FENOC
FirstEnergy Nuclear Operating Company

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

August 26, 2011
L-11-237

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
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. 14

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 (DBNPS). By letters dated June 20, 2011 (ML11167A171), July 21, 2011 (ML11195A020), and July 27, 2011 (ML11203A080), the Nuclear Regulatory Commission (NRC) requested additional information to complete its review of the License Renewal Application (LRA).

The Attachment provides the FENOC reply to NRC requests for additional information (RAIs) as follows:

1 of 14 RAIs in NRC letter dated June 20, 2011 (ML11167A171)
— The response to Follow-up RAI B.2.1-2 from the June 20, 2011, letter had been delayed based on a discussion with Mr. Samuel Cuadrado de Jesus, NRC Project Manager, on July 19, 2011, during which it was agreed that the RAI response would be withheld pending further review by NRC. The NRC review is complete and the FENOC response is contained herein.

4 of 13 RAIs in NRC letter dated July 21, 2011 (ML11195A020)
— Includes RAIs B.2.22-6; B.2.39-11; B.2.39-12; and, 3.5.2.3.12-4

2 of 5 RAIs in NRC letter dated July 27, 2011 (ML11203A080)
— Includes RAIs 3.3.2-4 and 3.3.2.14-1

3 Supplemental RAI responses
— Includes supplemental responses for RAI 3.3.2.3.14-1; One-Time Inspection Program Examination Types; and, Makeup Pump Casing Inspections

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The NRC request is shown in bold text in the Attachment followed by the FENOC response. The Enclosure provides Amendment No. 14 to the DBNPS LRA.

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 August 26, 2011.

Sincerely,

KWByrd

Kendall W. Byrd
Director, Site Performance Improvement

Attachment:
Reply to Request for Additional Information for the Review of the Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS), License Renewal Application, Sections B.2.1, B.2.22, B.2.30, B.2.39, 3.3.2 and 3.5.2

Enclosure:
Amendment No. 14 to the DBNPS 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

Question RAI Followup B.2.1-2

Background:

The applicant responded to the RAI B.2.1-1 by proposing to revise Subsection 2.1.2 of the Davis Besse Nuclear Power Station (DBNPS) Surveillance Test Procedure DB-PF-03009, Revision 06, "Containment Vessel and Shielding Building Visual Inspection." Revised Subsection 2.1.2 shall state "Personnel who performed general visual examinations of the exterior surface of the Containment vessel and the interior and exterior surfaces of the Shielding Building shall meet the requirements for a general visual examiner in accordance with Nuclear Operating Procedure NOP-CC-5708, Written Practice for the Qualification and Certification of Nondestructive Examination Personnel."

Issue:

Element 5 "Detection of Aging Effects" in GALL AMP XI.S4 recommends the implementation of periodic in-service examinations for the containment structures by applying the requirements of subsections in ASME Section XI. The associated Subsection IWE-3510.1 of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI (1995), requires that "The general Visual Examination shall be performed by, or under the direction of, a Registered Professional Engineer or other individual, knowledgeable in the requirements for design, in-service inspections, and testing of Class MC and metallic liners of Class CC components."

Request:

To comply with the ASME Code, Section XI requirement, the associated Subsection IWE-3510.1 of ASME Code, Section XI (1995) code requirement must be referenced in the new revision of the DBNPS's Nuclear Operating Procedure and/or Surveillance Test Procedure.

RESPONSE Followup RAI B.2.1-2

Davis-Besse is currently in the Third 10-year Inservice Inspection Interval (September 21, 2000, to September 20, 2012). The 1995 Edition through the 1996 Addenda of ASME Section XI is the Code Edition used for the Third 10-Year Inspection Interval. In response to license renewal future Commitment 27 provided in FENOC letter dated May 5, 2011 (ML11131A073), FENOC revised Davis-Besse procedure DB-PF-03009, "Containment Vessel and Shield Building Visual Inspection." To ensure

the qualification requirements for examiners are clear, sections of the ASME Code are included in procedure NOP-CC-5708, "Written Practice for the Qualification and Certification of Nondestructive Examination Personnel." Procedure NOP-CC-5708 is a fleet procedure, applicable to three stations (Davis-Besse, Beaver Valley Nuclear Power Station, and Perry Nuclear Power Station), and the ASME Code Editions are different for the three stations.

The following items summarize how FENOC is meeting the Subsection IWE-3510.1 requirements of the ASME Section XI Code (1995 Edition) for Davis-Besse:

1. Section 2.1.2 of procedure DB-PF-03009, "Containment Vessel and Shield Building Visual Inspection," requires that the General Visual examiner for Containment vessel and Shield Building examinations shall meet the requirements in NOP-CC-5708, as follows:

   > "Personnel who perform general visual examinations of the exterior surface of the Containment Vessel and the interior and exterior surfaces of the Shield Building shall meet the requirements for a general visual examiner in accordance with NOP-CC-5708. These individuals shall be knowledgeable of the types of conditions which may be expected to be identified during the examinations."

2. Section 1.3 of NOP-CC-5708 states that the procedure meets the requirements of ASME Section XI code through the 2001 Edition, 2003 Addenda. The procedure covers the Section XI code of record (as identified in each plant's Inservice Inspection program document) up to the most recent Edition applicable to the three sites using the procedure (Beaver Valley and Perry currently use the 2001 Edition of the ASME Code through the 2003 Addenda), which bounds the Code Edition currently in use by Davis-Besse. Based on the different Code Editions in use, separate requirements are included in the procedure for Davis-Besse, Beaver Valley and Perry.

3. Section 2.1 of NOP-CC-5708 specifically identifies that qualification and certification to perform Detailed and General Visual Examinations governed by Section XI, Subsections IWE and IWL, are covered by the procedure.

4. Section 4.2.5 of NOP-CC-5708 provides the ASME Code requirements for the General Visual Examiner (IWE /IWL) for each station based on the plant's Code Edition.

Question RAI B.2.22-6

Background:

By letter dated May 24, 2011, the applicant responded to a staff RAI B.2.22-2 regarding the examination of the inaccessible portion of the steel containment that may be exposed to borated water leakage from the reactor cavity pool leakage. The applicant added Commitment 39 to address the potential for borated water degradation of the steel containment vessel prior to entering the period of extended operation.

Issue:

In the RAI response, the applicant stated that prior to entering the period of extended operation, FENOC plans to access the inside surface of the embedded steel containment. Access will allow verification of whether or not borated water has come in contact with the steel containment vessel. If there is evidence of the presence of borated water in contact with the steel containment vessel, then FENOC will conduct NDT to determine what effect, if any, the borated water has had on the steel containment vessel. If there is evidence that borated water has come in contact with the steel containment vessel, then FENOC will perform a study to determine the effect through the period of extended operation of the loss of thickness in the steel containment due to exposure to borated water. However, the applicant did not provide specific details, schedule, and location for accessing the inside surface of the embedded steel containment.

