UNITED STATES
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August 30, 2013

Mr. Joe W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
P.O. Box 2000
Soddy-Daisy, TN 37384

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION (TAC NOS. MF0481 AND MF0482) – SET 12.

Dear Mr. Shea:

By letter dated January 7, 2013, Tennessee Valley Authority submitted an application pursuant to Title 10 of the *Code of Federal Regulations* (CFR) Part 54, to renew the operating license DPR-77 and DPR-79 for Sequoyah Nuclear Plant, Units 1 and 2, for review by the U.S. Nuclear Regulatory Commission (NRC) staff. The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

These requests for additional information (RAIs), outlined in the Enclosure were discussed with Henry Lee, and a mutually agreeable date for the response to RAI 4.3.1-8 is within 60 days from the date of this letter, and for the rest of the enclosed RAIs the mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-1427 or by e-mail at Richard.Plasse@nrc.gov.

Sincerely,

Emmanuel Sayoc FOR

Richard Plasse, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-327 and 50-328

Enclosure :
Requests for Additional Information

cc w/encl: Listserv

August 30, 2013

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SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2
LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONAL INFORMATION

RAI 4.3.1-2

Background:

LRA Table 4.3-1 and 4.3-2 lists the projected and analyzed transient cycles for Unit 1 and Unit 2 respectively.

Issue 1:

In LRA Tables 4.3-1 and 4.3-2, the applicant does not identify any past operating experience (i.e., through operations as of November 1, 2011 for the units) for the primary side leak test transient. Specifically, the staff seeks justification on why the LRA does not list at least the following cycle number in the "Cycles as of Nov. 1, 2011" column of the tables for the primary side leak test, a number of past primary side system leak test occurrences equivalent to the total numbers of system leak tests that were performed over the past 31 years for Unit 1 and 30 years for Unit 2 in accordance with the ASME Code Section XI, Examination Category B-P primary side system leak test requirements.

Request 1:

Specifically, for the primary side leak test transient, provide your basis why the "Cycles as of Nov. 1, 2011" column in the tables do not cite a value that is at least as conservative as the total number of primary side leak test performed over the past 31 years for Unit 1 and 30 years for Unit 2 in accordance with the ASME Code Section XI, Examination Category B-P system leak test requirements and possibly during past maintenance outages.

Issue 2:

Since the applicant used the 60-year transient projections to support the disposition of the time-limited aging analyses (TLAAs) evaluated in LRA Sections 4.7.3, the staff requires additional information to determine whether the methodology used in the cycle projection methodology is appropriate.

Request 2:

Justify why LRA Tables 4.3-1 and 4.3-2 do not provide any 60-year cycle projection values for the following design basis transients: (a) the "½ safe shutdown earthquake" transient; (b) the low-temperature overpressure protection actuation; (c) the secondary side hydrostatic test condition transient; and (d) the primary side leak test transient.

ENCLOSURE

RAI 4.3.1-3

Background:

LRA Section 4.3.1.4 provides the applicant's metal fatigue TLAAs for the replacement steam generator (SG) components. The applicant provides its cumulative usage factor (CUF) values for these SG components in LRA Table 4.3-6, including the CUF value for the SG U-bend support tree at Unit 1.

Issue:

The LRA indicates that a fatigue analysis was performed for the SG U-bend support tree at Unit 1, but not for the same component at Unit 2.

Request:

Provide the basis why the SG U-bend support tree for Unit 2 had not been subjected to a metal fatigue analysis in the manner that the SG U-bend support tree for Unit 1 had been analyzed for fatigue.

RAI 4.3.1-4

Background:

In LRA Section 4.3.1.6, the applicant identifies that the reactor coolant pump (RCP) design includes RCP thermowells that received a CUF analysis, and that the CUF values for the RCP thermowells are negligible. In LRA Section 4.3.1.7, the applicant identifies that the reactor coolant system (RCS) hot legs and cold legs were modified to include thermowells and that the fatigue waiver analyses for the thermowells in the RCS hot legs and cold legs were TLAAs for the LRA.

