NRR-PMDAPEm Resource

From:	Purnell, Blake
Sent:	Tuesday, May 09, 2017 1:08 PM
To:	Lashley, Phil H.
Cc:	Davisbesse.regulatory.affairs@firstenergycorp.com; Wolf, Gerald M.; Nesser, Kathryn M; Wrona, David
Subject:	Davis-Besse Nuclear Power Station, Unit No. 1 - Request for Additional Information Regarding Evaluation Submitted in Response to License Renewal Commitment No. 54 (CAC No. MF9126)
Attachments:	MF9126 DB LR Commitment 54 RAI.pdf

Mr. Lashley:

By letter dated January 23, 2017 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML17026A004), as supplemented by letter dated March 23, 2017 (ADAMS Package Accession No. ML17086A019), FirstEnergy Nuclear Operating Company (the licensee) submitted an evaluation by AREVA in response to Davis-Besse Nuclear Power Station, Unit No. 1, License Renewal Commitment No. 54.

The U.S. Nuclear Regulatory Commission staff is reviewing your submittal and has determined that additional information is required to complete the review. A response to the attached request for additional information is to be provided within 30 days.

Sincerely,

Blake Purnell, Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission

Docket No. 50-346

Hearing Identifier: NRR_PMDA
Email Number: 3502

Mail Envelope Properties (Blake.Purnell@nrc.gov20170509130800)

Subject: Davis-Besse Nuclear Power Station, Unit No. 1 - Request for Additional Information Regarding Evaluation Submitted in Response to License Renewal Commitment No. 54 (CAC No. MF9126)
Sent Date: 5/9/2017 1:08:07 PM
Received Date: 5/9/2017 1:08:00 PM
From: Purnell, Blake

Created By: Blake.Purnell@nrc.gov

Recipients:
"Davisbesse.regulatory.affairs@firstenergycorp.com" <Davisbesse.regulatory.affairs@firstenergycorp.com>
Tracking Status: None
"Wolf, Gerald M." <gmwolf@firstenergycorp.com>
Tracking Status: None
"Nesser, Kathryn M" <kmnesser@firstenergycorp.com>
Tracking Status: None
"Wrona, David" <David.Wrona@nrc.gov>
Tracking Status: None
"Lashley, Phil H." <phlashley@firstenergycorp.com>
Tracking Status: None

Post Office:

Files	Size	Date & Time
MESSAGE	894	5/9/2017 1:08:00 PM
MF9126 DB LR Commitment 54 RAI.pdf	98967	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

REQUEST FOR ADDITIONAL INFORMATION

LICENSE RENEWAL COMMITMENT NO. 54

FIRSTENERGY NUCLEAR OPERATING COMPANY

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-346

By letter dated January 23, 2017 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML17026A004), as supplemented by letter dated March 23, 2017 (ADAMS Package Accession No. ML17086A019), FirstEnergy Nuclear Operating Company (FENOC, the licensee) submitted an evaluation by AREVA in response to Davis-Besse Nuclear Power Station, Unit No. 1, License Renewal Commitment No. 54.

The U.S. Nuclear Regulatory Commission (NRC) staff needs the following additional information to complete its review of the submittals.

Request for Additional Information (RAI)-1

For Alloy A-286, Note 2 of Table 4-1 of the AREVA evaluation states: "Yield stress value based on 3 times (3x) design stress intensity at temperature (600 °F)." There is test data which supports the note for stainless steel piping; however, Alloy A-286 is not used in piping. Justify use of Note 2 for Alloy A-286. For example, provide a comparison of the yield stresses based on 3 times design stress intensity at 600 °F and test-based yield stresses at similar temperatures. .

RAI-2

Table 4-2 of the AREVA evaluation lists the stress intensities for reactor vessel internal (RVI) components under different stress combinations. These stress intensities are compared to the unirradiated yield stress values in Table 4-1 of the AREVA evaluation to screen out RVIs of no loss-of-ductility concern. Identify which material in Table 4-1 is applicable to each of the RVI components in Table 4-2.

RAI-3

Section 5 of the AREVA evaluation describes how the neutron fluence estimates for several RVI component are used to ensure that relevant stress and strain margins are maintained throughout the period of extended operation. However, the fluence calculations do not provide (1) projected fluence values, (2) specific locations for the reported values, (3) an indication of uncertainty or margin of accuracy, or (4) if the chosen methodology is qualified for estimating fluence values at the various RVI component locations.

a) Methods which are consistent with NRC Regulatory Guide (RG) 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," March 2001 (ADAMS Accession No ML010890301), may not be appropriate for estimating neutron fluence for some RVI components. For example, RG 1.190 permits representation of internal fuel assemblies in considerably less detail than peripheral assemblies, because

the neutron flux on the reactor pressure vessel is primarily due to fuel at the core periphery. This is not the case for components such as the core barrel top flange. Explain how the methodology used in the AREVA evaluation is appropriate for estimating neutron fluence for RVI components in Category Item #2 and Category Item #3. The explanation should:

i. Show that the current (r, z) spatial representation is sufficiently refined.

ii. Demonstrate that the detail represented in the (r, θ) model is adequate and produces a reliable neutron fluence estimate.

iii. Demonstrate that the chosen fluence methods are qualified for estimating neutron fluence at the various RVI component locations of interest.

iv. Explain whether the neutron fluence values used have been augmented to account for any uncertainty associated with the calculation methods, nuclear data, or modeling accuracy.

b) In Section 5.2 of the AREVA evaluation, for example, the estimated neutron fluence for a highly irradiated RVI component is used to determine the allowable irradiated yield stress for the component. If this fluence value is overestimated, then the large stress margin indicated may be nonconservative or, in the worst case, indicate that the allowable stress will be exceeded. Accounting for fluence uncertainty is needed to ensure that stress margins are maintained.

Provide neutron fluence (E > 1.0 MeV) values for the RVI components considered in the Category Item #2 assessment. Include irradiated yield stress margins after accounting for estimated RVI component nominal fluence values and their associated uncertainties.

c) Provide neutron fluence (E > 1.0 MeV) values for the RVI components considered in the Category Item #3 assessment. Include uniform elongation margins after accounting for estimated RVI component nominal fluence values and their associated uncertainties.

RAI-4

Section 5.3 of the AREVA evaluation states, in part: "If the projected fluences of the remaining reactor vessel internals component items are applied to Figure 5-2 (Figure E-3 of BAW-10008, Part 1, Revision 1),[1] the decrease in uniform elongation for the [specified RVI components] (all fabricated from Type 304 stainless steel) at both 572°F (300°C) and 752°F (400°C) (i.e., temperatures between which these component items would be expected to experience) is such that the 20 percent uniform elongation of irradiated material credited for 40 years in Appendix E of BAW-10008, Part1, Revision 1 and the 8.6 percent allowable strain specified in Appendix A of BAW-10008, Part 1, Revision 1 is met for these component items."

Provide justification for this statement using the neutron fluence values provided in response to RAI-3.

---

[1] AREVA Document BAW-10008 Part 1, Revision 1, "Reactor Internals Stress and Deflection Due to Loss-of-Coolant Accident and Maximum Hypothetical Earthquake," June 1970.

RAI-5

Section 5.5 of the AREVA evaluation describes a further assessment based on recalculated faulted condition loads based on (1) asymmetric effects on pipe break loadings and (2) crediting leak-before-break by eliminating primary loop pipe breaks due from consideration.

Provide the stress intensities for the evaluated RVI components resulting from this further assessment. Identify the source document for the stress intensities (e.g., provide references (title, date, etc.) to internal or industry documents).