Request:

Please provide specific details, schedule, and location for accessing the inside surface of the embedded steel at the lowest point in the containment. In addition, the applicant is requested to provide details on how it will continue to inspect and monitor the inside surface (inaccessible area) of the steel containment until the borated water leakage from the reactor cavity is stopped.

RESPONSE RAI B.2.22-6

FENOC is planning to perform a core bore to access the inside surface of the embedded containment vessel. A core bore is planned for completion by the end of 2014. Based on the core bore inspection results and refueling canal leakage mitigation results, a second core bore may be necessary. If a second core bore is necessary, the second core bore will be planned for completion by the end of 2020. The inspection in 2014 will allow a visual inspection of the embedded surface of the containment vessel to determine if borated water is present. If water is found, FENOC plans to analyze the water for boron content, pH value, and iron content. Regardless of whether water is found, FENOC plans to collect samples of corrosion, boric acid residue, or other foreign material found at the surface of the containment vessel. FENOC plans to analyze the

samples to the extent that there is enough material to allow analysis. Planned examination and chemical testing of removed concrete may provide evidence of current or past presence of an aging effect. If the concrete removal method provides large enough pieces of concrete, FENOC plans to perform a petrographic examination of those pieces. FENOC plans to use ultrasonic thickness (UT) measurements to determine the thickness of the containment vessel at the area accessed. FENOC also plans to examine and evaluate reinforcing bar if it is exposed. Upon completion of the inspection and testing, FENOC plans to fill the core bore hole with concrete or non-shrink grout. FENOC plans to enter the results of the inspection and testing into the FENOC Corrective Action Program to evaluate the conditions found to determine the need and scope of additional actions that need to be performed.

FENOC plans to locate the core bore below the reactor vessel where the Incore Tunnel opens through the primary shield wall into the area below the reactor vessel. That location is about eighteen feet from the containment vessel centerline. The lowest point of the containment vessel is about 30 inches lower than the elevation of the containment bottom head at the core bore location. The Incore Tunnel location was chosen because of the boron deposits that have been found in the Incore Tunnel. FENOC plans to use the results of the 2014 core bore inspection and testing to determine the need and scope of additional actions that need to be performed.

If a second core bore is necessary, FENOC plans to perform similar actions for a future core bore as are planned for the 2014 core bore. FENOC plans to conduct future core bores and ultrasonic thickness (UT) measurements in the same manner if the refueling canal leakage continues or if the leakage resumes.

LRA Table A-1, "Davis-Besse License Renewal Commitments," license renewal future Commitment 39, is revised based on the information provided above.

See the Enclosure to this letter for the revision to the DBNPS LRA.

Question RAI B.2.39-11

<u>Background:</u>

By letter dated May 24, 2011, the applicant responded to a staff RAI B.2.39-3 regarding operating experience with aggressive groundwater infiltration and possible degradation of inaccessible concrete. In the response the applicant stated that there is no evidence that aggressive groundwater has contributed to structural degradation. However, to address the possibility of degradation, the applicant committed to obtain and evaluate a concrete core from a representative, normally inaccessible location (Commitment 20).

Issue:

Although the applicant committed to taking core bores, the response did not provide details about when the cores would be taken, where they would be taken, what would be included in the evaluation of the cores, or the acceptance criteria that would be used to determine adequacy of effected concrete.

Request:

Provide more details about the concrete cores, including the timing, location, and tests to be completed on the cores. Also explain what criteria will be used to determine acceptable results. Provide technical justification for all of the responses.

RESPONSE RAI B.2.39-11

FENOC's current plan is as follows:

FENOC plans to investigate the effect of site groundwater on Davis-Besse reinforced concrete structures, using invasive testing and visual inspection to determine the extent, if any, of adverse effects of the site groundwater on the underground reinforced concrete structures.

FENOC plans to take core bores from two areas that are known to have had extended groundwater infiltration:

- The east wall of the Turbine Building condenser pit at approximately Elevation 573'.
- The Auxiliary Building Emergency Core Cooling System (ECCS) Pump Room No. 1 floor at approximately Elevation 545'.

FENOC plans to take the core bores from the inside of the building(s) and complete the evaluation prior to entering the period of extended operation.

FENOC plans to remove concrete as required at these locations to expose reinforcing steel for examination, and perform the following:

- Inspect reinforcing steel for corrosion,
- If corrosion exists on the rebar, collect corrosion samples for evaluation if there is sufficient material present,
- Measure reinforcing steel wastage if wastage is observed, and
- Measure corrosion buildup and evaluate cracking if a buildup of corrosion products has caused cracking of the concrete.

FENOC plans to subject the core bore samples to petrographic examination to determine chemical effects on the concrete and conduct compressive strength tests for comparison with the original concrete design strength.

FENOC plans to document the results of the concrete testing and reinforcing steel visual examinations as Structures Monitoring Program inspection results and, if necessary, enter them into the FENOC Corrective Action Program to ensure tracking of follow on actions (if any).

FENOC plans to use American Concrete Institute (ACI) Report 349.3R-02 as a reference for acceptance criteria for specific inspection and testing results. The overall acceptance criterion will be that the structures that are in scope for license renewal, that are exposed to aggressive groundwater, will continue to perform their intended functions during the period of extended operation. FENOC plans to conduct additional inspections, if warranted, based on the inspection or testing results of the interaction between groundwater and concrete.

The technical justification for the above response is that visual inspection and the planned invasive testing and evaluation methods are recommended in ACI Report 349.3R-02.

LRA Table A-1, "Davis-Besse License Renewal Commitments," license renewal future Commitment 20, is revised based on the information provided above.

See the Enclosure to this letter for the revision to the DBNPS LRA.

Question RAI B.2.39-12

Background:

By letter dated May 24, 2011, the applicant responded to a staff RAI B.2.39-7 regarding spalls observed on the shield building during a walkdown, and how the shield building would be inspected during the period of extended operation. In the response the applicant stated that the Structures Monitoring Program manages the shield building and will be enhanced to require optical aids, scaling technologies, mechanical lifts, ladders or scaffolding to allow visual inspections that meet the guidelines of ACI 349.3R (Commitment 20).

Issue:

Although the applicant committed to enhancing the Structures Monitoring Program prior to the period of extended operation, no information was provided on the spalls on the shield building.

Request:

Provide more information about the spalls on the shield building, including how they were identified and found acceptable or repaired. If they were repaired explain how the repairs were determined to be acceptable.

RESPONSE RAI B.2.39-12

FENOC personnel reviewed condition reports in the FENOC Corrective Action Program and reviewed completed Maintenance Rule Evaluation Work Sheets (MREWS) for information on Shield Building spalls. The review determined that three spalls had been identified on the outside surface of the shield building at an elevation about 30 feet above finished grade. Based on the records reviewed, the spalls were first identified during a Maintenance Rule structural evaluation of the Shield Building in 1999. The spalls were also identified again by security and operations personnel during their normal activities in a 2001 CR and by a technical services employee in a 2007 CR as a result of a required external inspection of the Shield Building. All three spalls have been determined to be acceptable during Maintenance Rule structural evaluations, and they were documented for future evaluation. The sizes of the spalls were estimated in the CRs and varied based on the individual observations. The 2001 CR described the spalls as being approximately 5" by ½", while the 2007 CR noted that the areas of distressed concrete appeared to be approximately 6" by 10" and approximately 2" deep. As a result of evaluation of the spalls by the FENOC Corrective Action Program, there is a maintenance order for pending repair of Shield Building spalled concrete.