Issue:

The staff cannot determine whether the RCP thermowells referred to in LRA Section 4.3.1.6 are the same component as any of the thermowells that were referred to in LRA Section 4.3.1.7 for the hot leg and cold leg designs.

Request:

Clarify whether the RCP thermowells referred to in LRA Section 4.3.1.6 are the same as any of the thermowells that were referenced in LRA Section 4.3.1.7 for the RCS hot legs and cold legs. Justify why the current licensing basis (CLB) for the thermowells in the RCS hot legs and cold legs would not need to have included fatigue analyses when a fatigue analysis was required as part of the CLB for the RCP thermowells. Revise LRA Appendix A as appropriate based on the response.

RAI 4.3.1-5

Background:

LRA Section 4.3.1.7 includes the implicit fatigue TLAAs for the Safety Class 1 or Class A piping systems that were designed to the standards in the USAS B31.1 design code.

Issue:

The staff noted that the applicant did not identify which of the design basis transients in LRA Table 4.3-1 or 4.3-2 constituted actual full thermal range transients for the implicit fatigue analysis that was performed for the Safety Class 1/Class A piping systems that were designed to the USAS B31.1 design code requirements, or the type of piping, piping components, piping elements that were included within the scope of the analyses for these systems.

Request:

Identify all Safety Class 1 or Class A systems (including Class 1 or Class A portions of interfacing systems to the RCS), and the piping, piping components, and piping elements in these systems, that were within the scope of the applicable implicit fatigue analysis requirements in the USAS B31.1 design code. For these systems, identify the design basis transients that constitute "full thermal range" transients for the implicit fatigue analyses of the systems. Justify that the total number of occurrences of those "full thermal range" transients remain less than 7000. Revise LRA Appendix A as appropriate based on the response.

RAI 4.3.1-6

Background:

LRA Section 4.3.1.7 includes the metal fatigue TLAA for the pressurizer surge lines. The applicant states that it will use the cycle monitoring activities and the periodic CUF update activities of the Fatigue Monitoring Program to accept the TLAA for the pressurizer surge lines in accordance with the criterion in 10 CFR 54.21(c)(1)(iii) and to manage the impacts of cracking by fatigue on the intended pressure boundary function of the surge lines during the period of extended operation.

The staff noted that the NRC addressed the impact of thermal stratification stresses on the pressure boundary functions of pressurizer surge lines in NRC Bulletin (BL) 88-11, "Pressurizer Surge Line Thermal Stratification" (December 20, 1988). The staff noted that the applicant addressed the issues and requests that were identified in BL 88-11 in the following four TVA letters to the NRC:

1. TVA Letter of April 18, 1989 (NRC Accession No. 8905010150 and Microfiche 49554, Fiche Pages 334-338)

2. TVA Letter of May 26, 1989 (NRC Accession No. 8906020225 and Microfiche 49988, Fiche Pages 300-306)

3. TVA Letter of June 22, 1989 (NRC Accession No. 8907050132 and Microfiche 50401 Fiche Pages 103-132)

4. TVA Letter of Sept. 6, 1989 (NRC Accession No. 89009120190 and Microfiche 51179, Fiche Pages 71-72)

Issue:

The program elements of the applicant's Fatigue Monitoring Program includes steps to update the respective CUF analysis on an as needed basis, as based on the results of the program's cycle counting activities for the transients that were assumed for in the analysis for the pressurizer surge lines. It is not evident to the staff on whether such potential updates of the CUF analysis for the pressurizer surge lines will continue to address potential impact of thermal stratification stresses on the CUF results for the updated analysis.

Request:

Clarify whether potential updates of the CUF analysis for the pressurizer surge line under the Fatigue Monitoring Program would continue to address potential impacts of thermal stratification stresses on the results of the CUF analysis. If yes, clarify how the Fatigue Monitoring Program will be used to address potential impacts of thermal stratification stresses on the results of the updated CUF analysis. If not, justify why any updates of the CUF analysis for the pressurizer surge lines would not need to address potential impacts of thermal stratification stresses on the fatigue analysis results for the pressurizer surge lines. Revise LRA Appendix A as appropriate based on the response.

