



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

October 11, 2011

Barry S. Allen, Vice President
Davis-Besse Nuclear Power Station
FirstEnergy Nuclear Operating Company
5501 North State Route 2
Oak Harbor, OH 43449

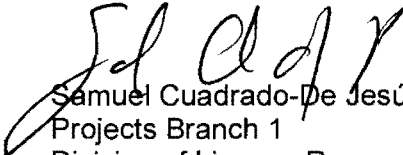
SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
DAVIS-BESSE NUCLEAR POWER STATION (TAC NO. ME4640)

Dear Mr. Allen:

By letter dated August 27, 2010, FirstEnergy Nuclear Operating Company submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 for renewal of Operating License NPF-3 for the Davis-Besse Nuclear Power Station. The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing this application in accordance with the guidance in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." During its review, the staff has identified areas where additional information is needed to complete the review. The staff's requests for additional information are included in the enclosure. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with Cliff Custer, of your staff, 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 by telephone at 301-415-2946 or by e-mail at Samuel.CuadradoDeJesus@nrc.gov.

Sincerely,


Samuel Cuadrado-De Jesús, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure:
As stated

cc w/encl: Listserv

DAVIS-BESSE NUCLEAR POWER STATION
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION

RAI B.2.40-3 Follow-Up to RAI B.2.40-2

Background:

By letter dated August 17, 2011, the applicant responded to a staff RAI regarding operating experience with degradation of the north embankment of the safety-related portion of the intake canal. In the response the applicant committed to ensure that an investigation of the embankment degradation would be completed prior to the period of extended operation. The applicant further committed to evaluate the results and complete needed repairs or modifications of the embankment prior to the period of extended operation.

Issue:

Although the applicant committed to completing long-term evaluation plans, no information was provided about the plan, such as schedule, scope, or acceptance criteria.

Request:

Provide details about the embankment investigation. The response should include scheduling information, activities planned and completed to date, and probable corrective actions. The response should provide technical justification for the timeliness of the repairs, including an explanation why prior to the period of extended operation is an acceptable deadline for completing the repairs.

RAI 4.7.3-1

Background:

License renewal application (LRA) Section 4.7.3 discusses a fracture mechanics analysis for evaluating the integrity of the reactor vessel (RV) during the pressurized thermal shock (PTS) event associated with low-temperature (35 °F) water injection from the borated water storage tank (BWST) following a small steam line break. LRA Section 4.7.3 states that the current licensing basis (CLB) analysis for this event is addressed in the Davis-Besse Updated Safety Analysis Report (USAR), Section 5.2 and that the subject analysis was revised to consider the period of extended operation (52 EFPY).

Issue:

The staff reviewed USAR Section 5.2 and could not locate the CLB analysis for evaluating RV integrity under the subject PTS conditions. Furthermore, the staff found no references in LRA Section 4.8 for reports documenting the analysis of RV integrity under these PTS conditions for the period of extended operation, based on the 52 EFPY reference temperature for PTS (RT_{PTS}) values.

Request:

1. State the USAR section and page number where the summary of the CLB analysis of the subject PTS event is located. If a summary of the CLB analysis is not located in the USAR, please state where it can be found.

ENCLOSURE

2. Provide the reports documenting the projected 52 EFPY analysis of RV integrity under the subject PTS conditions.

RAI 4.7.4-1

Background:

By letter dated June 3, 2011, the applicant provided Amendment 8 to Davis-Besse LRA. LRA Amendment 8 revised the disposition for the analysis of the HPI/Makeup Nozzle Thermal Sleeves in LRA Section 4.7.4 from "10 CFR 54.21(c)(1)(iii)" to "Not a TLAA." As an explanation for the revised disposition, LRA Section 4.7.4, as amended, now states that "[b]ased on the [USAR Supplement] commitment [to replace the subject thermals sleeves], the HPI/Makeup nozzle thermal sleeves are short-lived (not 40-year) parts and therefore this analysis is not a TLAA." Similarly, LRA Amendment 8 revised the corresponding USAR Supplement section in LRA Section A.2.7.4 to reflect the changed disposition. LRA Section A.2.7.4, as revised by LRA Amendment 8, now states that, "[b]ased on the commitment [to replace the subject thermal sleeves], the HPI/makeup nozzle thermal sleeves are short lived (not 40-year) parts and therefore this analysis is not a TLAA." Finally, LRA Section 4.1, Table 4.1-1, was amended per LRA Amendment 8 to state that the evaluation of the subject thermal sleeves is "Not a TLAA."

