UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 18, 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 16.

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 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,

Richard A. 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: Listserv

October 18, 2013

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DATE	10/10/2013	10/10/2013	10/10/2013	10/18/2013

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

RAI B.1.23-2c (Follow up)

Background:

In its September 30, 2013, response to RAI B.1.23-2a, the applicant described justification for why an inspection program is not necessary to manage the wear of the control rod drive mechanism (CRDM) nozzles. As part of the response, the applicant addressed its analysis on the maximum wear depth of CRDM nozzles (i.e., 0.050 inches).

In its response, the applicant stated that, when contact occurs between the CRDM nozzle and the thermal sleeve centering pads of the nozzle, only a relatively small wear volume of the three centering pads is distributed over the relatively large areas of the CRDM nozzle inside surfaces. The applicant acknowledged that the specific hardness values of the sleeves, centering pads and CRDM nozzles are not known, and further stated that similar grades of stainless steel and Inconel materials have similar hardness values (i.e., approximately 90 on Rockwell B scale).

Issue:

As previously discussed in RAI B.1.23-2a, the applicant's analysis on the maximum wear depth involves uncertainties in local vibratory motions, residual stresses, and hardness levels of the CRDM nozzles, thermal sleeves, and centering pads. Without an inspection of the wear indications, localized severe wear conditions cannot be excluded. Therefore, the staff finds that an inspection program is necessary to confirm the adequacy of the applicant's analysis.

In addition, wear of the CRDM nozzles may interfere with the volumetric examination of the CRDM nozzles which is specified in the applicant's Nickel Alloy Inspection Program. The staff needs to clarify how the applicant's program would resolve the situation that wear of the CRDM nozzles interferes with the volumetric examination of the CRDM nozzles.

Request:

1. Identify an inspection program to confirm the adequacy of the applicant's analysis on the maximum wear depth of the CRDM nozzles. As part of the response, describe how applicant's inspection program confirms the adequacy of the applicant's analysis.

2. Clarify whether the applicant's Nickel Alloy Inspection Program accounts for a potential loss of ultrasonic testing signal due to the surface irregularities of the wear areas.

3. In addition, describe how the applicant's Nickel Alloy Inspection Program would resolve the interference caused by wear of the CRDM nozzles with volumetric examination of the CRDM nozzles. As part of the response, clarify how the applicant's program will confirm the absence of cracking in the wear areas that could not be adequately examined by the volumetric examination.

ENCLOSURE

RAI 4.3.1-8a (Follow up)

Background:

In its September 30, 2013, response to RAI 4.3.1-8, the applicant stated that the pressurizer surge nozzle-to-safe end welds for the units were originally included in the cumulative usage factor (CUF) analyses for the pressurizer surge nozzles; however, the applicant stated that the design of the welds has been modified to include a full structural weld overlay (SWOL). The applicant also stated that, as identified in LRA Section 4.3.1.3, the current design basis of the pressurizer surge nozzles and their nozzle-to-safe end weld relies on a flaw evaluation that is used to establish the inservice inspection (ISI) frequency for the components.

Issue:

The response to RAI 4.3.1-8 may be inconsistent with LRA Section 4.3.1.3 Specifically, LRA Section 4.3.1.3, identifies that the flaw evaluation for the nickel alloy pressurizer surge nozzle-to-safe end weld was performed to assess postulated cracking that could be initiated and grown by a stress corrosion cracking (SCC) mechanism, and not by a metal fatigue mechanism. As a result, the response to RAI 4.3.1-8 will only provide a valid basis for concluding that the welds would not need to be evaluated for environmentally-assisted fatigue if it is demonstrated that the flaw evaluation of the pressurizer surge nozzle-to-safe end welds also included an evaluation of crack initiation and growth that is induced by a thermally-induced metal fatigue mechanism.

Thus, it is not evident whether flaw growth by a thermally-induced metal fatigue mechanism was included as part of the basis for establishing the inspection frequency that is used to schedule the inspections of the pressurizer spray nozzle-to-safe end weld under the applicant's ISI Program or Nickel Alloy Inspection Program.

Request:

Identify whether the flaw evaluation that was performed on the SWOL-modified pressurizer surge nozzle designs included an assessment of cracking that would be induced and grown by a thermally-induced metal fatigue mechanism (i.e., in addition to an assessment of cracking that is initiated and grown by SCC).

1. If it is determined that the flaw evaluation did include an assessment of both SCC and fatigue, identify the inspection frequency that is currently applicable to the ISI inspections under the applicant's ISI Program or Nickel Alloy Inspection Program. In addition, identify which of the cracking mechanisms was determined to be limiting for establishment of the inspection frequency.

2. If it is determined that the flaw growth analysis does not include an assessment of cracking that could be initiated and grown by fatigue, identify design basis CUF values that are applicable to the pressurizer surge nozzle-to-safe end weld locations for Units 1 and 2 and justify why the CUF values for these Nickel alloy nozzle-to-safe end weld would not need to be adjusted for environmentally-assisted fatigue, as performed in accordance with the recommended guidance for performing environmentally-assisted fatigue analyses for Nickel alloy components in SRP-LR Section 4.3. Justify your responses to this request.

Letter to J. Shea from R. Plasse dated October 18, 2013

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE EQUOYAH NUCLEAR PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION (TAC NOS. MF0481 AND MF0482) – SET 16.

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