RAI 4.3.1-7

Background:

LRA Section 4.3.1.7 identifies that thermowells were installed and that the cycle-based fatigue waiver analyses for the thermowells, as performed in accordance with ASME Section III fatigue waiver provisions, are TLAAs for the LRA. In this section of the LRA, the applicant states that the cycle counting activities of LRA AMP B.1.11, "Fatigue Monitoring Program," will be used to accept this TLAA in accordance with the requirement in 10 CFR 54.21(c)(1)(iii) and to manage the impacts of fatigue on the intended reactor coolant pressure boundary function of the thermowells.

Issue:

The scope of the current program description and program elements in GALL AMP X.M1, "Fatigue Monitoring Program," only includes cycle counting and monitoring bases for those analyses that are defined as cycle-based cumulative usage factor (CUF) analyses. The program has not been extended by the applicant to include program element criteria for using the cycle counting bases to monitor against other types of cycle-based analyses, such as cycle-based ASME fatigue waiver analyses or cycle-based flaw tolerance or fracture mechanics analyses.

To extend the scope of AMP B.1.11, Fatigue Monitoring Program, to the monitoring of the RCS transients that have been analyzed in applicable ASME Section III fatigue waiver analyses, the applicant may need to enhance the program elements including, but not limited to, "scope of program," "detection of aging effects," "monitoring and trending," and "acceptance criteria" program appropriately to account for the fact that the program is also being credited for monitoring of the design transients that have been assumed in applicable ASME Section III fatigue waiver analyses.

Request:

Provide your basis for using the Fatigue Monitoring Program to accept the fatigue waiver analysis for the RCS hot-leg and cold-leg thermowells in accordance with 10 CFR 54.21(c)(1)(iii), without including any enhancements of program elements to account for cycle count monitoring activities against these types of analyses. Revise LRA Appendix A as appropriate based on the response.

RAI 4.3.1-8

Background:

In LRA Table 4.3-12, the applicant provides the CUF-F_{en} results for pressurizer surge lines, including the low-alloy steel pressurizer surge nozzles with the CUF values of 0.49471 and 0.36634, for Units 1 and Unit 2 respectively. Both the USAR and LRA Table 3.1.2-3 identify that the pressurizer surge nozzle-to-safe end welds are made from Alloy 82/182 Inconel materials.

Issue:

It is not clear to the staff whether the pressurizer surge nozzle-to-safe end welds were considered as part of the fatigue analysis for the pressurizer surge nozzles or a separate CUF value was calculated for the pressurizer surge nozzle-to-safe end welds.

Request:

Clarify whether the pressurizer surge nozzle-to-safe end welds were considered to be within the scope of the fatigue analysis for the pressurizer surge nozzles. If the answer to this request is yes, justify why the environmentally-assisted fatigue calculation that was performed on the pressurizer surge nozzle using the methodology in NUREG/CR-6583 for low-alloy steel components would be an acceptable basis for assessing environmentally-assisted fatigue in the pressurizer surge nozzle-to-safe end welds, which are made from nickel alloy materials. If the answer to this request is no, clarify whether the pressurizer surge nozzle-to-safe end welds are in contact with the reactor coolant environment and how the effects of reactor coolant environment on the component fatigue life of the pressurizer surge nozzle-to-safe end welds will be managed during the period of extended operation.

RAI 4.3.2-2

Background:

LRA Section 4.3.2 identifies that an ASME Section III fatigue waiver was performed on the residual heat removal (RHR) heat exchangers and that the fatigue waiver analysis is a TLAA for the LRA. In this section of the LRA, the applicant states that the cycle counting activities of LRA AMP B.1.11, "Fatigue Monitoring Program," will be used to accept this TLAA in accordance with the requirement in 10 CFR 54.21(c)(1)(iii) and to manage the impacts of fatigue on the intended reactor coolant pressure boundary function of the RHR exchangers and to ensure that the fatigue waiver analysis for the RHR heat exchanges will remain valid for the period of extended operation.

