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May 17, 2013
L-13-181

10 CFR 54

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 Number NPF-3
Supplemental Reply to Request for Additional Information for the Review of the Davis-Besse Nuclear Power Station, Unit No. 1, License Renewal Application (TAC No. ME4640) and License Renewal Application Amendment No. 41

By letter dated August 27, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML102450565), FirstEnergy Nuclear Operating Company (FENOC) 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, Unit No. 1 (Davis-Besse). By letter dated March 14, 2013 (ML13077A391), FENOC responded to a Nuclear Regulatory Commission (NRC) request for additional information (RAI) B.2.4-1b regarding structural high strength bolting.

During telephone conference calls with the NRC held on April 11, April 24, and May 2, 2013, FENOC agreed to submit a supplemental response to RAI B.2.4-1b to address volumetric examinations of high strength structural bolts managed by the Davis-Besse Inservice Inspection (ISI) – IWF Program.

The Attachment provides the FENOC supplemental response to the NRC request for additional information. The NRC request is shown in bold text followed by the FENOC response. The Enclosure provides Amendment No. 41 to the Davis-Besse License Renewal Application.

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There are no regulatory commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Clifford I. Custer, Fleet License Renewal Project Manager, at 724-682-7139.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 17, 2013.

Sincerely,

Raymond A. Lieb

Attachment:
Supplemental Reply to Request for Additional Information for the Review of the Davis-Besse Nuclear Power Station, Unit No. 1 (Davis-Besse), License Renewal Application (LRA), Section B.2.4

Enclosure:
Amendment No. 41 to the Davis-Besse License Renewal Application

cc: NRC DLR Project Manager
NRC Region III Administrator

cc: w/o Attachment or Enclosure
NRC DLR Director
NRR DORL Project Manager
NRC Resident Inspector
Utility Radiological Safety Board

Supplemental Question RAI B.2.4-1b

By letter dated March 14, 2013 (ML13077A391), FENOC provided a response to RAI B.2.4-1b addressing visual inspections and volumetric examinations of high strength structural bolts managed by the Structures Monitoring Program. In a conference call with FENOC on April 11, 2013, the NRC staff stated they had identified a gap between the FENOC response and NUREG-1801, "Generic Aging Lessons Learned (GALL) Report." Specifically, the NRC staff stated that NUREG-1801 requires monitoring of A325 and A490 high strength bolting (i.e., actual measured yield strength greater than or equal to 150 ksi [thousand pounds per square inch]) in ASME Section XI, Subsection IWF applications for stress corrosion cracking using volumetric examination. The staff stated that the IWF Program requirement for A325 and A490 bolting is different from the requirement for A325 and A490 high strength structural bolting addressed in the Structures Monitoring Program, because there is an exemption for high strength A325 and A490 bolting in the Structures Monitoring Program that does not exist in the IWF Program. After some discussion, FENOC proposed a follow-up conference call on this topic once the issues were better understood.

Additional conference calls were conducted on April 24 and May 2, 2013. In summary, FENOC agreed to provide a supplemental response to RAI B.2.4-1b to address volumetric examinations of IWF high strength structural bolts (i.e., actual measured yield strength greater than or equal to 150 ksi) in sizes greater than 1 inch nominal diameter.

SUPPLEMENTAL RESPONSE RAI B.2.4-1b

NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," Revision 2, Section XI.S3, "ASME Section XI, Subsection IWF," requires monitoring of high strength structural bolting (i.e., actual measured yield strength greater than or equal to 150 ksi or 1,034 MPa) in sizes greater than 1 inch nominal diameter for cracking using volumetric examination.

FENOC has identified that Davis-Besse has high strength structural bolts (i.e., actual measured yield strength greater than or equal to 150 ksi) in sizes greater than 1 inch nominal diameter in the IWF bolting population consisting of material types ASTM A490 and ASTM A540.

ASTM A325 bolts in the IWF bolting population were determined not to be high strength. The specified minimum yield strength for the subject ASTM A325 Type 1 bolting is 81 ksi, which is substantially below the high strength threshold of 150 ksi. The certified material test reports (CMTRs) for 214 ASTM A325 bolts confirm that the yield strengths are less than 150 ksi. Therefore, it is reasonable to conclude that the IWF ASTM A325 bolts are not high strength.