The basis for accepting the spalls was documented in the 1999 and 2005 MREWS. The 1999 MREWS noted that although some minor spalling was present no areas would create a structural concern. The 2005 MREWS described spalling as identified in the previous MREWS. Digital images of the spalls were attached to the 2005 MREWS to provide documentation for reference and future evaluations. The 2005 MREWS also noted that no areas identified would create a structural concern.

Section 15 of Specification C-401Q; "Forming, Placing, Finishing, and Curing of Concrete," details the methods used to restore concrete. The method of repair is based on the actual size, depth and amount of rebar exposed in the area to be repaired.

Question RAI 3.5.2.3.12-4

Background:

By letter dated June 3, 2011, the applicant responded to a staff RAI 3.5.2.3.12-2 asking how the Structures Monitoring Program would be used to manage loss of material for steel wave protection dikes in structural backfill and exposed to aggressive groundwater. The applicant stated the components are installed on both sides of a piping system that is subjected to the Buried Piping and Tank Inspections Program. Both this program and the Structures Monitoring Program have requirements for opportunistic inspections that would identify degradation of the components.

Issue:

Although the staff believes opportunistic inspections are appropriate for buried concrete when the groundwater is non-aggressive, the staff does not agree this approach is adequate for steel components in structural backfill with aggressive groundwater. In addition, the portion of Commitment 20 discussing opportunistic inspections does not discuss buried steel components.

Request:

1. **Explain why opportunistic inspections are adequate to detect loss of material of steel components in structural backfill exposed to aggressive groundwater, or propose an appropriate aging management program to manage loss of material for the components. If the proposal involves focused inspections, justify the adequacy of the inspection technique and frequency.**

   Explain whether or not the opportunistic inspections apply to components other than concrete, and update the commitment as necessary.

RESPONSE RAI 3.5.2.3.12-4

FENOC's current plan is as follows:

FENOC plans to manage the steel components in structural backfill exposed to aggressive groundwater for loss of material by focused inspection (that will be included in the Structures Monitoring Program). FENOC plans to perform the inspection of the buried corrugated pipe prior to entering the period of extended operation.

There are three types of steel components in the wave protection dike in structural backfill that are exposed to aggressive groundwater:

- H-piles (or soldier piles),
- corrugated galvanized steel pipe segments and
- protective enclosures made from carbon steel plates.

The corrugated galvanized steel pipe segments also have their ends closed with steel plates. FENOC has included the corrugated galvanized steel pipe segments and the protective enclosures made from carbon steel plates as components subject to inspection.

The H-piles were installed to support initial plant construction and were left in place to support construction of Units 2 and 3 (which never progressed past initial excavation activities). The excavation for Units 2 and 3 left a gap between the south wall of the Unit 1 Service Water (SW) Intake Structure and the wave protection dike to the south. A temporary gabion wall was installed at the gap to provide wave protection. At the location of the gap, wave protection is required for postulated waves coming from the east. Two rows of H-piles were installed in the gap to the east of the gabion wall and to the east and west of buried piping that runs south from the SW Intake Structure. The H-piles were installed to stabilize the nearby soil. In 1988 the plant was modified by removing the gabion wall, filling in the excavated area and extending the southern wave protection dike to the south wall of the SW Intake Structure. The construction of the dike permanently stabilized the soil material near the rows of H-piles. Once the construction of the wave protection dike extension was completed, the H-piles no longer had a design function. Therefore, the H-piles have no license renewal intended function and they are removed from the scope of license renewal.

The buried corrugated pipe segments and enclosures exposed to aggressive groundwater protect piping that was buried during the construction of the wave protection dike extension. The piping is adjacent to or near the south wall of the SW Intake Structure. The buried corrugated pipe segments and protective enclosures are not pressure-retaining components rather, the corrugated pipe functions as a protective enclosure to the pressure retaining piping . For the focused visual inspection, FENOC plans to expose at least five linear feet of buried corrugated pipe and one protective enclosure by excavation for inspection. There are approximately 70 feet of corrugated galvanized steel pipe segments and two protective enclosures exposed to aggressive groundwater.

Five linear feet of buried corrugated protective pipe represents about 7 percent of the buried corrugated protective pipe, and one protective enclosure represents 50 percent of the protective enclosures. FENOC plans to select the excavation location(s) to ensure that all necessary plant design functions are maintained (e.g., wave control). FENOC plans to inspect the external surfaces of the protective piping and enclosure to determine the presence and extent of corrosion, coatings deterioration, holes or

perforation of pipe or steel plate, the condition of fasteners and other signs of distress (i.e. deflection or buckling), and to conducte the inspections prior to the period of extended operation.

FENOC plans to use the results of the inspections to determine the need or time frame for further inspections, with adverse conditions identified during this inspection entered into the FENOC Corrective Action Program for evaluation to determine required actions.

A visual inspection of the external surfaces of the protective piping and enclosure is adequate because evidence of the loss of material aging effect will be apparent due to visible presence of carbon steel corrosion products or visible disturbance of the coating. Both the internal and external surfaces of these components are subject to the same aggressive groundwater environment. However, the external surfaces are also exposed to abrasive effects from the installation and presence of the backfill material. These protective structures are not pressure boundaries so there have been no aging effects caused by internal fluid flow. Therefore the condition of the internal surfaces can reasonably be expected to be better than the condition of the external surfaces. The elevation of the protective piping varies by only three feet and it protects a continuous length of SW piping, therefore the sample size can be expected to provide reasonable assurance that the condition of the inspected protective piping will be representative of the total length of the protective piping. The elevation of both protective enclosures is the same, therefore the condition of the inspected protective enclosure can be expected to provide reasonable assurance that the condition of the inspected protective enclosure will be representative of the condition of both protective enclosures.

The frequency of the inspections is expected to be adequate based on the timing of the first inspections and the evaluation of the need for further inspections being based on the results of the first inspections. Because these protective structures were installed in 1988, they will have been in service for less than 30 years when the initial inspections are conducted. The number and frequency of future inspections are expected to be adequate because FENOC plans to base the need for future inspections on the results of the conditions identified during the first inspections. Since the inspected structures will have been in service for almost 30 years when they are inspected, the first inspections can reasonably be expected to identify potential aging effects.

The opportunistic inspections also apply to structural components other than concrete. LRA Section B.2.39, "Structures Monitoring Program," enhancement for the "Parameters Monitored or Inspected" element, and LRA Table A-1, "Davis-Besse License Renewal Commitments," license renewal future Commitment 20, are revised accordingly.

