

NRR-PMDAPem Resource

From: Purnell, Blake
Sent: Friday, August 26, 2016 9:19 AM
To: Lashley, Phil H.
Cc: Wolf, Gerald M.; Davisbesse.regulatory.affairs@firstenergycorp.com; Miller, Ed
Subject: Davis-Besse License Renewal Commitment 42 (CAC No. MF7626)
Attachments: DB LR Commitment 42 RAI.docx

Mr. Lashley:

By letter dated April 21, 2016 (Agencywide Documents Access and Management System Accession No. ML16112A079), FirstEnergy Nuclear Operating Company (FENOC, the licensee) provided a fatigue monitoring program evaluation for Davis-Besse Nuclear Power Station, Unit No. 1. This submittal was in response to license renewal Commitment No. 42.

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. This request was discussed with FENOC personnel on August 23, 2016.

Sincerely,

Blake Purnell, Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission

Docket No. 50-346

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From: Purnell, Blake

Created By: Blake.Purnell@nrc.gov

Recipients:

"Wolf, Gerald M." <gmwolf@firstenergycorp.com>
Tracking Status: None
"Davisbesse.regulatory.affairs@firstenergycorp.com"
<Davisbesse.regulatory.affairs@firstenergycorp.com>
Tracking Status: None
"Miller, Ed" <Ed.Miller@nrc.gov>
Tracking Status: None
"Lashley, Phil H." <phlashley@firstenergycorp.com>
Tracking Status: None

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REQUEST FOR ADDITIONAL INFORMATION

LICENSE RENEWAL COMMITMENT NO. 42

FIRSTENERGY NUCLEAR OPERATING COMPANY

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-346

By letter dated April 21, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16112A079), FirstEnergy Nuclear Operating Company (the licensee) provided a fatigue monitoring program evaluation for Davis-Besse Nuclear Power Station (DBNPS), Unit No. 1. This submittal was in response to license renewal Commitment No. 42. The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing your submittal and has determined that additional information is required to complete the review.

Background

Section 2.C(11), "License Renewal Conditions," of Renewed Facility Operating License No. NPF-3 specifies that the Commitments in Appendix A of NUREG-2193, Supplement 1, "Safety Evaluation Report Related to the License Renewal of Davis-Besse Nuclear Power Station," published April 2016 (ADAMS Accession No. ML16104A350), are part of the DBNPS Updated Final Safety Analysis Report. License renewal Commitment No. 42 in Appendix A of NUREG-2193, Supplement 1, states the following:

Enhance the Fatigue Monitoring Program to:

- Evaluate additional plant-specific component locations in the reactor coolant pressure boundary that may be more limiting than those considered in NUREG/CR-6260^[1]. This evaluation will include identification of the most limiting fatigue location exposed to reactor coolant for each material type (i.e., [carbon steel] CS, [low-alloy steel] LAS, [stainless steel] SS, and [nickel-based alloy] NBA) and that each bounding material/location will be evaluated for the effects of the reactor coolant environment on fatigue usage. Nickel-based alloy items will be evaluated using NUREG/CR-6909^[2]. Submit the evaluation to the NRC 1 year prior to the period of extended operation.

Enclosure B of the licensee's letter dated June 17, 2011 (ADAMS Accession No. ML11172A389), provides AREVA Report No. 51-9157140-001. Table 3-9 of the AREVA Report contains the environmentally-assisted fatigue (EAF) values for the NUREG/CR-6260 locations. Table 3-8 of the AREVA Report contains a summary of the reactor coolant system pressure boundary locations with environmentally-adjusted cumulative usage factor (CUF_{en}) values that exceed the limit of 1.0.

In its April 21, 2016, letter, the licensee submitted the results of its evaluations associated with Commitment No. 42. The letter stated that locations were screened in accordance with the

¹ NUREG/CR-6260, "Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components, dated February 1995, ADAMS Accession No. ML031480219.

² NUREG/CR-6909 "Effect of LWR Coolant Environments on the Fatigue Life of Reactor Materials," dated February 2007

methodology of Electric Power Research Institute (EPRI) Technical Report 1024995, “Environmentally Assisted Fatigue Screening, Process and Technical Basis for Identifying EAF Limiting Locations,” dated 2012. The letter also identified the most limiting locations for each of the four material types (i.e., CS, LAS, SS, and NBA). The CUF_{en} values are provided for two of the four limiting locations. The CUF_{en} values are not provided for the LAS and NBA locations. The LAS and NBA locations reference EPRI Technical Report 1024995.

Issue

The April 21, 2016, letter, describes the results of the licensee’s evaluation and references the generic methodologies (e.g., EPRI Technical Report 1024995) used, but it does not provide sufficient details about the actual evaluation. The plant-specific methodology and criteria used to select the most limiting locations for EAF is not clearly described. The letter does not explain how the plant-specific screening methodology conservatively evaluates EAF effects, with the same degree of analytical rigor for all locations, to identify the bounding locations. Additionally, the licensee uses different material types to bound limiting locations for LAS and NBA without justification.

EPRI Technical Report 1024995 has not been submitted to the NRC for approval and has not been endorsed by the NRC. The licensee does not explain how the plant-specific implementation of the generic procedures in EPRI Technical Report 1024995 will identify the most limiting plant-specific locations. The NRC staff lacks sufficient information to evaluate the plant-specific methodology and criteria used to select the most limiting locations for EAF.

Request

- (1) Describe the plant-specific methodology and criteria used to rank locations and select the most limiting locations for EAF. Describe relevant factors for each step of the process, such as thermal zones, material types, transient complexity, temperature effects, and complexity of the systems (as applicable). Justify the use of different material types to bound locations. Justify that the process is appropriately conservative.
- (2) Describe and justify any engineering judgement, plant-specific assumptions, and plant-specific criteria used in the EAF analysis or screening process. This should include the systematic process used to eliminate locations as limiting and examples showing how the process was implemented.
- (3) Describe how the screening process was applied to the locations in Table 3-8 of the AREVA Report No. 51-9157140-001.
- (4) State the locations being managed by the fatigue monitoring program to maintain the CUF_{en} values below the limit of 1.0 through the period of extended operation. Provide the CUF_{en} values for the locations being managed by the fatigue monitoring program.