FENOC
FirstEnergy Nuclear Operating Company

Davis-Besse Nuclear Power Station
5501 N. State Route 2
Oak Harbor, Ohio 43449

June 4, 2013
L-13-199

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. 44

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 May 17, 2013, FENOC submitted a supplemental response to Nuclear Regulatory Commission (NRC) request for additional information (RAI) B.2.4-1b regarding high strength bolting managed by the Davis-Besse license renewal Inservice Inspection (ISI) – IWF Program.

During a telephone conference call with the NRC staff held on May 28, 2013, FENOC agreed to submit a supplemental response to RAI B.2.4-1b to clarify the method for management of high strength IWF ASTM A540 bolting.

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. 44 to the Davis-Besse License Renewal Application.

A145
NRR

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 June 4, 2013.

Sincerely,

David M. Imlay
Director, Site Performance Improvement

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. 44 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

The NRC staff initiated a telephone conference call with FENOC on May 28, 2013, to discuss the FENOC supplemental response to NRC request for additional information (RAI) B.2.4-1b submitted by FENOC letter dated May 17, 2013.

NRC staff stated that, in addition to the plant-specific justification to waive the volumetric examination requirement for high strength (i.e., measured yield strength greater than 150 ksi [thousand pounds per square inch]) IWF A540 bolting greater than 1 inch diameter (i.e., susceptible bolting) every IWF interval, the staff had expected that FENOC would also perform periodic visual inspections of 100 percent of the susceptible A540 bolting for a corrosive environment similar to the approach that FENOC plans for susceptible A540 structural bolting in the Structures Monitoring Program. The staff stated that a gap exists between the FENOC response and NRC expectations.

The NRC staff stated that the basis for accepting the plant-specific justification for waiving the NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," volumetric examinations of susceptible A540 bolting should include verification that the bolting remains free of a corrosive environment. Periodic 100 percent visual examinations performed at least every 5 years are necessary to ensure that the susceptible A540 bolts are not exposed to a corrosive environment. Should a corrosive environment be identified on one or more susceptible A540 bolts, then a sample of the affected bolts would receive volumetric examinations. The NRC staff stated that the visual examinations for a corrosive environment do not have to be performed to the requirements of a VT-3 examination.

Following discussions, both parties agreed that FENOC would submit a supplemental response to RAI B.2.4-1b requiring performance of visual examinations for a corrosive environment of 100 percent of the susceptible IWF A540 bolt population at least every 5 years, or alternatively, the NUREG-1801 approach of performing volumetric examinations of 20 percent with a maximum of 25 bolts from the susceptible IWF A540 bolt population each inservice inspection interval.

SUPPLEMENTAL RESPONSE RAI B.2.4-1b

The Davis-Besse Inservice Inspection (ISI) - IWF Program is revised to include monitoring of ASTM A540 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 in nominal diameter (i.e., susceptible bolting) for cracking. Periodic visual inspections of susceptible ASTM A540 bolting are to be conducted prior to the period of extended operation and at an interval not to exceed five years to identify locations where the susceptible A540 bolting may be exposed to a potentially corrosive environment for stress corrosion cracking. If the visual inspections identify one or more bolts in a potentially corrosive environment, then an engineering evaluation is performed to determine whether the bolting material had been subjected to a corrosive environment for stress corrosion cracking. The bolts determined to have been subjected to a corrosive environment for stress corrosion cracking comprise the population subject to sampling for volumetric examinations. The representative sample size is equal to 20 percent (rounded up to the nearest whole number) of the bolts in the sample population, with a maximum sample size of 25 bolts. The volumetric examinations are performed in accordance with the requirements of ASME Code Section V, Article 5, Appendix IV. Volumetric examinations will be performed no later than the subsequent refueling outage following visual identification of bolting subject to a corrosive environment. Deferral of volumetric examinations to the subsequent refueling outage is not permitted if the visual inspection indicates evidence of contaminant penetration through the coating. The frequency of examination is once each 10-year ISI interval beginning with the 4th interval that started September 21, 2012. For ASTM A540 high strength bolts that are not exposed to a corrosive environment, the volumetric examinations are waived based on plant-specific operating experience associated with the volumetric examination of the Davis-Besse reactor head closure studs (60 each) constructed of high strength ASTM A540 material where the studs are examined once each ISI interval, and after three intervals, no unacceptable indications have been noted.