The ASTM A540 bolts used in IWF applications have a specified minimum yield strength of 130 ksi. With only a margin of 20 ksi between the minimum yield specification and the high strength threshold of 150 ksi, it is reasonable to conclude that the subject bolting is high strength. In accordance with NUREG-1801, Section XI.S3, volumetric examinations of high strength bolting may be waived with adequate plant-specific justification. Based on similar material specifications and environmental conditions, the volumetric examination results of the Davis-Besse reactor head closure studs are used to provide the plant-specific justification. The 60 reactor head closure studs are constructed of ASTM A540 Grade B23 material with an actual measured yield strength of greater than 150 ksi. Volumetric examinations of these studs are performed once per each 10-year inservice inspection (ISI) interval. Davis-Besse has completed three ISI intervals, for a total of 180 reactor head closure stud volumetric examinations to date with no unacceptable indications noted. Therefore, volumetric examination of IWF ASTM A540 bolts is not required based on plant-specific justification.

The Davis-Besse Inservice Inspection (ISI) – IWF Program is revised to include monitoring of ASTM A490 high strength bolting (i.e., actual measured yield strength greater than or equal to 150 ksi or 1,034 MPa) in sizes greater than 1 inch nominal diameter for cracking using volumetric examination. The volumetric examinations will be performed in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section V, Article 5, Appendix IV, 2007 Edition through 2008 Addenda. The representative sample size will be equal to 20 percent (rounded up to the nearest whole number) of the entire IWF population of ASTM A490 high strength bolts in sizes greater than 1 inch nominal diameter, with a maximum sample size of 25 bolts. The selection of the representative sample will consider susceptibility to stress corrosion cracking (e.g., actual measured yield strength) and as low as reasonably achievable (ALARA) radiation dose reduction principles. The frequency of examination will be once each 10-year ISI interval beginning with the fourth interval that started September 21, 2012.

LRA Section A.1.23 "Inservice Inspection (ISI) Program – IWF," Table A-1, "Davis-Besse License Renewal Commitments," and Section B.2.23, "Inservice Inspection (ISI) Program – IWF," are revised to address volumetric examination of high strength bolting.

See the Enclosure to this letter for the revision to the Davis-Besse LRA.

Enclosure

Davis-Besse Nuclear Power Station, Unit No. 1 (Davis-Besse)

Letter L-13-181

Amendment No. 41 to the
Davis-Besse License Renewal Application

License Renewal Application
Sections Affected

Section A.1.23

Table A-1

Section B.2.23

The Enclosure identifies the change to the License Renewal Application (LRA) by Affected LRA Section, LRA Page No., and Affected Paragraph and Sentence. The count for the affected paragraph, sentence, bullet, etc. starts at the beginning of the affected Section or at the top of the affected page, as appropriate. Below each section the reason for the change is identified, and the sentence affected is printed in *italics* with deleted text ~~*lined-out*~~ and added text *underlined*.

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
A.1.23	Page A-17	2 New Paragraphs

Based on the supplemental response to request for additional information (RAI) B.2.4-1b regarding aging management of high strength bolting and related Inservice Inspection (ISI) Program – IWF enhancements, LRA Section A.1.23, "Inservice Inspection (ISI) Program – IWF," is revised to include two new paragraphs, to read as follows:

A.1.23 INSERVICE INSPECTION (ISI) PROGRAM – IWF

The Inservice Inspection (ISI) Program – IWF establishes responsibilities and requirements for conducting ASME Code, Section XI, Subsection IWF (IWF) inspections as required by 10 CFR 50.55a. The Inservice Inspection (ISI) Program – IWF includes visual examination of supports based on sampling of the total support population. The sample size varies depending on the ASME Class. The largest sample size is specified for the most critical supports (ASME Class 1). The sample size decreases for the less critical supports (ASME Classes 2 and 3). The primary inspection method is visual examination. Degradation that potentially compromises support function or load capacity is identified for evaluation. Supports determined to be unacceptable for continued service requiring corrective actions are re-examined during the next inspection period in accordance with the requirements of IWF.

