seismic risk at the site isextremely unlikely to be a significant issue for any risk-informed application.

   Providean estimate of seismic CDF and LERF and include it in the assessment of impactfrom external events.

c. The total change in LERF from three tests in 10 years to once in 15 years is estimated inthe LAR as 2.83E-07/year for Unit 1 and 2.84E-07/year for Unit 2. These changesare considered to be "small" (i.e., between 1E-06/year and 1E-07/year) per theacceptance guidelines in Regulatory Guide 1.174, Revision 2 "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," May 2011 (ADAMS Accession No. ML100910006). An assessment of total baselineLERF is also required to show that the total LERF is less than 1E-05/year. Please providean estimate of the total LERF for internal and external events including

[1]EPRITR 1009325, Revision 2 is available in ADAMS at ADAMS Accession No. ML072970208. TR 1009325, Revision 2-A was issued by EPRIin October 2008 after the NRC staff issued its safety evaluation for TR 1009325, Revision 2, but could not be located in ADAMS. However, a copy of TR 1009325, Revision 2-A is publically available at EPRI website.

effects fromsteel liner corrosion and proposed change in ILRT frequency, for both units, andjustify acceptability of the ILRT extension application.

APLA RAI-2

EPRITR-1009325, Revision 2-A states, in part:

> [t]he most relevant plant-specificinformation should be used to develop population dose information. The order ofpreference shall be plant-specific best estimate, Severe Accident Mitigation Alternative(SAMA) for license renewal, and scaling of a reference plant population dose.

Consistent with the guidelines in EPRITR-1009325, Revision 2-A, the population dose2estimate in the LAR was obtained by scaling the reference plant population dose toaccount for differences in reactor power level, population density, and allowablecontainment leak rate (La). A rated thermal power of 3458 Meggawatt thermal (MWt) was used in thesepopulation dose estimates in the LAR. Based on Amendment No. 146 to Comanche PeakNuclear Power Plant, Units 1 and 2 (CPNPP), dated June 27, 2008 (ADAMS Accession Number ML081510157),the licensed thermal power for CPNPP is 3612 MWt. Please justify or update the populationdose estimates for the ILRT extension application.

REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST 14-002

EXTENSION OFCONTAINMENT LEAKAGE RATE TESTING

PROGRAMCOMANCHE PEAK NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-445 AND 50-446

By application dated January 28, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15036A032), Luminant Generation Company LLC(Luminant, the licensee) requested changes to the Technical Specifications (TSs) forComanche Peak Nuclear Power Plant (CPNPP), Units 1 and 2. The proposed change wouldpermit the existing Containment Integrated Leak Rate Testing (ILRT) frequency to be extendedfrom 10 years to 15 years and containment isolation valves leakage tests (Type C tests) from 60 months to 75 monthson a permanent basis.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the License AmendmentRequest (LAR) and requests the following additional information to complete its review:

EMCBRAI-1:

Section 9.2.3.2 of NEI 94-01, Revision 3-A, "Industry Guidelines for Implementing Performance- Based Option of 10 CFR [*Title 10 of the Code of Federal Regulations*] Part 50, Appendix J," (ADAMS Accession No. ML12221A202) and Condition 2 in Section 4.1 of the NRC safety evaluation for topical report NEI 94-01, Revision 2 (ADAMS Accession No. ML081140105) require supplemental general visual inspections of accessible interior and exterior surfaces of the containment for structural deterioration that may affect the containment leak-tight integrity. These inspections must be conducted prior to each Type A test and during at least three other outages before the next Type A test if the interval for the Type A test has been extended to 15 years. In Section 3.1.4 of the LAR, the licensee states, under the subheading "ASME Section XI, Subsection IWL" (on page 10 of 44), the following, in part:

> If the interval for the Type A test has been extended to 15 years a minimum of two complete inspections of the containment exterior concrete will be performed during the interval between ILRT performances. This requirement when coupled with the following commitment provided in SER[safety evaluation report] Section 3.2 will require the performance of three containment exterior concrete inspections if the interval for the Type A test has been extended to 15 years.
>
> Prior to performing an ILRT, the licensee will schedule its IWE and IWL examinations in a way that it be counted as a pre-ILRT examination.

