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L-15-087

10 CFR 50.46

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

## SUBJECT:

Davis-Besse Nuclear Power Station, Unit No. 1  
Docket No. 50-346, License No. NPF-3  
Response to a Request for Additional Information Concerning Report of Errors in  
Evaluation Model (TAC No. MF5578)

By letter dated December 19, 2014, (Accession No. ML14353A228), FirstEnergy Nuclear Operating Company (FENOC) submitted a report in accordance with Section 50.46(a)(3) to Title 10 of the *Code of Federal Regulations*. This report describes an error identified in the emergency core cooling system evaluation model and an estimate of the effect of the error on the predicted peak cladding temperature.

During its review, the Nuclear Regulatory Commission (NRC) staff determined that additional information is required to complete its review (Accession No. ML15062A651). During a telephone conversation held on May 12, 2015, the NRC project manager and FENOC agreed to a June 11, 2015 due date for the response to the request for additional information, which is attached.

There are no regulatory commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing at (330) 315-6810.

Sincerely,



Raymond A. Lieb

Attachment: Response to Request for Additional Information

cc: NRC Region III Administrator  
Nuclear Reactor Regulation Project Manager  
NRC Resident Inspector  
Utility Radiological Safety Board

Response to Request for Additional Information

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The Nuclear Regulatory Commission (NRC) staff has requested additional information (Accession No. ML15062A651) to complete its review of the FirstEnergy Nuclear Operating Company (FENOC) Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS) report of errors in an evaluation model submitted on December 19, 2014 (Accession No. ML14353A228). The staff's request for additional information (RAI) is provided below in bold text followed by the FENOC response.

**RAI 1:**

**The report dated December 19, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14353A228), states that:**

**FENOC is currently performing a [loss-of-coolant accident] LOCA reanalysis, which is scheduled to be completed by July 31, 2015. AREVA recommends FENOC perform a reanalysis with the revised [evaluation model] EM that uses a COPERNIC2 based [thermal conductivity degradation] TCD uncertainty increase to the TACO3 and GDTACO inputs at [middle of life] MOL.**

**Although the COPERNIC code has been approved by the U.S. Nuclear Regulatory Commission (NRC), as documented in BAW-10231P-A, the staff does not consider the application of COPERNIC-based uncertainty values to TACO-based fuel performance methods, for application within the NRC-approved licensing topical report BAW-10192P-A, "BWNT Loss-of-Coolant Accident Evaluation Model for Once-Through Steam Generator Plants, Volume I – Larger Break," to be accordant with NRC-approved methodology. However, the change in fuel temperature uncertainty discussed above has not been submitted to the NRC staff for generic review and approval.**

**In light of the fact that the proposed TACO and GDTACO fuel temperature uncertainty values have not been previously reviewed and approved by the NRC, explain how FENOC will ensure that the corrected emergency core cooling system (ECCS) evaluation is performed using an acceptable evaluation model, pursuant to Section 50.46(a)(1)(i) to Title 10 to the *Code of Federal Regulations* (10 CFR).**

**In the December 19, 2014, report, FENOC indicated that the TCD-related model changes will be incorporated into a version of the NRC-approved licensing topical report BAW-10192P-A. This model change will significantly change the predicted emergency core cooling performance.**

**Regarding the evaluation of ECCS performance, 10 CFR 50.46(a)(1)(i) states, in part, that ECCS cooling performance “must be calculated for a number of postulated loss-of-coolant accidents of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated loss-of-coolant accidents are calculated.” It was not indicated whether the implementation of the TCD-related changes will affect the predicted emergency core cooling performance for the spectrum of break sizes, locations, and other properties, such that the existing, most limiting MOL LOCA event analyzed would become the most severe hypothetical LOCA, when reanalyzed to correct for TCD.**

**Since the December 19, 2014, report indicates that a limited reanalysis of the highest-peak cladding temperature case at MOL conditions will be performed, explain how this analysis will address the 10 CFR 50.46(a)(1)(i) requirement, regarding assurance that the most severe hypothetical LOCAs are calculated.**