The Inservice Inspection (ISI) Program – IWF includes monitoring of ASTM A490 high strength bolting (i.e., actual measured yield strength greater than or equal to 150 ksi or 1,034 MPa) in sizes greater than 1 inch nominal diameter for cracking using volumetric examination. The volumetric examinations are performed in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section V, Article 5, Appendix IV, 2007 Edition through 2008 Addenda. The representative sample size is equal to 20 percent (rounded up to the nearest whole number) of the entire IWF population of ASTM A490 high strength bolts in sizes greater than 1 inch nominal diameter, with a maximum sample size of 25 bolts. The selection of the representative sample considers susceptibility to stress corrosion cracking (e.g., actual measured yield strength) and as low as reasonably achievable (ALARA) radiation dose reduction principles. The frequency of examination is once each 10-year ISI interval beginning with the fourth interval that started September 21, 2012.

There are no other high strength bolts in IWF applications except ASTM A540 bolts. The volumetric examinations for these IWF bolts were waived based on plant-specific operating experience associated with the volumetric examination of the Davis-Besse reactor head closure studs constructed of ASTM A540 material. The 60 reactor head closure studs are examined once each ISI interval, and after three intervals, no unacceptable indications were noted.

The inservice examinations conducted throughout the service life of Davis-Besse will comply with the requirements of the ASME Code Section XI edition and addenda incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the inspection interval, subject to prior approval of the edition and addenda by the NRC.

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
Table A-1	**Page A-69**	**New Commitment No. 50**

Based on the supplemental response to request for additional information (RAI) B.2.4-1b regarding aging management of high strength bolting, new license renewal future Commitment 50 in LRA Table A-1, "Davis Besse License Renewal Commitments," is added to address Inservice Inspection (ISI) Program – IWF enhancements, as follows:

Table A-1
Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
50	*Enhance the Inservice Inspection (ISI) Program – IWF to:* • *Include monitoring of ASTM A490 high strength bolting (i.e., actual measured yield strength greater than or equal to 150 ksi or 1,034 MPa) in sizes greater than 1 inch nominal diameter for cracking using volumetric examination. The volumetric examinations will be performed in accordance with the requirements of ASME Boiler and Pressure Vessel Code, Section V, Article 5, Appendix IV, 2007 Edition through 2008 Addenda. The representative sample size will be equal to 20 percent (rounded up to the nearest whole number) of the entire IWF population of ASTM A490 high strength bolts in sizes greater than 1 inch nominal diameter, with a maximum sample size of 25 bolts. The selection of the representative sample will consider susceptibility to stress corrosion cracking (e.g., actual measured yield strength) and as low as reasonably achievable*	*Prior to October 22, 2016*	*LRA and FENOC Letter L-13-181*	*A.1.23 B.2.23 and Supplemental Response to NRC RAI B.2.4-1b from telecons held with the NRC on April 11, April 24 and May 2, 2013*

Table A-1
Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
	(ALARA) radiation dose principles. The frequency of examination will be once each 10-year inservice inspection interval beginning with the fourth interval that started September 21, 2012.			

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
B.2.23	Page B-100	Enhancements

Based on the supplemental response to request for additional information (RAI) B.2.4-1b regarding aging management of high strength bolting, LRA Section B.2.23, "Inservice Inspection (ISI) Program – IWF," subsection titled "Enhancements," is revised to add an enhancement, to read as follows:

Enhancements

~~*None.*~~

The following enhancement will be implemented in the identified program element prior to the period of extended operation.

- ***Detection of Aging Effects***

  Include monitoring of ASTM A490 high strength bolting (i.e., actual measured yield strength greater than or equal to 150 ksi or 1,034 MPa) in sizes greater than 1 inch nominal diameter for cracking using volumetric examination. The volumetric examinations will be performed in accordance with the requirements of ASME Boiler and Pressure Vessel Code, Section V, Article 5, Appendix IV, 2007 Edition through 2008 Addenda. The representative sample size will be equal to 20 percent (rounded up to the nearest whole number) of the entire IWF population of ASTM A490 high strength bolts in sizes greater than 1 inch nominal diameter, with a maximum sample size of 25 bolts. The selection of the representative sample will consider susceptibility to stress corrosion cracking (e.g., actual measured yield strength) and as low as reasonably achievable (ALARA) radiation dose principles. The frequency of examination will be once each 10-year inservice inspection interval beginning with the fourth interval that started September 21, 2012.