Based on the above statement, it appears that the licensee intends to perform a total of three IWL containment exterior concrete visual examinations (one pre-ILRT and two during the 15 year interval between ILRTs), instead of four visual examinations as required by NEI 94-01. Please clarify the intent of the licensee concerning meeting the general visual examination requirements for concrete containment structure set forth in NEI 94-01, Revision 3-A, and Condition 2 in Section 4.1 of the NRC safety evaluation for topical report NEI 94-01, Revision 2.

In case the licensee is proposing to take an exception to NEI 94-01, Revision 3-A, please provide a justification for the deviation.

In addition, based on the information provided in the LAR, the last Unit 1 and Unit 2 Type A tests were performed on April 14, 2007, and October 9, 2012, respectively. Please provide a schedule for a typical 15 year interval (between the last Type A test and the proposed next Type A test), in a tabular format, of the in service inspections of CPNPP, Units 1 and 2 containments that were, and will be performed, and explain how it meets the requirements in Section 9.2.3.2 of NEI 94 01, Revision 3-A, and Condition 2 in Section 4.1 of the NRC safety evaluation for topical report NEI 94-01, Revision 2.

EMCBRAI-2:

In Section 4.1.2.2 of the LAR, the licensee states that moisture barriers and liner leak chase channel test piping are subject to a General Visual Inspection of 100% of the surfaces during each CISI period. Please provide information regarding findings, if any, from past visual inspections that may indicate degradation of these items and any corrective actions taken to disposition the findings.

EMCBRAI-3:

In Section 4.1.2 of the LAR, the licensee discusses examination of inaccessible areas of containment and evaluation of the acceptability of inaccessible areas. Please provide information about instances during implementation of the CPNPP CISI program in accordance with American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Subsections IWE/IWL, where conditions existed in accessible areas that indicated the presence of or resulted in degradation to inaccessible areas. For each inaccessible area identified, please provide (1) a description of the type and estimated extent of degradation and the conditions that led to the degradation; (2) an evaluation of each area and the result of the evaluation; and (3) a description of corrective actions taken, as required by 10 CFR 55a(b)(2)(viii)(E) or 10 CFR 50.55a(b)(2)(ix)(A).

EMCBRAI-4:

In Section 3.2.3 of the LAR, the licensee states that a fuel transfer tube penetration is provided for fuel transfer between the refueling canal in the containment structure and the spent fuel pools in the Fuel Building, bellows expansion joints are provided to permit differential movements, and that a test connection is provided so that the space between the transfer tube and the sleeve with connecting bellows can be pressurized to Pa [calculated peak containment internal pressure related to design basis accident] in order to measure the leakage rate of the bellows or attachment welds. For any bellows used on penetrations through containment pressure retaining boundaries at CPNPP, Units 1 and 2, please provide information on their inspection, testing and operating experience with regard to detection of bellows leakage.

EMCBRAI-5:

In Section 4.1.5 of the LAR, the licensee states that (1) the percentage of the total number of Unit 1 Type B tested components that are on 120-month extended performance-based test intervals is 55%; (2) the percentage of the total number of Unit 1 Type C tested components that are on 60-month extended performance-based test intervals is 28%; (3) the percentage of the total number of Unit 2 Type B tested components that are on 120-month extended performance-

based test intervals is 5%; and (4) the percentage of the total number of Unit 2 Type C tested components that are on 60-month extended performance-based test intervals is 29%.

Please provide reason(s) for the low percentages of the total number of Type B and Type C tested components that are on the maximum test intervals (120 months for Type B and 60 months for Type C), particularly for Type B tested components at Unit 2 (5%), and discuss implications that this may have in supporting the proposed extension of the containment ILRT and Type C test frequencies for CCNPP, Units 1 and 2.