Issue:

The scope of the current program description and program elements in GALL AMP X.M1, "Fatigue Monitoring Program," only includes cycle-counting and monitoring bases for those analyses that are defined as cumulative usage factor (CUF) analyses. The program has not been extended by the applicant to include program element criteria for using the cycle counting-bases to monitor against other types of cycle-based analyses, such as cycle-based ASME fatigue waiver analyses.

To extend the scope of AMP B.1.11, Fatigue Monitoring Program, to the monitoring of the RCS transients that have been analyzed for in applicable ASME Section III fatigue waiver analyses, the applicant may need to enhance the program elements including, but not limited to, "scope of program," "detection of aging effects," "monitoring and trending," and "acceptance criteria" program appropriately to account for the fact that the program is also being credited for monitoring of the design transients that have been assumed in applicable ASME Section III fatigue waiver analyses.

Request:

Provide the basis for using the Fatigue Monitoring Program to accept the fatigue waiver analysis for the RHR heat exchangers in accordance with 10 CFR 54.21(c)(1)(iii), without including any enhancements of the program elements to account for cycle-count monitoring activities against these types of analyses. Revise LRA Appendix A as appropriate based on the response.

RAI 4.3.2-3

Background:

LRA Section 4.3.2.3 indicates that the CLB includes metal fatigue analyses for the heat exchangers in the chemical and volume control systems (CVCS) and fatigue waiver analyses for the RHR heat exchangers.

Issue:

During the staff's safety audit (March 18-22, 2013) of the aging management program (AMP)s for mechanical systems, the staff noted the CLB includes metal fatigue analyses for the letdown heat exchangers and excessive letdown heat exchangers. However, the applicant has not justified why these fatigue analyses would not need to be identified as TLAAs, when compared to the six criteria in 10 CFR 54.3 for defining a plant analysis as a TLAA.

Request:

1. Clarify how the fatigue analyses for the letdown heat exchangers and excessive letdown heat exchangers compare to the six criteria for TLAAs in 10 CFR 54.3.

2. Based on the response to Part a., clarify and justify whether the fatigue analyses for the letdown heat exchangers and excessive letdown heat exchangers need to be identified as a TLAAs in accordance with requirement in 10 CFR 54.21(c)(1). If the analyses need to be identified as a TLAAs, amend the LRA accordingly and provide the basis for dispositioning the TLAAs in accordance with 10 CFR 54.21(c)(1)(i), (ii), or (iii). Revise LRA Appendix A as appropriate based on the response.

3. Identify whether the CLB includes any other metal fatigue analyses or fatigue waiver analyses for Non-Safety Class 1/Non-Safety Class A heat exchanger components at the plant.

4. If it is determined that the CLB does include additional metal fatigue analyses or fatigue waiver analyses for heat exchanger components, identify each component-specific analysis that was performed as part of the CLB and justify why the applicable analysis would not need to be identified as TLAA in accordance with 10 CFR 54.21(c)(1).

RAI 3.5.1-88

Background:

LRA Table 3.5.1, item 3.5.1-88, states that vibration, flexing of the joint, cyclic shear loads, thermal cycles and other causes can cause partial self-loosening of a fastener; however, these causes of loosening are minor contributors in structural steel and steel component threaded connections and are eliminated by initial preload bolt torquing. The LRA further states that SQN uses site procedures and manufacturer recommendations to provide guidance for proper torquing of nuts and bolts used in structural applications. Therefore, loss of preload due to self-loosening is not an aging effect requiring management for structural steel and steel component threaded fasteners within the scope of license renewal.

Issue:

The Structures Monitoring Program described in the GALL Report, which is an acceptable program to manage the loss of preload due to self-loosening for these components, not only considers the initial preload bolt torquing in the "preventive actions" program element, but also recommends inspection of structural bolting for loose bolts, missing or loose nuts, and other conditions indicative of loss of preload in the "parameters monitored or inspected" program element. The staff notes that the Structures Monitoring Program described in LRA Section B.1.40 has been enhanced to include the inspection of structural bolting for loose or missing nuts and to revise procedures to follow parameters to be monitored or inspected based on ANSI/ASCE 11, "Guideline for Structural Condition Assessment of Existing Buildings, American Society of Civil Engineers."

