



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

April 20, 2015

**LICENSEE:** FirstEnergy Nuclear Operating Company

**FACILITY:** Davis-Besse Nuclear Power Station, Unit 1

**SUBJECT:** SUMMARY OF TELEPHONE CONFERENCE CALL HELD ON FEBRUARY 20, 2015, BETWEEN THE U.S. NUCLEAR REGULATORY COMMISSION AND FIRSTENERGY NUCLEAR OPERATING COMPANY, TO CLARIFY THE RESPONSES TO REQUESTS FOR ADDITIONAL INFORMATION PERTAINING TO THE DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1, LICENSE RENEWAL APPLICATION (TAC NO. ME4640)

The U.S. Nuclear Regulatory Commission (NRC or the staff) and representatives of FirstEnergy Nuclear Operating Company held a telephone conference call on February 20, 2015, to clarify information in the applicant's responses to requests for additional information (RAIs) concerning aging management of the shield building related to safety review of the Davis-Besse Nuclear Power Station, Unit 1, license renewal application. The teleconference was useful in clarifying the information provided in the applicant's RAI responses.

Enclosure 1 provides a listing of the participants and Enclosure 2 contains a summary of the items discussed with the applicant regarding their responses.

The applicant had an opportunity to comment on this summary.

Sincerely,

**/RA/**

Emmanuel Sayoc, 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

April 20, 2015

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TELEPHONE CONFERENCE CALL  
DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1  
LICENSE RENEWAL APPLICATION

LIST OF PARTICIPANTS  
FEBRUARY 20, 2015

**PARTICIPANTS**

Emmanuel Sayoc

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**DAVIS-BESSE NUCLEAR POWER STATION**  
**LICENSE RENEWAL APPLICATION**  
**SHIELD BUILDING MONITORING PROGRAM**  
**FOLLOW-UP RAI RESPONSE CLARIFICATIONS**

This telephone conference call (telecon) held on February 20, 2015, was initiated by NRC staff. The purpose of the call was to clarify the information provided in FENOC's responses to NRC requests for additional information (RAIs) B.2.43-7 and B.2.43-8 regarding the Davis-Besse Shield Building Monitoring Program submitted by letter L-15-037 (ML15028A540) dated January 28, 2015, as follows:

**RAI B.2.43-7 Response**

Based on questioning by the NRC regarding the FENOC response to RAI B.2.43-7, FENOC provided the following clarifications:

- The staff asked FENOC to clarify whether the 0.013 inch crack width acceptance criteria, as indicated in the response, corresponds to the maximum crack size observed in the Shield Building and how it compares to the crack widths observed in test samples.

FENOC clarified that the crack width acceptance criterion of 0.013 inch corresponds to the maximum crack size observed in the Shield Building core bores. The crack widths in the test samples at the two Universities were larger than 0.013 inch, and the testing results bound observed crack widths.

- The staff asked FENOC for clarification on the planar limits, associated Regions elevations, shield building dome elevation, and core bore locations.

FENOC clarified that the planar limits provided in the Planar Limit Table are based on the maximum currently observed crack areas, rounded. From the table, Region 1 elevation corresponds to the dome area. There is a cold joint at the top of the cylinder wall at 801.54 feet where the bottom of the dome rests atop the cylinder wall. The top of the parapet surrounding the Shield Building dome walking area extends to 809.5 feet. The dome curves upward from 806.25 feet to a maximum height of 824.5 feet. The dome inspections for License Renewal are managed under the Structures Monitoring Program. No core bores are located in the structure above 800 feet. There are multiple bores in Region 4, and one of those bores is included in the population for the Shield Building Monitoring Program. Region 2 has the majority of the cracked areas because the reinforcing bar density is greater than in the other Regions. Also, the largest crack width is located in Region 2.

- The staff asked FENOC to clarify what it defined to be the "leading edge" for the laminar cracks, as indicated in the FENOC's response, and how the extent of planar crack expansion was determined.

FENOC clarified that planar propagation limits were determined by impulse response testing and mapping (non-destructive testing), then confirmed by core bore inspections. The "leading edge[s]" of the planar cracks are where FENOC would observe a plane extend or expand, compared to previous

ENCLOSURE 2

core bore inspection results. Leading edge monitoring is achieved through inspection of bores and impulse response mapping, as required.