EMCBRAI-6:

In Section 4.1.2 of the LAR, the licensee stated that the Containment Inservice Inspection (CISI) Program Plan details the requirements for the examination and testing of Class MC and Class CC components at CPNPP Units 1 and 2 and that the CISI Program Plan is developed in accordance with the 2007 Edition with the 2008 Addenda of the ASME Code Section XI, Subsections IWE and IWL, as conditioned by 10 CFR 50.55a.

Please discuss highlights of the significant findings from the ASME Code, Section XI, Subsection IWE and IWL examinations performed since the last Type A test on the containment pressure-retaining structures and components, in accordance with the CPNPP CISI program, and actions taken to disposition them. In the response, please provide information that would demonstrate proper and effective implementation of the CPNPP CISI program in monitoring and managing degradation to ensure that containment structural and leak-tight integrity has been, and will continue to be, maintained throughout the service life of the plant. The response should include relevant highlights of examinations performed on the containment penetrations (with seals, gaskets, and bolted connections), the containment steel liner, moisture barrier, and the reinforced concrete containment structure.

ByletterdatedJanuary28,2015 (Reference 1),Luminant Generation Company LLC (Luminant, the licensee) submittedaLicenseAmendmentRequest(LAR)forapermanentextension of thefrequencyforComanche peak Nuclear Power Plant (CPNPP), Units 1 and 2containment TypeA IntegratedLeak RateTest (ILRT) from ten-years to fifteen years.The licensee also requested for extension of containment isolation valves leakage test (Type C tests) from its current 60 month frequency to 75 months in accordance with Nuclear Energy Institute (NEI) 94-01, Revision 3-A, "Industry Guidance for Implementing Performance Based Option to 10 CFR 50, Appendix J," July 2012 (AgencywideDocumentsAccessandManagementSystem(ADAMS)AccessionNumber No. ML12221A202).

The U.S. Nuclear Regulatory Commission (NRC) staff requires the following additional information to complete its review:

SCVB RAI-1

InAttachment 1 to the submittal dated January 28, 2015 (Reference 1) Section 3.3 "Integrated Leakage Rate Testing History", Table 3.3-1 "Unit 1 Type A ILRT History"and Table 3.3-2 "Unit 2 Type A ILRT History" provides the details of the historical ILRT "As-found Leakage Rate" and "As-Left Leakage Rate" values.

> CPNPP, Units1 and 2 TS 5.5.16 "Containment Leakage Rate Testing Program" reads in part:
>
> b. Thepeakcalculatedcontainmentinternalpressureforthedesignbasislossof coolantaccident,P_a,is48.3psig.
>
> c. Themaximumallowablecontainment leakage rate,L_a,atP_a,shallbe0.10%of containmentairweightperday.
>
> d. Leakagerateacceptancecriteriaare:
>
> 1. Containmentleakagerateacceptancecriteriais≤1.0L_a.Duringthe firstunitstartupfollowingtestinginaccordancewiththisprogram,theleakag erateacceptancecriteriaare<0.60$L_a$fortheTypeBandTypeCtestsand≤0.7 5$L_a$forType Atests;

All historical ILRT values contained in Table 3.3-1and Table 3.3-2for CPNPP, Units 1 and 2 are below the Limits of TS 5.5.16.c and of TS 5.5.16.d.1.

Section 9.2.3 of NEI TR 94-01, Revision 2 (Reference 6) states that:

> Type A testing shall be performed during a period of reactor shutdown at a frequency of at least once per 15 years based on acceptable performance history. Acceptableperformance history is defined as successful completion of two consecutive periodic Type A tests where the calculated performance leakage rate was less than 1.0 L_a [the maximum allowable Type A test leakage rate at P_a, where P_a equals the calculated peak containment internal pressure related to the design-basis loss-of- coolant accident]. A preoperational Type A test may be used as one of the two Type A tests that must be successfully completed to

> extend the test interval, provided that an engineering analysis is performed to document why a preoperational Type A test can be treated as a periodic test. Elapsed time between the first and last tests in a series of consecutive satisfactory tests used to determine performance shall be at least 24 months.