See the Enclosure to this letter for the revision to the DBNPS LRA.

Question RAI 3.3.2-4

Background:

In its response to RAI 3.3.2-2 dated June 3, 2011, the applicant stated that the copper alloy and copper alloy with greater than 15 percent zinc components (spray nozzles and valve bodies) exposed internally to outdoor air in the fire protection system (LRA Table 3.3.2-14) are sprinkler system components which are normally drained but vented to the outdoor atmosphere. The applicant further stated that these components are not susceptible to loss of material, cracking, or selective leaching because the environment to which they are exposed is not wetted and therefore the components have no aging effects requiring management.

The staff noted that while the sprinkler system internal components are not directly exposed to a wetted environment, they are open to the atmosphere, which contains moisture that can potentially become trapped in the system and cause condensation to accumulate. Normal daily temperature variations can promote the exchange of air from within the system to the atmosphere and vice versa, allowing moisture and contaminants to enter the system.

The GALL Report, Revision 2, Item VII.I.AP-159, states that copper alloy components exposed externally to outdoor air are susceptible to loss of material and recommends GALL AMP XI.M36, "External Surfaces Monitoring," to manage the aging effect. The staff noted that there are no GALL Report recommendations for copper alloy components exposed to condensation, but that a condensation environment can be bounded by a raw water environment. The GALL Report, Revision 2, Item VII.G.AP-159, states that copper alloy fire protection components exposed to raw water are susceptible to loss of material and recommends GALL AMP XI.M27, "Fire Water System," to manage the aging effect. GALL AMP XI.M27 includes flow testing and inspection recommendations for sprinkler system components, including sprinkler heads.

The GALL Report, Section IX.C states that copper alloy with greater than 15 percent zinc components are susceptible to selective leaching and cracking in addition to the aging effects for copper alloy components.

Issue:

It is not clear to the staff why the sprinkler system components exposed to outdoor air are not susceptible to loss of material, cracking, and selective leaching.

Request:

State why the copper alloy components exposed to outdoor air are not susceptible to loss of material and the copper alloy with greater than 15% zinc components are not also susceptible to cracking and selective leaching; or provide an appropriate program to manage the aging effects.

RESPONSE RAI 3.3.2-4

The sprinkler system internal surfaces are not directly exposed to a wetted environment, however they are open to the atmosphere, which contains moisture that can potentially become trapped in the system and cause the internal surfaces to be subjected to prolonged wetting. Therefore, the subject sprinkler system components exposed to air-outdoor (internal) are susceptible to loss of material and cracking.

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Program will manage loss of material for the subject copper alloy components of the FP System that are exposed to the "Air-outdoor (Internal)" environment.

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Program will manage cracking and loss of material, other than due to selective leaching, for the subject copper alloy with greater than 15 percent zinc components of the Fire Protection System that are exposed to the "Air-outdoor (Internal)" environment.

The Selective Leaching Inspection will detect and characterize loss of material due to selective leaching for the subject copper alloy with greater than 15 percent zinc components of the FP System that are exposed to the "Air-outdoor (Internal)" environment.

LRA Table 3.3.2-14, "Aging Management Review Results – Fire Protection System," is revised to include the appropriate rows based on the information provided above.

See the Enclosure to this letter for the revision to the DBNPS LRA.

Question RAI 3.3.2.14-1

Background:

The GALL Report states that stainless steel components exposed to steam are susceptible to loss of material and stress corrosion cracking. In LRA Table 3.3.2-14, the fire water storage tank heat exchanger contains stainless steel tubes exposed to steam that are being managed for reduction in heat transfer. However, the applicant has not identified loss of material or stress corrosion cracking as applicable aging effects, as discussed in the GALL Report.

Issue:

Even though the heat exchanger tubes license renewal function is heat transfer, both loss of material and stress corrosion cracking could affect the intended function. It is unclear to the staff why the applicant has not included both loss of material and stress corrosion cracking as applicable aging effects.

Request:

Justify why loss of material and stress corrosion cracking are not applicable aging effects for the fire water storage tank heat exchanger tubes exposed to steam. If it is determined that both loss of material and stress corrosion cracking are applicable, provide information on how these aging effects will be managed.

RESPONSE RAI 3.3.2.14-1

As discussed in NUREG-1801 (the GALL Report), the only aging mechanism that is identified as causing the aging effect of reduction of heat transfer is the aging mechanism of fouling. Loss of material and cracking (due to the aging mechanism of stress corrosion cracking) are potential aging effects for the fire water storage tank heat exchanger tubes exposed to steam, and could ultimately affect the pressure boundary function of the tubes, but would not affect the license renewal function of heat transfer for this heat exchanger.

The fire water storage tank heat exchanger tubes are not credited with a license renewal pressure boundary function. Should the heat exchanger tubes leak, fire water would not leak from the tubes; rather, the higher pressure (i.e., approximately 50 psig) steam from the Auxiliary Steam System on the external surfaces of the tubes would pass through the tubes and mix with fire water (approximately 25 psig), thereby continuing to add heat to the water. Fire water storage tank level would increase due to water entering the system, but level in the tank could be controlled (i.e., feed-and-bleed) to prevent the tank from overflowing onto the ground. A breach of the heat exchanger tubes would result in continued heat transfer to fire water, and would not prevent the Fire Water System from performing its functions. Therefore, loss of material and stress corrosion cracking are not applicable license renewal aging effects for the fire water storage tank heat exchanger tubes exposed to steam.

Supplemental Question 3.3.2.3.14-1

The NRC initiated a telephone conference call with FENOC on August 2, 2011, to discuss the FENOC response to RAI 3.3.2.3.14-1, submitted under FENOC letter dated June 3, 2011 (ML11159A132). The NRC staff stated that they do not agree with the FENOC response to this RAI and that aging mechanisms do exist and loss of preload could occur. FENOC agreed to supplement the response and add a row for loss of pre-load, and include the response with the next RAI response letter. The NRC staff agreed to this action and noted that some additional detail should be provided on how the LOP will be managed for the subject submerged bolting (e.g., opportunistic inspection or pump performance).

Original Question RAI 3.3.2.3.14-1 reads as follows:

In LRA Table 3.3.2-14, the applicant identified loss of material and cracking as aging effects for steel bolting exposed to an external environment of raw water. As identified in EPRI NP-5769 and NUREG-1833, loss of pre-load for bolting can occur in any environment.

In LRA Table 3.3.2-14, the applicant did not identify loss of pre-load for steel bolting exposed to an external environment of raw water.

Justify why loss of pre-load is not identified as an aging effect for steel bolting in an environment of raw water.

SUPPLEMENTAL RESPONSE 3.3.2.3.14-1

FENOC replaces the previous response to RAI 3.3.2.3.14-1 submitted under FENOC letter dated June 3, 2011 (ML11159A132) in its entirety, as follows.