As an alternative to the visual examinations and the subsequent volumetric examinations of ASTM A540 bolts subjected to a corrosive environment, the Inservice Inspection (ISI) Program – IWF provides an option to perform periodic volumetric examinations as follows. The program includes monitoring of ASTM A540 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 ASME Code Section V, Article 5, Appendix IV. The representative sample size is equal to 20 percent (rounded up to the nearest whole number) of the entire IWF population of ASTM A540 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

reduction principles. The frequency of examination is once each 10-year ISI interval beginning with the 4th 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 visual and volumetric examinations of IWF A540 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-13-199

Amendment No. 44 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	Paragraph 3, and New Paragraph 4

Based on the supplemental response to request for additional information (RAI) B.2.4-1b regarding aging management of high strength IWF ASTM A540 bolting, LRA Section A.1.23, "Inservice Inspection (ISI) Program – IWF," third paragraph, previously revised by FENOC letter dated May 17, 2013, is replaced, and a new fourth paragraph is added, 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 Inspection (ISI) Program - IWF includes monitoring of ASTM A540 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 in nominal diameter for cracking. Periodic visual inspections of susceptible ASTM A540 bolting are conducted prior to the period of extended operation and at an interval not to exceed five years to identify locations where the susceptible A540 bolting may be exposed to a potentially corrosive environment for stress corrosion cracking. If the visual inspections identify one or more bolts in a potentially corrosive environment, then an engineering evaluation is performed to determine whether the bolting material had been subjected to a corrosive environment for stress corrosion cracking. The bolts determined to have been subjected to a corrosive environment for stress corrosion cracking comprise the population subject to sampling for volumetric examinations. The representative sample size is equal to 20 percent (rounded up to the nearest whole number) of the bolts in the sample population, with a maximum sample size of 25 bolts. The volumetric examinations are performed in accordance with the requirements of ASME Code Section V, Article 5, Appendix IV. Volumetric examinations will be performed no later than the subsequent refueling outage following visual identification of bolting subject to a corrosive environment. Deferral of volumetric examinations to the subsequent refueling outage is not permitted if the visual inspection indicates evidence of contaminant penetration through the coatings. The frequency of examination is once each 10-year ISI interval beginning with the 4th interval that started September 21, 2012. For susceptible ASTM A540 high strength bolts that are not exposed to a corrosive environment, the volumetric examinations are waived based on plant-specific operating experience associated with the volumetric examination of the Davis-Besse reactor head closure studs (60 each) constructed of high strength ASTM A540 material where the studs are examined once each ISI interval, and after three intervals, no unacceptable indications have been noted.

As an alternative to the visual examinations and the subsequent volumetric examinations of ASTM A540 bolts subjected to a corrosive environment, the Inservice Inspection (ISI) Program – IWF provides an option to perform periodic volumetric examinations as follows. The program includes monitoring of ASTM A540 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 ASME Code Section V, Article 5, Appendix IV. The representative sample size is equal to 20 percent (rounded up to the nearest whole number) of the entire IWF population of ASTM A540 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 ALARA radiation dose reduction principles. The frequency of examination is once each 10-year ISI interval beginning with the 4th interval that started September 21, 2012.

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**	**2 New Enhancements**

Based on the supplemental response to RAI B.2.4-1b regarding aging management of high strength IWF ASTM A540 bolting, license renewal future Commitment 50 in LRA Table A-1, "Davis Besse License Renewal Commitments," previously added by FENOC letter dated May 17, 2013, is revised to address additional 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 *Letters* L-13-181 *and* *L-13-199*	A.1.23 B.2.23 and Supplemental Responses to NRC RAI B.2.4-1b from telecons held with the NRC on April 11, *April 24, ~~and~~ May 2 and May 28, 2013*

Table A-1
Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
	(ALARA) radiation dose reduction principles. The frequency of examination will be once each 10-year inservice inspection interval beginning with the fourth interval that started September 21, 2012. • *Include monitoring of ASTM A540 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 in nominal diameter for cracking. Periodic visual inspections of susceptible ASTM A540 bolting will be conducted prior to the period of extended operation and at an interval not to exceed five years to identify locations where the A540 bolting may be exposed to a potentially corrosive environment for stress corrosion cracking. If the visual inspections identify one or more bolts in a potentially corrosive environment, then an engineering evaluation will be performed to determine whether the bolting material had been subjected to a corrosive environment for stress corrosion cracking. The bolts determined to have been subjected to a corrosive environment for stress corrosion cracking comprise the population subject to sampling for volumetric examinations. The representative sample size is equal to 20 percent (rounded up to the nearest whole number) of the bolts in the sample population, with a maximum sample size of 25 bolts. The volumetric examinations are performed in accordance with the requirements of ASME Code Section V, Article 5, Appendix IV. Volumetric examinations will be*			