ANSI/ASCE 11, Section 3.3.2.6, "Physical Conditions of Connectors," and "3.3.3 Test Methods," provides guidelines for the inspection of the condition and tightness of the bolts which in addition to visual examination/observation include "physical assistance such as cleaning, scraping, and sounding" to establish the existence of snug fit "under some positive compressive force."

Based on the above, the staff's position is that the potential loss of preload due to self-loosening from vibration, flexing of the joint, cyclic shear loads, thermal cycles and other causes is an aging effect requiring management.

Request:

Provide the staff with sufficient technical basis for concluding loss of preload due to self-loosening is not an aging effect requiring management, or identify an aging management program to manage this aging effect.

RAI 3.5.1-2

Background

SRP-LR Table 3.5-1 includes line items for aging effects for accessible concrete areas that do not require further evaluation but recommend GALL Report AMPs to manage the effects of aging. In the Discussion column for several LRA Table 3.5-1 items, the applicant stated that the listed aging effects for the SQN steel containment vessel (SCV) concrete basemat do not require management at SQN. The discussion further states that SQN concrete is designed and constructed in a way that would prevent the effect of this aging from occurring and that aging effects are not significant for accessible areas.

For inaccessible areas associated with the listed aging effects, the applicant's response to RAI 3.5.1-1 stated that SQN is enhancing the Structures Monitoring Program (SMP) to require inspections of inaccessible areas in environments where observed conditions in accessible areas exposed to the same environment indicate that significant degradation is occurring.

Issue:

The staff does not agree that the aging effects associated with accessible areas of concrete do not require management. Regardless of the design and construction of the concrete, the staff believes all aging effects could occur in accessible and inaccessible areas and, therefore, require management. The discussion in the LRA states that the components are included in the SMP to confirm the absence of these aging effects; however, the associated line items do not appear in any of the LRA "Table 2's" for consistency with the GALL Report. If the enhancement listed in the SMP is credited to ensure that age-related degradation would be detected before a loss of intended function for the inaccessible concrete associated with further evaluation sections, then the accessible area line items need to be in the scope of the SMP and evaluated for consistency with GALL in Table 2's.

Request:

Provide a technical justification for why the following aging effects do not require management in accessible areas or identify a program to manage this aging effect. If a program is identified to manage this aging effect, update the LRA accordingly (including Table 2 AMR line items).

1. increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide (SRP Table 3.5-1, Items 15 and 20)

2. cracking; loss of bond; and loss of material (spalling, scaling) due to corrosion of embedded steel (SRP Table 3.5-1, Item 21)

3. increase in porosity and permeability; cracking; loss of material (spalling, scaling) due to aggressive chemical attack (SRP Table 3.5-1 Items 16 and 24)

RAI 3.5.1-1a (Follow up)

Background:

LRA Table 3.5-1, items 3.5.1-12 and 3.5.1-19 address cracking due to expansion from reaction with aggregates in inaccessible and accessible areas of containment concrete; respectively. The applicant's response to RAI 3.5-1 indicated that it would manage this aging effect, for areas of accessible and inaccessible concrete associated with LRA Table 3.5-1, Items 43, 50, and 54, using the Structures Monitoring Program.

Issue:

The staff noted that items 3.5.1-12 and 3.5.1-19 were not included in RAI 3.5.1-1; however, they also address cracking due to expansion from reaction with aggregates. As stated in RAI 3.5.1-1, regardless of the design and construction of the concrete, the staff believes all aging effects could occur in accessible areas and therefore, require management. The discussion in the LRA states that the components are included in the SMP; however, the associated line items do not appear in any of the LRA "Table 2's."

Request:

State whether LRA Table 3.5-1 items 3.5.1-12 and 3.5.1-19 will be revised consistent with those revised in response to RAI 3.5.1-1. If a program is identified to manage this aging effect, update the LRA accordingly. If not, provide a technical justification for why cracking due to reaction with aggregates does not require management in accessible or inaccessible areas of the concrete basemat.