Issue:

The staff determined that aging of the subject thermal sleeves, as discussed in LRA Section 4.7.4, should be identified as a time-limited aging analysis (TLAA) in LRA Sections 4.1, 4.7.4, and the USAR Supplement, because the aging mechanism is time dependent (i.e., it is dependent on the number of transient cycles incurred), and the staff cannot accept future commitments to replace components as a means for disposition of the currently-installed components undergoing time-dependent aging processes, without a TLAA of the currently installed components.

Request:

Based on the above, the staff requests that the applicant amend LRA Sections 4.1, 4.7.4, and A.2.7.4 to identify HPI/makeup thermal sleeve aging as a TLAA. The staff also requests that the applicant select an appropriate disposition under Title 10 of the *Code of Federal Regulations* (10 CFR 54.21(c)(1)). If the applicant proposes a 10 CFR 54.21(c)(1)(iii) disposition for this analysis, then the staff requests that the applicant amend LRA Sections 4.7.4 and A.2.7.4 to propose an appropriate aging management program (AMP) for managing the effects of aging on the intended function of the thermal sleeves. Any AMP identified in LRA Sections 4.7.4 and A.2.7.4 for a 10 CFR 54.21(c)(1)(iii) disposition of this analysis should ensure that the effects of aging on the subject thermal sleeves are appropriately managed for the period of extended operation.

RAI 4.7.5.2-2

Background:

LRA Section 4.7.5.2 addresses the TLAA related to the steam generator 1-2 flaw evaluations. LRA Section 4.7.5.2 states that the subject flaws were analytically evaluated using the ASME Code, Section XI, IWB-3612 acceptance criteria. LRA Section 4.7.5.2 further states that the IWB-3612 analysis of the subject flaws determined that the steam generator shell components containing the flaws would remain acceptable for continued service during the period of

extended operation, accounting for flaw growth due to fatigue based on 240 heat-up and cool-down cycles.

By letter dated March 17, 2011 (ADAMS Accession No. ML110680172) the NRC staff submitted a request for additional information (RAI) concerning the plant-specific TLAAAs in the Davis-Besse LRA, Sections 4.7.4, 4.7.5.1, and 4.7.5.2. The staff issued RAI 4.7.5.2-1 to request clarification on a number of issues concerning the subject steam generator shell flaws and the ASME Code, Section XI, IWB-3612 analytical evaluations of these flaws.

In RAI 4.7.5.2-1, part (b), the staff requested that the applicant state whether the subject flaws were found to be the result of service-induced degradation or fabrication defects. In RAI 4.7.5.2-1, part (e) the staff requested that the applicant state whether the flaw dimensions have increased since discovery in 1988. The staff also requested that, if the flaw dimensions have increased, the applicant state whether the subject flaws were re-analyzed in accordance with ASME Code, Section XI, IWB-3612 requirements based on the new flaw dimensions. In RAI 4.7.5.2-1, part (g), the staff requested that the applicant provide references for all reports documenting IWB-3612 analytical evaluations of the subject flaws.

Issue:

By letter dated April 15, 2011, the applicant submitted its responses to the staff's RAIs. In its response to RAI 4.5.2.1, part (b), the applicant stated that the subject flaws "were analyzed in accordance with IWB-3612, as required by the ASME [Code], Section XI acceptance standards, and found to be acceptable for continued operation." The staff reviewed the applicant's response to RAI 4.7.5.2-1, part (b) and noted that the applicant did not state whether the subject flaws were determined to be service-induced or caused by fabrication.

In its response to RAI 4.7.5.2-1, part (e), the applicant stated that "[t]he subject components were reexamined during Cycle 6 (year 1990) and no flaw growth was noted. The subject components, with the exception of the W axis longitudinal seam weld intersection with the shell to lower tubesheet weld, were also reexamined during Cycle 7 (year 1991) and no flaw growth was noted." The staff reviewed the applicant's response to RAI 4.7.5.2-1, part (e), and noted that the RAI response only stated that no flaw growth was noted during the ASME Code, Section IWC-2420(b)-required successive inspections performed in 1990 and the subsequent inspections performed in 1991. The staff noted that the applicant did not state whether any flaw growth was noted for the subject components as a result of any examinations performed on the flawed regions after 1991.