Table A-1
Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
	performed no later than the subsequent refueling outage following visual identification of bolting subject to a corrosive environment. Deferral of volumetric examinations to the subsequent refueling outage is not permitted if the visual inspection indicates evidence of contaminant penetration through the coatings. The frequency of examination is once each 10-year ISI interval beginning with the 4th interval that started September 21, 2012. For ASTM A540 high strength bolts that are not exposed to a corrosive environment, the volumetric examinations are waived based on plant-specific operating experience associated with the volumetric examination of the Davis-Besse reactor head closure studs (60 each) constructed of high strength ASTM A540 material where the studs are examined once each ISI interval, and after three intervals, no unacceptable indications have been noted. • *As an alternative to the visual examinations and the subsequent volumetric examinations of ASTM A540 bolts subjected to a corrosive environment, the Inservice Inspection (ISI) Program – IWF provides an option to perform periodic volumetric examinations as follows. The program includes monitoring of ASTM A540 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 ASME Code*			

Table A-1
Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
	Section V, Article 5, Appendix IV. The representative sample size is equal to 20 percent (rounded up to the nearest whole number) of the entire IWF population of ASTM A540 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 ALARA radiation dose reduction principles. The frequency of examination is once each 10-year ISI interval beginning with the 4th interval that started September 21, 2012.			

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
B.2.23	Page B-100	2 New Enhancements

Based on the supplemental response to RAI B.2.4-1b regarding aging management of high strength IWF ASTM A540 bolting, LRA Section B.2.23, "Inservice Inspection (ISI) Program – IWF," subsection titled "Enhancements," previously revised by FENOC letter dated May 17, 2013, is revised to add two additional enhancements, to read as follows:

Enhancements

The following enhancements 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 reduction principles. The frequency of examination will be once each 10-year inservice inspection interval beginning with the fourth interval that started September 21, 2012.

  Include monitoring of ASTM A540 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 in nominal diameter for cracking. Periodic visual inspections of susceptible ASTM A540 bolting will be conducted prior to the period of extended operation and at an interval not to exceed five years to identify locations where the A540 bolting may be exposed to a potentially corrosive environment for stress corrosion cracking. If the visual inspections identify one or more bolts in a potentially corrosive environment, then an engineering evaluation will be performed to

determine whether the bolting material had been subjected to a corrosive environment for stress corrosion cracking. The bolts determined to have been subjected to a corrosive environment for stress corrosion cracking comprise the population subject to sampling for volumetric examinations. The representative sample size will be equal to 20 percent (rounded up to the nearest whole number) of the bolts in the sample population, with a maximum sample size of 25 bolts. The volumetric examinations will be performed in accordance with the requirements of ASME Code Section V, Article 5, Appendix IV. Volumetric examinations will be performed no later than the subsequent refueling outage following visual identification of bolting subject to a corrosive environment. Deferral of volumetric examinations to the subsequent refueling outage is not permitted if the visual inspection indicates evidence of contaminant penetration through the coatings. The frequency of examination will be once each 10-year ISI interval beginning with the 4th interval that started September 21, 2012. For ASTM A540 high strength bolts that are not exposed to a corrosive environment, the volumetric examinations will be waived based on plant-specific operating experience associated with the volumetric examination of the Davis-Besse reactor head closure studs (60 each) constructed of high strength ASTM A540 material where the studs are examined once each ISI interval, and after three intervals, no unacceptable indications have been noted.

As an alternative to the visual examinations and the subsequent volumetric examinations of ASTM A540 bolts subjected to a corrosive environment, the Inservice Inspection (ISI) Program - IWF provides an option to perform periodic volumetric examinations as follows. The program includes monitoring of ASTM A540 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 Code Section V, Article 5, Appendix IV. The representative sample size will be equal to 20 percent (rounded up to the nearest whole number) of the entire IWF population of ASTM A540 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 ALARA radiation dose reduction principles. The frequency of examination will be once each 10-year ISI interval beginning with the 4th interval that started September 21, 2012.