RAI B.1.6-1a (Follow up)

Background:

In its response to item 1 of RAI B.1.6-1, on July 1, 2013, the applicant provided an Exhibit A showing the design modification for the test connection tubing in the access boxes installed in SQN Unit 2, and stated that plans are in place to install a similar modification in SQN Unit 1. The applicant also stated "prior to installing this design modification in SQN Unit 2, remote visual examinations were performed, to the extent possible, inside the leak test channels by inserting a boroscope video probe into test connection tubing. Based on the satisfactory examination results to date, following installation of the design modification SQN has no plans to perform future visual examinations of the embedded SCV liner plate or embedded leak test channels."

GALL Report AMP XI.S1, program element "detection of aging effects," states "[t]he examination methods, frequency, and scope of examination specified in 10 CFR 50.55a and

Subsection IWE ensure that aging effects are detected before they compromise the design-basis requirements." 10 CFR 50.55a(b)(2)(ix)(A) states that licensees "shall evaluate the acceptability of inaccessible areas when conditions exist in accessible areas that could be indicative of or result in degradation of inaccessible areas."

Issue:

Exhibit A shows a cover plate seal welded to the bottom of the corroded access boxes. The all-around field welding symbol pointing to the welding of the cover plates to access box steels, may not meet code approved welding standards because of their degraded (excessive corrosion) condition. The SQN-NRC Integrated Inspection Report (IR)-2012005 of February 13, 2013, states that an inspection completed by NRC on December 31, 2012 indicated the failure of the applicant to conduct IWE visual inspections of the access boxes. Furthermore, the IR states that the applicant subsequently performed visual examinations that revealed significant corrosion of the access boxes, including a through-wall hole in tubing leading down to a leak chase channel. Follow-up boroscopic examination confirmed the existence of water in the leak chase channels with corrosion.

It is not clear whether the applicant's design modification to cover the tubing opening is an effective approach of sealing the leak channel test connection. It is also not clear why "SQN has no plans to perform future visual examinations of the embedded SCV liner plate or embedded leak test channels."

Request:

1. Explain how the design modification, shown in exhibit A, will be effective in sealing the leak chase channels from moisture intrusion during the period of extended operation. Furthermore complete exhibit A, shown in RAI B.1.6-1, with a code approved weld type, weld-size, and weld symbol continued to be used for welding the cover plates to the access box steels.

2. Explain why the applicant has no plans to perform future visual examinations of the embedded leak test channels, when the recent IR indicates the existence of water in the channels and corresponding corrosion.

RAI B.1.6-1b (Follow-up)

Background:

In its response to item 2 of RAI B.1.6-1 on July 1, 2013, the applicant stated "[b]ased on past satisfactory examinations results, SQN has no plans to perform ultrasonic tests (UT) examination of the SCV below the moisture barrier from the annulus area or from inside the SCV." The applicant also stated that "if future examinations identify moisture intrusion below the moisture barrier sealant in the inaccessible area of SCV embedded in concrete, one or both of these examination techniques may be necessary for compliance with 10 CFR 50.55a(b)(2)(ix), and would be performed if necessary."

Issue:

It is not clear what examination techniques the applicant is referring to use if moisture intrusion below the moisture barrier sealant in the inaccessible area of SCV embedded in concrete were identified during the period of extended operation.

Request:

Identify what examination techniques are to be used, if moisture intrusion below the moisture barrier sealant in the inaccessible area of SCV embedded in concrete were identified during the period of extended operation.

RAI B.1.6-2a (Follow-up)

Background:

In its response to item 1 of RAI B.1.6-2 on July 1, 2013, the applicant stated "SQN elected to perform augmented volumetric examinations at the location of the full penetration welds where the SCV domes were cut for the steam generator replacements (SGRs). This voluntary volumetric examination is not required by the ASME Code and change to this examination does not represent a change in scope to the requirements established under IWE-2412. IWE-2412 is not applicable to the examination frequency for this owner elected examination."