LRA Table 3.3.2-14, "Aging Management Review Results – Fire Protection System," is revised to add loss of pre-load as an aging effect for steel bolting exposed to an external environment of raw water. Loss of pre-load for steel bolting exposed to an external environment of raw water will be managed by the Bolting Integrity Program.

The bolting in the Fire Protection System that is exposed to an external environment of raw water is associated with the diesel fire pump column that is submerged in raw water supplied by Lake Erie. In addition to the Bolting Integrity Program there are other opportunities to identify loss of pre-load in the diesel fire pump column bolting. For example, loss of pre-load could also be identified during pump flow testing conducted in accordance with the Fire Protection Program or during inspection of the diesel fire pump column bolting that is done in accordance with the Collection, Drainage, and Treatment Component Inspection Program.

See the Enclosure to this letter for the revision to the DBNPS LRA.

Supplemental Question One-Time Inspection Examination Types - Revision

The NRC initiated a telephone conference call with FENOC on August 22, 2011, to discuss the FENOC Supplemental Response – Methods for One-Time Inspections, submitted in FENOC letter L-11-238 dated August 17, 2011. NRC stated that there were two inconsistencies in the response provided. The Supplemental question and FENOC response provided in letter L-11-238 dated August 17, 2011, is replaced in its entirety by the following:

The NRC initiated a telephone conference call with FENOC on August 2, 2011, to discuss FENOC's response to RAI 3.3.2.2.4.3-1 and corresponding LRA Section B.2.30 amendment in letter dated June 3, 2011 (ML11159A132). The amendment to LRA Section B.2.30 states that the "scope" program element is to include visual and volumetric inspections of the stainless steel makeup pump casings for cracking due to cyclic loading, but it does not state what type of visual examinations will be used to detect cracking. The GALL [NUREG-1801] AMP XI.M32, "One-Time Inspection" states in the "detection of aging effects" program element that the program manages cracking due to cyclic loading using enhanced visual (EVT-1 or equivalent), surface, or volumetric examinations. However, some types of visual examination may not be sufficient to identify cracking, and it is unclear what visual examinations will be performed to meet this need. The NRC requests the type of visual examination that will be used to identify cracking as part of the One Time Inspection Program.

SUPPLEMENTAL RESPONSE One-Time Inspection Examination Types - Revision

LRA Section B.2.30, "One-Time Inspection," subsection "Detection of Aging Effects," is revised to include a table that identifies the types of inspections that will be used for detection of aging effects.

See the Enclosure to this letter for the revision to the DBNPS LRA.

Supplemental Question – Makeup Pump Casing Inspections

During the NRC Region III Inspection Procedure (IP) 71002, "License Renewal Inspection," held the week of August 22, 2011, NRC Inspectors identified that there are inconsistencies between LRA Table A-1, "Davis-Besse License Renewal Commitments," license renewal future Commitment 13, related to inspection for cracking due to cyclic loading of the stainless steel high-pressure makeup pumps (i.e., DB-P37-1 and 2) in the Makeup and Purification System, and LRA Section B.2.30, "One-Time Inspection," subsections "Enhancements," and "Aging Management Program Elements – Detection of Aging Effects." Commitment 13 and the affected B.2.30 subsections should consistently identify the inspection methods to be used to detect cracking. Open Item OIN-376 was created to track the issue.

SUPPLEMENTAL RESPONSE – Makeup Pump Casing Inspections

LRA Table A-1, "Davis-Besse License Renewal Commitments," license renewal future Commitment 13, and LRA Section B.2.30 are revised to state that the inspection for cracking due to cyclic loading of the stainless steel high-pressure makeup pumps (DB-P37-1 and 2) in the Makeup and Purification System will consist of enhanced visual (VT-1 or equivalent) and/or volumetric (RT or UT) inspections to align with the revised FENOC response to Supplemental Response – One-Time Inspections contained in this letter.

See the Enclosure to this letter for the revision to the DBNPS LRA.

Enclosure

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

Letter L-11-237

Amendment No. 14 to the
DBNPS License Renewal Application

License Renewal Application
Sections Affected

Table 2.4-12

Section 3.3.2.1.14

Table 3.3.2-14

Table 3.3.2 Plant-Specific Notes

Table 3.5.2-12

Table 3.5.2 Plant-Specific Notes

Table A-1

Section B.2.30

Section B.2.39

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**
Table 2.4-12	**Pages 2.4-47 and 2.4-48**	**Wave Protection Dike Corrugated Pipe Casings Row; and, Wave Protection Dike Piles Row**

In response to RAI 3.5.2.3.12-4, the Wave Protection Dike Corrugated Pipe Casings and Wave Protection Dike Piles rows of Table 2.4-12, "Yard Structures, Components Subject to Aging Management Review," are revised as follows:

Component Type	**Intended Function (as defined in Table 2.0-1)**
Wave Protection Dike Corrugated Pipe Casings	*EN, ~~SNS~~, SSR, SRE*
~~*Wave Protection Dike Piles*~~	~~*SNS*~~

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
3.3.2.1.14	**Page 3.3-19**	**Detection of Aging Effects**

In response to RAI 3.3.2-4, the Aging Management Program subsection of Section 3.3.2.1.14 is revised as follows:

Aging Management Programs

The following aging management programs manage the aging effects for subject mechanical components of the Fire Protection System:

- Aboveground Steel Tanks Inspection Program
- Bolting Integrity Program
- Boric Acid Corrosion Program
- Buried Piping and Tanks Inspection Program
- Collection, Drainage, and Treatment Components Inspection Program
- External Surfaces Monitoring Program
- Fire Water Program
- Fuel Oil Chemistry Program
- *Internal Surfaces in Miscellaneous Piping and Ducting Program*
- Lubricating Oil Analysis Program
- One-Time Inspection
- PWR Water Chemistry Program
- Selective Leaching Inspection

Affected LRA Section | **LRA Page No.** | **Affected Paragraph and Sentence**

Table 3.3.2-14 | **Page 3.3-313** | **Entire Table**

In response to RAI 3.3.2-4 and the Supplemental Response to RAI 3.3.2.3.14-1,, LRA Table 3.3.2-14, "Aging Management Review Results – Fire Protection System" is replaced in its entirety with the following:

Table 3.3.2-14 Aging Management Review Results – Fire Protection System

Row No.	***Component Type***	***Intended Function(s)***	***Material***	***Environment***	***Aging Effect Requiring Management***	***Aging Management Program***	***NUREG-1801, Volume 2 Item***	***Table 1 Item***	***Notes***
1	*Bolting*	*Pressure boundary*	*Stainless Steel*	*Air with borated water leakage (External)*	*None*	*None*	*VII.J-16*	*3.3.1-99*	*C*
2	*Bolting*	*Pressure boundary*	*Stainless Steel*	*Air with steam or water leakage (External)*	*Cracking*	*Bolting Integrity*	*N/A*	*N/A*	*F*
3	*Bolting*	*Pressure boundary*	*Stainless Steel*	*Air with steam or water leakage (External)*	*Loss of material*	*Bolting Integrity*	*N/A*	*N/A*	*F*
4	*Bolting*	*Pressure boundary*	*Stainless Steel*	*Air-indoor uncontrolled (External)*	*Loss of preload*	*Bolting Integrity*	*N/A*	*N/A*	*F*
5	*Bolting*	*Pressure boundary*	*Steel*	*Air with borated water leakage (External)*	*Loss of material*	*Boric Acid Corrosion*	*VII.I-2*	*3.3.1-89*	*A*