- The staff asked if the design calculation accounts for laminar cracking 360 degrees around of the entire cylindrical wall of the shield building.

FENOC clarified that the strength portion of the design calculation accounts for 100% laminar cracking around the cylindrical wall of the entire structure. With respect to the planar limits in the table, a seismic sensitivity analysis was used to determine the impact of various planar areas of cracking to observe changes in the behavior of the structure. Three different Finite Element models with different levels of cracking and effective flutes were created to assess the impacts on the dynamic characteristics of the Shield Building.

- The staff asked FENOC to clarify what percent of lap splices in the shield building wall are greater than 79 inches in length.

FENOC clarified that approximately 15% of the outside face horizontal reinforcing bar lap splices are 120 inches in length. The remaining lap splices are 79 inches in length.

- The staff asked FENOC to clarify how the 23 bore sample is distributed between Region 2, 3, and 4.

FENOC clarified that the vertical distribution of the 23 core bore inspections by Region as listed in the Planar Limit Table is 21% in Region 2, 74% in Region 3, and 5% in Region 4.

- The staff asked FENOC to clarify what actions would result if the crack size or planar (or both) limit(s) is/are exceeded in the future.

FENOC clarified that if Shield Building crack size or planar limits change in future inspections, the new condition of the Shield Building would be entered into the FENOC Corrective Action Program and would require re-evaluation against the structural evaluation hierarchy shown in Figure 5.1 of American Concrete Institute (ACI) Report 349.3R, "Evaluation of Existing Nuclear Safety-Related Concrete Structures." Re-evaluation would be required to ensure that the correct inspection frequency and scope is applied to the structure and an acceptable state is reached after each inspection cycle.

#### **RAI B.2.43-8 Response**

Based on questioning by the NRC regarding the FENOC response to RAI B.2.43-8, FENOC provided the following clarifications:

- The staff asked FENOC to clarify how crack width or planar (or both) limit(s) is/are obtained.

FENOC clarified that a representative core bore provides information regarding crack width and/or the planar limits of cracking.

- The staff asked FENOC to clarify the distribution of the 23 core bores in the inspection sample in different Regions and whether the bore is cracked or uncracked.

FENOC clarified that based on the latest inspection records, the 23 inspection core bores consist of 14 cracked and 9 uncracked bores distributed horizontally around the Shield Building and by Region (elevation) as shown in the table below:

REGION	ELEVATION (FT)	TOTAL BORES	CRACKED BORES	UNCRAKED BORES
1	801.0 – 812.75	0	0	0
2	774.5 – 801.0	5	3	2
3	643.0 – 774.5	17	10	7
4	565.0 – 643.0	1	1	0

- The staff asked FENOC to clarify what conditions may trigger taking corrective actions and considerations that would determine the need to install a new core bore to the sample.

FENOC clarified that it would write a condition report in the FENOC Corrective Action Program based on any one of the following inspection findings (see the Shield Building Monitoring Program changes to “Acceptance Criteria” contained in the Enclosure to FENOC letter L-15-037 dated January 28, 2015):

- evidence of coating degradation that exceeds the criteria specified in the quantitative acceptance criteria for coatings in Chapter 5, Sections 5.1.4 and 5.2.4, of ACI Report 349.3R [note that Shield Building coatings inspections are also performed using the criteria of ACI Report 349.3R under the Structures Monitoring Program]; or
- evidence of reinforcing bar corrosion or degradation; or
- any indication of new cracking; or
- a discernable change in previously identified cracks, such as a change in crack width or planar size; or
- crack width greater than 0.013 inch; or
- maximum planar crack limits exceeding a value shown in the Planar Limit Table.

The FENOC Corrective Action Program evaluation of the condition would result in comparing the inspection results to design calculation limits. Crack width and planar limits both need to be within the limits of the acceptance

criteria for the design calculation to be bounding. For a change in crack planar limits or if a crack expands into a non-cracked bore, the Corrective Action Program review would trigger an evaluation to determine whether a new core bore needs to be installed to monitor future changes in the planar limits.

There was no further discussion, and the call was concluded. The staff determined that the applicant's clarification is sufficiently clear and additional RAIs on these issues are not needed.