The staff notes that the last sentence of Section 9.2.3 “Extended Test Intervals” of NEI 94-01 Revision 2-A (Reference 3) reads “In the event where previous Type A tests were performed at reduced pressure (as described in 10 CFR 50, Appendix J, Option A), at least one of the two consecutive periodic Type A tests shall be performed at peak accident pressure (P_a).”

Based on these NEI 94-01 excerpts, the staff needs additionalinformationto confirm that at least one of the actual ILRT test pressures employed during the two most recentCPNPP, Units 1 and 2 Type A tests bound the P_a (i.e. 48.3 psig) value ofCPNPP, Units 1 and 2TS5.5.16.b(per the guidance of ANS 56.8-1994 – Reference 4).

SCVB-RAI-2

InAttachment 1 to the submittal dated January 28, 2015 (Reference 1), Table 4.1.6-1 “NEI 94-01 Revision 2-A Limitations and Conditions”, the first “Limitation/Condition” reads:

> For calculating the Type A leakage rate, the licensee should use the definition in the NEI TR 94-01, Rev 2, in lieu of that inAmerican National Standards Institute(ANSI)/American Nuclear Society (ANS)-56.8-2002. (Refer to SE Section 3.1.1.1).

CPNPPresponse stated:

> CPNPP will utilize the definition in NEI 94-01 Revision3-A, Section 5.0. This definition has remained unchanged from Revision 2-A to Revision 3-A of NEI 94-01.

The NRC staff notes that the identical definition of “performance leakage rate”as defined in NEI 94-01, Revision 3-A first appeared in Section 5.0 of NEI 94-01, Revision 2 dated August 31, 2007 (Reference 6).

Table 3.3-1 “Unit 1 Type A ILRT History” and Table 3.3-2 “Unit 2 Type A ILRT History” provide the details of the historical ILRT Containment “As-found Leakage Rate” and “As-Left Leakage Rate” values. With respect to the information contained in Tables 3.3-1 and 3.3-2, the NRC staffstaff requests the following information:

1. Please clarify if either the Unit 1 IRLT of April 14, 2007 or Unit 2 ILRT of October 9, 2012 use the definitionof “performance leakage rate” as defined in Section 5.0 of NEI 94-01, Revision 2 dated August 31, 2007 (Reference 6) in the plant ILRT procedures?

2. From the Unit 1 Table 3.3-1 of ILRT results, it can be seen that the “Leakage Rate” increased by 13.1% [0.063019 “As found”/ 0.0557 “As Left”] between the time the ILRT of 12/07/93 was performed and when the ILRT of 4/14/12 was performed. Please describe the phenomenon to which this increase in containment leakage rate was attributed to?

3. From the Unit 2 Table 3.3-2 of ILRT results, it can be seen that the “Leakage Rate” increased by 85.4% [0.0595 “As found” / 0.0321 “As Left”] between the time the ILRT of 12/01/97 was performed and when the ILRT of 10/9/12 was performed. Please describe the phenomenon to which this increase in containment leakage rate was attributed to?

SCVB-RAI-3

InAttachment 1 to the submittal dated January 28, 2015 (Reference 1), Table 4.1.6-1 “NEI 94-01 Revision 2-A Limitations and Conditions”, the fourth “Limitation/Condition”reads:

> “The licensee addresses any tests and inspections performed following major modifications to the containment structure, as applicable. (Refer to SE Section 3.1.4).”

CPNPP Response states:

> CPNPP Unit 1 steam generator replacements have been completed. Unit 2 replacements are not anticipated.
>
> There are no planned modifications for CPNPP Units I and 2 that will require a Type A test prior to the next Units 1 and 2 Type A test proposed under this LAR.
>
> There is no anticipated addition or removal of plant hardware within the containment building which could affect its leak-tightness.

SE Section 3.1.4 (Reference 5) reads:

Section 9.2.4 of NEITR 94-01, Revision 2 (Reference 6), states that:

> Repairs and modifications that affectthe containment leakage integrity require LLRT or short duration structural tests as appropriate to provide assurance of containment integrity following the modification or repair. This testingshall be performed prior to returning the containment to operation.