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
6	Bolting	Pressure boundary	Steel	Air with steam or water leakage (External)	Cracking	Bolting Integrity	VII.I-3	3.3.1-41	B
7	Bolting	Pressure boundary	Steel	Air with steam or water leakage (External)	Loss of material	Bolting Integrity	VII.I-6	3.3.1-42	B
8	Bolting	Pressure boundary	Steel	Air-indoor uncontrolled (External)	Loss of material	Bolting Integrity	VII.I-4	3.3.1-43	B
9	Bolting	Pressure boundary	Steel	Air-indoor uncontrolled (External)	Loss of preload	Bolting Integrity	VII.I-5	3.3.1-45	B
10	Bolting	Pressure boundary	Steel	Air-outdoor (External)	Loss of material	Bolting Integrity	VII.I-1	3.3.1-43	B
11	Bolting	Pressure boundary	Steel	Air-outdoor (External)	Loss of preload	Bolting Integrity	N/A	N/A	H
12	Bolting	Pressure boundary	Steel	Raw water (External)	Cracking	Collection, Drainage, and Treatment Components Inspection	N/A	N/A	G 0324
13	Bolting	Pressure boundary	Steel	Raw water (External)	Loss of material	Collection, Drainage, and Treatment Components Inspection	VII.C1-19	3.3.1-76	E 0324

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
14	Bolting	Pressure boundary	Steel	Raw water (External)	Loss of preload	Bolting Integrity	NA	NA	H
15	Bolting	Pressure boundary	Steel	Soil (External)	Loss of material	Buried Piping and Tanks Inspection	VII.G-25	3.3.1-19	C
16	Bolting	Structural integrity	Steel	Air with steam or water leakage (External)	Cracking	Bolting Integrity	VII.I-3	3.3.1-41	B
17	Bolting	Structural integrity	Steel	Air with steam or water leakage (External)	Loss of material	Bolting Integrity	VII.I-6	3.3.1-42	B
18	Bolting	Structural integrity	Steel	Air-indoor uncontrolled (External)	Loss of material	Bolting Integrity	VII.I-4	3.3.1-43	B
19	Bolting	Structural integrity	Steel	Air-indoor uncontrolled (External)	Loss of preload	Bolting Integrity	VII.I-5	3.3.1-45	B
20	Heat Exchanger (channel) – Fire Water Storage Tank Heat Exchanger (DB-E52)	Pressure boundary	Steel	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.G-5	3.3.1-59	A

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	**Component Type**	**Intended Function(s)**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801, Volume 2 Item**	**Table 1 Item**	**Notes**
21	Heat Exchanger (channel) – Fire Water Storage Tank Heat Exchanger (DB-E52)	Pressure boundary	Steel	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	C
22	Heat Exchanger (shell) – Fire Water Storage Tank Heat Exchanger (DB-E52)	Pressure boundary	Steel	Steam (Internal)	Loss of material	One-Time Inspection	VIII.B1-8	3.4.1-37	E 0315
23	Heat Exchanger (shell) – Fire Water Storage Tank Heat Exchanger (DB-E52)	Pressure boundary	Steel	Steam (Internal)	Loss of material	PWR Water Chemistry	VIII.B1-8	3.4.1-37	C

Table 3.3.2-14 Aging Management Review Results – Fire Protection System

Row No.	**Component Type**	**Intended Function(s)**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801, Volume 2 Item**	**Table 1 Item**	**Notes**
_24_	_Heat Exchanger (shell) – Fire Water Storage Tank Heat Exchanger (DB-E52)_	_Pressure boundary_	_Steel_	_Air-indoor uncontrolled (External)_	_Loss of material_	_External Surfaces Monitoring_	_VII.G-5_	_3.3.1-59_	_A_
_25_	_Heat Exchanger (tubes) – Fire Water Storage Tank Heat Exchanger (DB-E52)_	_Heat transfer_	_Stainless Steel_	_Raw water (Internal)_	_Reduction in heat transfer_	_Collection, Drainage, and Treatment Components Inspection_	_VII.G-7_	_3.3.1-83_	_E_
_26_	_Heat Exchanger (tubes) – Fire Water Storage Tank Heat Exchanger (DB-E52)_	_Heat transfer_	_Stainless Steel_	_Steam (External)_	_Reduction in heat transfer_	_PWR Water Chemistry_	_N/A_	_N/A_	_G_

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
27	Heat Exchanger (tubes) – Fire Water Storage Tank Heat Exchanger (DB-E52)	Heat transfer	Stainless Steel	Steam (External)	Reduction in heat transfer	One-Time Inspection	N/A	N/A	G 0315
28	Heat Exchanger (tubesheet) - Fire Water Storage Tank Heat Exchanger (DB-E52)	Pressure boundary	Steel	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	C
29	Heat Exchanger (tubesheet) - Fire Water Storage Tank Heat Exchanger (DB-E52)	Pressure boundary	Steel	Steam (External)	Loss of material	One-Time Inspection	VIII.B1-8	3.4.1-37	E 0315

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
30	Heat Exchanger (tubesheet) - Fire Water Storage Tank Heat Exchanger (DB-E52)	Pressure boundary	Steel	Steam (External)	Loss of material	PWR Water Chemistry	VIII.B1-8	3.4.1-37	C
31	Hydrant	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
32	Hydrant	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Selective Leaching Inspection	VII.G-14	3.3.1-85	A
33	Hydrant	Pressure boundary	Gray Cast Iron	Air-outdoor (External)	Loss of material	External Surfaces Monitoring	VII.I-9	3.3.1-58	A
34	Hydrant	Pressure boundary	Gray Cast Iron	Soil (External)	Loss of material	Buried Piping and Tanks Inspection	VII.G-25	3.3.1-19	A
35	Hydrant	Pressure boundary	Gray Cast Iron	Soil (External)	Loss of material	Selective Leaching Inspection	VII.G-15	3.3.1-85	A
36	Orifice	Pressure boundary	Steel	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
37	Orifice	Pressure boundary	Steel	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
38	Orifice	Throttling	Steel	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
39	Piping	Pressure boundary	Copper Alloy	Raw water (Internal)	Loss of material	Fire Water	VII.G-12	3.3.1-70	A
40	Piping	Pressure boundary	Copper Alloy	Air with borated water leakage (External)	None	None	VII.J-5	3.3.1-99	A
41	Piping	Pressure boundary	Copper Alloy	Air-indoor uncontrolled (External)	None	None	VIII.I-2	3.4.1-41	A
42	Piping	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
43	Piping	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Selective Leaching Inspection	VII.G-14	3.3.1-85	A
44	Piping	Pressure boundary	Gray Cast Iron	Air-outdoor (External)	Loss of material	External Surfaces Monitoring	VII.I-9	3.3.1-58	A
45	Piping	Pressure boundary	Gray Cast Iron	Soil (External)	Loss of material	Buried Piping and Tanks Inspection	VII.G-25	3.3.1-19	A
46	Piping	Pressure boundary	Gray Cast Iron	Soil (External)	Loss of material	Selective Leaching Inspection	VII.G-15	3.3.1-85	A