Response to RAI 1:

A supplement to BAW-10192P-A, Revision 0, describing the modification to the Babcock & Wilcox (B&W) plant large break loss-of-coolant accident (LBLOCA) evaluation model (EM) to address thermal conductivity degradation (TCD) will be submitted by AREVA to the NRC for review and approval. In addition, a modification will be made to BAW-10179P-A, “Safety Criteria and Methodology for Acceptable Cycle Reload Analysis,” currently Revision 8, to reference the supplement to BAW-10192P-A, Revision 0. The topical report BAW-10179P-A is the single reference in the DBNPS technical specifications for reload analysis and includes the B&W plant LBLOCA EM. BAW-10179P-A provides an overview of the B&W plant LBLOCA EM and references all of the NRC approved topical reports that form the B&W plant LBLOCA EM.

The LBLOCA EM modifications being made to address TCD use bounding fuel temperature input from the TACO3, GDTACO, and COPERNIC2 codes. Each of these codes and LBLOCA initialization methods have been reviewed and approved for developing input to 10 CFR 50.46 analyses. The previously approved EM (primarily topical report BAW-10192P-A, Revision 0) uses initial fuel temperature input TACO3 and GDTACO for all fuel pin burnups, but the uncertainties applied to these codes were determined to be inadequate relative to TCD effects. The proposed revised EM will adequately account for TCD by using the limiting fuel temperatures from TACO3 and COPERNIC2 for UO<sub>2</sub> fuel and GDTACO and COPERNIC2 for gadolinia fuel. Because the approved COPERNIC2 code includes the effects of TCD, the lack of adequate TCD compensation in the TACO series of codes will be adequately addressed.

The revised LBLOCA analyses will include a review of the current LBLOCA analyses to determine if the conclusion of the previous evaluation of a spectrum of break sizes, locations, and other properties is sufficient to verify the selection of the most severe hypothetical case. If the review determines that additional calculations are required to select the most severe hypothetical case, then the additional calculations will be performed. This is consistent with the regulation and past practice on compliance with the regulation.

**RAI 2:**

**Technical Specification (TS) 5.6.5.b, "Core Operating Limits Report," requires that the:**

**analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, as described in BAW-10179P-A, 'Safety Criteria and Methodology for Acceptable Cycle Reload Analyses.'**

**The TS also permits the use of additional methods not described in BAW-10179P-A, provided such methods are reviewed and approved by the NRC, and identified in the applicable core operating limits report.**

**As the application of COPERNIC-based fuel temperature uncertainties to TACO3 and GDTACO evaluation models is not consistent with NRC-approved fuel performance methodology, address how the proposed TCD correction is consistent with Section 9.2.3 of BAW-10179P-A and the associated TS requirement.**

Response to RAI 2:

As described in the response to RAI 1, a supplement to BAW-10192P-A, Revision 0, describing the modification to the B&W plant LBLOCA EM to address TCD will be submitted by AREVA to the NRC for review and approval. In addition, a modification will be made to BAW-10179P-A, currently Revision 8, to reference the supplement to BAW-10192P-A, Revision 0. The topical report BAW-10179P-A is the single reference in the DBNPS technical specifications for reload analysis and includes the B&W plant LBLOCA EM. BAW-10179P-A provides an overview of the B&W plant LBLOCA EM and references the NRC approved topical reports that form the B&W plant LBLOCA EM.

Once BAW-10192P, Revision 0, Supplement 1, and BAW-10179P, Revision 9 are approved by the NRC and updated analysis are used as the basis for the reload analysis, the DBNPS Core Operating Limits Report will be updated to reference BAW-10179P-A, Revision 9. This will provide the complete description and reference for the approved B&W plant LOCA EM. The NRC will be informed when the reanalysis is complete.

The reanalysis is expected to be completed 9 months following NRC issuance of the final Safety Evaluation Report for BAW-10179, Revision 9.