In its response to RAI 4.7.5.2-1, part (g), the applicant stated that the subject flaw evaluations are documented in the following Babcock & Wilcox (B&W) Reports from 1988:

1. Report No. 32-1172294-00, "Davis-Besse 1 SG Flaw Evaluation," dated June 9, 1988
2. Report No. 32-1172294-01, "Davis-Besse 1 SG Flaw Evaluation," dated July 18, 1988
3. Report No. 32-1172523-00, "DB-1 SG Flaw Evaluation," dated July 18, 1988

The above flaw evaluation reports were provided in an enclosure to the April 15, 2011 RAI response. These flaw evaluation reports reference the 1977 Edition of the ASME Code, Section XI, IWB-3612 analytical acceptance standard. The flaw evaluation report summaries state that the subject flaws were found to be acceptable, in accordance with the ASME Code, Section XI, IWB-3612 analytical acceptance standard.

In reviewing the above flaw evaluation reports, the staff determined that the subject flaw evaluations were only performed for normal conditions, and only demonstrated acceptability based on the analytical acceptance criterion for normal (including upset and test) operating conditions, as specified in the ASME Code, Section XI, IWB-3612, paragraph (a). The staff determined that the applicant had not specifically evaluated the subject flaws for emergency and faulted conditions, as required by the 1977 Edition of the ASME Code, Section XI, IWB-3612, paragraph (b).

Request:

Based on the above, the staff requests that the applicant provide the following information concerning the subject steam generator flaws and the analytical evaluations performed for these flaws:

- (1) Taking into consideration the steam generator shell materials containing the flaws, the secondary side water and steam environment, and the secondary side thermal and pressure stresses to which these shell components are subjected, please state whether any of the surface-breaking indications were believed to have been caused by stress corrosion cracking, or any other service-induced aging effect.
- (2) For any inservice examinations performed on the flawed regions of the steam generator shell after 1991, in particular the examinations performed for the steam generator X/Y axis outlet nozzle to shell weld and the lower tubesheet to shell weld during the first and second periods of the third 10-year ISI interval, please state whether these examinations detected any increase in the flaw dimensions, relative to the 1988 flaw dimensions. (The staff notes that any measured increase in flaw dimensions would likely invalidate the analyses performed in the 1988 flaw evaluation reports.)
- (3) Please state whether the subject flaws were analyzed for emergency and faulted conditions, as required by the ASME Code, Section XI, IWB-3612, paragraph (b). If the subject flaws were analyzed for emergency and faulted conditions, as required by IWB-3612, paragraph (b), please provide the flaw analyses for these conditions, or explain how the IWB-3612, paragraph (a) analyses, as documented in the 1988 flaw evaluation reports, for normal, upset, and test conditions, would bound the flaw analyses for emergency and faulted conditions. If the subject flaws were not analyzed for emergency and faulted conditions, please provide these analyses, as required by IWB-3612, paragraph (b).

October 11, 2011

Barry S. Allen, Vice President
Davis-Besse Nuclear Power Station
FirstEnergy Nuclear Operating Company
5501 North State Route 2
Oak Harbor, OH 43449

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
DAVIS-BESSE NUCLEAR POWER STATION (TAC NO. ME4640)

Dear Mr. Allen:

By letter dated August 27, 2010, FirstEnergy Nuclear Operating Company submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 for renewal of Operating License NPF-3 for the Davis-Besse Nuclear Power Station. The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing this application in accordance with the guidance in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." During its review, the staff has identified areas where additional information is needed to complete the review. The staff's requests for additional information are included in the enclosure. Further requests for additional information may be issued in the future.

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Sincerely,
/RA/

Samuel Cuadrado-De Jesús, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure:
As stated

cc w/encl: Listserv

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ADAMS Accession No.: ML11271A147

*concurrence via e-mail

OFFICE	LA:DLR*	PM:RPB1:DLR	BC:RPB1:DLR	PM:RPB1:DLR
NAME	SFigueroa	SCuadrado	DMorey	SCuadrado
DATE	10/5/2011	10/7/2011	10/10/2011	10/11/2011

OFFICIAL RECORD COPY

Letter to Barry S. Allen from Samuel Cuadrado-De Jesús dated October 11, 2011

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
DAVIS-BESSE NUCLEAR POWER STATION (TAC NO. ME4640)

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