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	**Component Type**	**Intended Function(s)**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801, Volume 2 Item**	**Table 1 Item**	**Notes**
47	Piping	Pressure boundary	Stainless Steel	Air-indoor uncontrolled (Internal)	None	None	VII.J-15	3.3.1-94	C 0301
48	Piping	Pressure boundary	Stainless Steel	Air with borated water leakage (External)	None	None	VII.J-16	3.3.1-99	A
49	Piping	Pressure boundary	Stainless Steel	Air-indoor uncontrolled (External)	None	None	VII.J-15	3.3.1-94	A
50	Piping	Pressure boundary	Steel	Air with borated water leakage (External)	Loss of material	Boric Acid Corrosion	VII.I-10	3.3.1-89	A
51	Piping	Pressure boundary	Steel	Air-indoor uncontrolled (Internal)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	C 0301
52	Piping	Pressure boundary	Steel	Air-outdoor (Internal)	Loss of material	External Surfaces Monitoring	VII.I-9	3.3.1-58	C 0301
53	Piping	Pressure boundary	Steel	Raw water (Internal)	Cracking	TLAA	N/A	N/A	H 0339
54	Piping	Pressure boundary	Steel	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
55	Piping	Pressure boundary	Steel	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
56	Piping	Pressure boundary	Steel	Air-outdoor (External)	Loss of material	External Surfaces Monitoring	VII.I-9	3.3.1-58	A
57	Piping	Pressure boundary	Steel	Concrete (External)	None	None	VII.J-21	3.3.1-96	A
58	Piping	Pressure boundary	Steel	Raw water (External)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A 0323
59	Piping	Pressure boundary	Steel	Soil (External)	Loss of material	Buried Piping and Tanks Inspection	VII.G-25	3.3.1-19	A
60	Piping	Structural integrity	Copper Alloy	Air-indoor uncontrolled (Internal)	None	None	VIII.I-2	3.4.1-41	A 0301
61	Piping	Structural integrity	Copper Alloy	Air-indoor uncontrolled (External)	None	None	VIII.I-2	3.4.1-41	A
62	Piping	Structural integrity	Steel	Air-indoor uncontrolled (Internal)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A 0301
63	Piping	Structural integrity	Steel	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
64	Piping	Structural integrity	Steel	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	**Component Type**	**Intended Function(s)**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801, Volume 2 Item**	**Table 1 Item**	**Notes**
65	Pump Casing – Diesel Fire Pump (DB-P5-2)	Pressure boundary	Gray Cast Iron	Air-indoor uncontrolled (Internal)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	C 0301
66	Pump Casing – Diesel Fire Pump (DB-P5-2)	Pressure boundary	Gray Cast Iron	Moist air (Internal)	Loss of material	Selective Leaching Inspection	N/A	N/A	H 0321
67	Pump Casing – Diesel Fire Pump (DB-P5-2)	Pressure boundary	Gray Cast Iron	Moist air (Internal)	Loss of material	One-Time Inspection	VII.G-23	3.3.1-71	E 0313
68	Pump Casing – Diesel Fire Pump (DB-P5-2)	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
69	Pump Casing – Diesel Fire Pump (DB-P5-2)	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Selective Leaching Inspection	VII.G-14	3.3.1-85	A
70	Pump Casing – Diesel Fire Pump (DB-P5-2)	Pressure boundary	Gray Cast Iron	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A
71	Pump Casing – Diesel Fire Pump (DB-P5-2)	Pressure boundary	Gray Cast Iron	Moist air (External)	Loss of material	Selective Leaching Inspection	N/A	N/A	G 0321

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
72	Pump Casing – Diesel Fire Pump (DB-P5-2)	Pressure boundary	Gray Cast Iron	Moist air (External)	Loss of material	One-Time Inspection	VII.G-23	3.3.1-71	E 0313, 0322
73	Pump Casing – Diesel Fire Pump (DB-P5-2)	Pressure boundary	Gray Cast Iron	Raw water (External)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
74	Pump Casing – Diesel Fire Pump (DB-P5-2)	Pressure boundary	Gray Cast Iron	Raw water (External)	Loss of material	Selective Leaching Inspection	VII.G-14	3.3.1-85	A
75	Pump Casing – Electric Fire Pump (DB-P5-1)	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
76	Pump Casing – Electric Fire Pump (DB-P5-1)	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Selective Leaching Inspection	VII.G-14	3.3.1-85	A
77	Pump Casing – Electric Fire Pump (DB-P5-1)	Pressure boundary	Gray Cast Iron	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A
78	Pump Casing – Fire Water Storage Tank Recirculation Pump (DB-P114)	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
79	Pump Casing – Fire Water Storage Tank Recirculation Pump (DB-P114)	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Selective Leaching Inspection	VII.G-14	3.3.1-85	A
80	Pump Casing – Fire Water Storage Tank Recirculation Pump (DB-P114)	Pressure boundary	Gray Cast Iron	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A
81	Spray Nozzle	Pressure boundary	Copper Alloy > 15% Zn	Air-indoor uncontrolled (Internal)	None	None	VIII.I-2	3.4.1-41	A 0301
82	Spray Nozzle	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (Internal)	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting	N/A	N/A	G
83	Spray Nozzle	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (Internal)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting	N/A	N/A	G
84	Spray Nozzle	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (Internal)	Loss of material	Selective Leaching Inspection	N/A	N/A	G
85	Spray Nozzle	Pressure boundary	Copper Alloy > 15% Zn	Raw water (Internal)	Loss of material	Fire Water	VII.G-12	3.3.1-70	A

Table 3.3.2-14 Aging Management Review Results – Fire Protection System

Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
86	Spray Nozzle	Pressure boundary	Copper Alloy > 15% Zn	Raw water (Internal)	Loss of material	Selective Leaching Inspection	VII.G-13	3.3.1-84	A
87	Spray Nozzle	Pressure boundary	Copper Alloy > 15% Zn	Air with borated water leakage (External)	Loss of material	Boric Acid Corrosion	VII.I-12	3.3.1-88	A
88	Spray Nozzle	Pressure boundary	Copper Alloy > 15% Zn	Air-indoor uncontrolled (External)	None	None	VIII.I-2	3.4.1-41	A
89	Spray Nozzle	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (External)	Cracking	External Surfaces Monitoring	N/A	N/A	G
90	Spray Nozzle	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (External)	Loss of material	External Surfaces Monitoring	N/A	N/A	G
91	Spray Nozzle	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (External)	Loss of material	Selective Leaching Inspection	N/A	N/A	G
92	Spray Nozzle	Spray	Copper Alloy > 15% Zn	Air-indoor uncontrolled (Internal)	None	None	VIII.I-2	3.4.1-41	A 0301
93	Spray Nozzle	Spray	Copper Alloy > 15% Zn	Air-outdoor (Internal)	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting	N/A	N/A	G