Article IWE-5000 of the American Society of Mechanical Engineers (ASME) Code, Section XI, Subsection IWE (up to the 2001 Edition and the 2003 Addenda), would require a Type A test after major repair or modifications to the containment. In general, theNRC staff considers the cutting of a large hole in the containment for replacement of steamgenerators or reactor vessel heads, replacement of large penetrations, as major repair ormodifications to the containment structure. At the request of a number of licensees, the NRCstaff has agreed to a relief request from the IWE requirements for performing the Type A testand has accepted a combination of actions consisting of ensuring that: (1) the modifiedcontainment meets the pre-service Non-Destructive Evaluation test requirements (i.e., asrequired by the construction code), (2) the locally welded areas are examined for essentiallyzero leakage using a soap bubble, or an equivalent, test, and (3) the entire containment issubjected to the peak calculated containment design basis accident pressure for a minimum of10 minutes (steel containment) and 1 hour (concrete containment), and (4) the outside surfacesof concrete containments are visually examined as required by the ASME Code, Section XI,Subsection IWL, during the peak pressure, and that the outside and inside surfaces of the steelsurfaces are examined as required by the ASME Code, Section XI, Subsection IWE, immediately after the test. This is defined as a short duration structural test of the containment.For minor modifications (e.g.,

replacement or addition of a small penetration), or modification ofattachments to the pressure retaining boundary (i.e., repair/replacement of steel containmentstiffeners), leakage integrity of the affected pressure retaining areas should be verified by aLLRT.

The NRC staff notes that the above “CPNPP Response” is brief and is based mostly on the potential for future Containment modifications. The staff notes that bothCPNPP, Units 1 and 2 containments have been in service for approximately 25 years.

Please provide additional historical information (i.e. a synopsis) about any modifications to the CPNPP, Units 1 and 2 containments and about the subsequent post modification testing. The synopsis should demonstrate compliance with guidance of SE Section 3.1.4.

SCVB-RAI-4

Excerpts from Section 4.1.5 (Reference 1, Attachment 1, Page 24 of 44) read:

> The percentage of the total number of Unit 1Type B tested components that are on 120-month extended performance-based test intervals is 55%.
>
> The percentage of the total number of Unit 2 Type B tested components that are on 120-monthextended performance-based test intervals is 5%.

Please describe to what phenomenon is the marked difference in the percentages attributable to?

REFERENCES

1. Luminant Generation Company LLClettertoNRCdatedJanuary28,2015“License Amendment Request 14-002:Extension Of Containment Leakage Rate Testing Program,"(ADAMSAccessionNumberML15036A032).

2. NRClettertoBiffBradley(NEI),datedAugust20,2013,“RequestRevisionToTRNEI94-01,Revision3-A,“IndustryGuidelineforImplementing Performance−BasedOptionof10CFRPART50,AppendixJ”,(ADAMSAccessionNumberML13192A394).

3. Nuclear Energy Institute Topical Report)TR) NEI 94-01, Revision 2-A, “Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J,” October 2008 (ADAMS Accession No. ML100620847).

4. American National Standards Institute (ANSI)/American Nuclear Society (ANS) NS-56.8-1994, “Containment System Leakage Testing Requirements”.

5. NRC letter dated June 25, 2008, “Final Safety Evaluation For Nuclear Energy Institute TR 94-01, Revision 2, “Industry Guideline For Implementing Performance-Based Option Of 10 CFR Part 50, Appendix J” And Electric Power Research Institute (EPRI) Report No. 1009325, Revision 2, August 2007, “Risk Impact Assessment Of Extended Integrated Leak Rate Testing Intervals” (TAC No. MC9663)” (ADAMS Accession No. ML081140105).

6. Nuclear Energy Institute TR NEI 94-01, Revision 2 “Nuclear Energy Institute 94-01, Revision 2, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J"and Electric Power Research Institute Report No. 1009325, Revision 2, August 2007, "Risk Impact Assessment of Extended Integrated Leak Rate Testing Intervals,"(ADAMS Accession No. ML072970206).