In its response to item 2 of RAI B.1.6-2 on July 1, 2013, the applicant stated "A similar owner-elected augmented examination plan was performed at Tennessee Valley Authority Watts Bar Nuclear Plant. The volumetric examinations are strictly voluntary examinations beyond those required by the ASME Code and do not constitute a change in scope to the requirements established under IWE-2412."

The staff noted, however, the following ASME Section XI, IWE and referenced Articles:

- IWE-1241 "Examination Surface Areas," that states "Surface areas likely to experience accelerated degradation and aging require the augmented examinations identified in Table IWE-2500-1, Examination Category E-C."
- IWE-2500(b)(4) "Examination and Pressure Test Requirements," which states that "... periodic reexamination can be performed in accordance with the requirements of Table IWE-2500-1, Examination Category E-C."

In addition the staff noted in the GALL Report, XI.S2, ASME Section XI, Subsection IWE program description that "[l]imited volumetric examination (ultrasonic thickness measurement) and surface examination (e.g., liquid penetrant) may also be necessary in some instances to detect aging effects." Specifically:

- "Scope of program," program element, states "The components within the scope of Subsection IWE are Class MC pressure-retaining components (steel containments) and their integral attachments, metallic shell and penetration liners of Class CC containments and their integral attachments, containment moisture barriers, containment pressure-retaining bolting, and metal containment surface areas, including **welds** and base metal;" and

- "Detection of aging effects," program element, states "IWE-1240 requires augmented examinations (Examination Category E-C) of containment surface areas subject to degradation. A VT-1 visual examination is performed for areas accessible from both sides, and volumetric (ultrasonic thickness measurement) examination is performed for areas accessible from only one side."

Issue:

1. The staff reviewed the applicant's response and noted that it identifies volumetric examination at the locations of the full penetration welds where the SCV domes were cut, as voluntary and not required by ASME Code of record. The applicant also stated that "changes to this examination do not represent a change in scope to the requirements established under IWE-2412. IWE-2412 is not applicable to the examination frequency for this owner-elected examination."

    a. It is not clear whether the surface areas of the SCV subject to volumetric examinations are experiencing accelerated degradation, requiring ultrasonic thickness examination per IWE-1241 augmented examination, as listed in Examination Category of E-C of Table IWE2500-1;and

    b. It is not clear why IWE-2412 is not applicable to the examination frequency for the owner-elected examination.

2. Furthermore, the applicant did not provide any discussion(s) on fleet-wide operating experience(s) and associated corrective actions that may have been performed, and are the cause of applicant's "voluntary" volumetric examinations at the locations of the full penetration welds where the SCV domes were cut.

Request:

1. Explain whether:
    a. the augmented volumetric examinations are pursued because of anticipated aging effects experiencing accelerated degradation at the locations of the full penetration welds where the SCV domes were cut; and

    b. the IWE-2412 examination frequency will continue to be performed during the period of extended operation.

2. Provide operating experience(s) and associated corrective action(s) for any past volumetric examination(s) performed to ensure the integrity of the SCVs continue to be maintained across the fleet.

RAI B.1.23-2b

Background:

In its July 1, 2013 response to RAI B.1.23-2, the applicant indicated that wear occurred in the thermal sleeves of control rod drive mechanism (CRDM) nozzles due to interactions with the CRDM nozzles. The CRDM nozzle thermal sleeves perform the following functions: (1) shielding the CRDM nozzles from thermal transients, (2) providing a lead-in for the rod cluster control assembly (RCCA) drive rods into the CRDM nozzles, and (3) protecting the RCCA drive rods from the head cooling spray cross flow in the reactor vessel upper head plenum region.

Issue:

The applicant's operating experience indicates that wear occurred in these thermal sleeves. The LRA does not address aging management for loss of material due to wear of the CRDM nozzle thermal sleeves.

Request:

The LRA does not address aging management for loss of material due to wear of the CRDM nozzle thermal sleeves. Identify an aging management program for these thermal sleeves and describe how the applicant's program will adequately manage loss of material due to wear for the CRDM nozzle thermal sleeves.

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION (TAC NOS. MF0481 AND MF0482) – SET 12.

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