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
94	Spray Nozzle	Spray	Copper Alloy > 15% Zn	Air-outdoor (Internal)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting	N/A	N/A	G
95	Spray Nozzle	Spray	Copper Alloy > 15% Zn	Air-outdoor (Internal)	Loss of material	Selective Leaching Inspection	N/A	N/A	G
96	Spray Nozzle	Spray	Copper Alloy > 15% Zn	Raw water (Internal)	Loss of material	Fire Water	VII.G-12	3.3.1-70	A
97	Spray Nozzle	Spray	Copper Alloy > 15% Zn	Raw water (Internal)	Loss of material	Selective Leaching Inspection	VII.G-13	3.3.1-84	A
98	Spray Nozzle	Spray	Copper Alloy > 15% Zn	Air with borated water leakage (External)	Loss of material	Boric Acid Corrosion	VII.I-12	3.3.1-88	A
99	Spray Nozzle	Spray	Copper Alloy > 15% Zn	Air-indoor uncontrolled (External)	None	None	VIII.I-2	3.4.1-41	A
100	Spray Nozzle	Spray	Copper Alloy > 15% Zn	Air-outdoor (External)	Cracking	External Surfaces Monitoring	N/A	N/A	G
101	Spray Nozzle	Spray	Copper Alloy > 15% Zn	Air-outdoor (External)	Loss of material	External Surfaces Monitoring	N/A	N/A	G
102	Spray Nozzle	Spray	Copper Alloy > 15% Zn	Air-outdoor (External)	Loss of material	Selective Leaching Inspection	N/A	N/A	G

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
103	Spray Nozzle	Structural integrity	Copper Alloy > 15% Zn	Air-indoor uncontrolled (Internal)	None	None	VIII.I-2	3.4.1-41	A 0301
104	Spray Nozzle	Structural integrity	Copper Alloy > 15% Zn	Raw water (Internal)	Loss of material	Fire Water	VII.G-12	3.3.1-70	A
105	Spray Nozzle	Structural integrity	Copper Alloy > 15% Zn	Raw water (Internal)	Loss of material	Selective Leaching Inspection	VII.G-13	3.3.1-84	A
106	Spray Nozzle	Structural integrity	Copper Alloy > 15% Zn	Air-indoor uncontrolled (External)	None	None	VIII.I-2	3.4.1-41	A
107	Strainer (body)	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
108	Strainer (body)	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Selective Leaching Inspection	VII.G-14	3.3.1-85	A
109	Strainer (body)	Pressure boundary	Gray Cast Iron	Air with borated water leakage (External)	Loss of material	Boric Acid Corrosion	VII.I-10	3.3.1-89	A
110	Strainer (body)	Pressure boundary	Gray Cast Iron	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A
111	Strainer (body)	Pressure boundary	Steel	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
112	Strainer (body)	Pressure boundary	Steel	Air with borated water leakage (External)	Loss of material	Boric Acid Corrosion	VII.I-10	3.3.1-89	A
113	Strainer (body)	Pressure boundary	Steel	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A
114	Strainer (screen)	Filtration	Copper Alloy > 15% Zn	Raw water (External)	Loss of material	Fire Water	VII.G-12	3.3.1-70	A
115	Strainer (screen)	Filtration	Copper Alloy > 15% Zn	Raw water (External)	Loss of material	Selective Leaching Inspection	VII.G-13	3.3.1-84	A
116	Strainer (screen)	Filtration	Stainless Steel	Raw water (External)	Loss of material	Fire Water	VII.G-19	3.3.1-69	A
117	Tank – Fire Water Storage Tank (DB-T81)	Pressure boundary	Steel	Air-outdoor (Internal)	Loss of material	External Surfaces Monitoring	VII.I-9	3.3.1-58	C 0301
118	Tank – Fire Water Storage Tank (DB-T81)	Pressure boundary	Steel	Moist air (Internal)	Loss of material	One-Time Inspection	VII.G-23	3.3.1-71	E 0313
119	Tank – Fire Water Storage Tank (DB-T81)	Pressure boundary	Steel	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	C

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
120	Tank – Fire Water Storage Tank (DB-T81)	Pressure boundary	Steel	Air-outdoor (External)	Loss of material	Aboveground Steel Tanks Inspection	VII.H1-11	3.3.1-40	B 0333
121	Tank – Fire Water Storage Tank (DB-T81)	Pressure boundary	Steel	Air-outdoor (External)	Loss of material	External Surfaces Monitoring	VII.I-9	3.3.1-58	A
122	Tank – Retard Chamber	Pressure boundary	Copper Alloy > 15% Zn	Air-indoor uncontrolled (Internal)	None	None	VIII.I-2	3.4.1-41	C 0301
123	Tank – Retard Chamber	Pressure boundary	Copper Alloy > 15% Zn	Air with borated water leakage (External)	Loss of material	Boric Acid Corrosion	VII.I-12	3.3.1-88	C
124	Tank – Retard Chamber	Pressure boundary	Copper Alloy > 15% Zn	Air-indoor uncontrolled (External)	None	None	VIII.I-2	3.4.1-41	C
125	Tank – Retard Chamber	Pressure boundary	Gray Cast Iron	Air-indoor uncontrolled (Internal)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	C 0301
126	Tank – Retard Chamber	Pressure boundary	Gray Cast Iron	Air with borated water leakage (External)	Loss of material	Boric Acid Corrosion	VII.I-10	3.3.1-89	A
127	Tank – Retard Chamber	Pressure boundary	Gray Cast Iron	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A

Table 3.3.2-14 Aging Management Review Results – Fire Protection System

Row No.	**_Component Type_**	**_Intended Function(s)_**	**_Material_**	**_Environment_**	**_Aging Effect Requiring Management_**	**_Aging Management Program_**	**_NUREG-1801, Volume 2 Item_**	**_Table 1 Item_**	**_Notes_**
_128_	_Tubing_	_Pressure boundary_	_Copper Alloy_	_Raw water (Internal)_	_Loss of material_	_Fire Water_	_VII.G-12_	_3.3.1-70_	_A_
_129_	_Tubing_	_Pressure boundary_	_Copper Alloy_	_Air with borated water leakage (External)_	_None_	_None_	_VII.J-5_	_3.3.1-99_	_A_
_130_	_Tubing_	_Pressure boundary_	_Copper Alloy_	_Air-indoor uncontrolled (External)_	_None_	_None_	_VIII.I-2_	_3.4.1-41_	_A_
_131_	_Tubing_	_Pressure boundary_	_Steel_	_Air-indoor uncontrolled (Internal)_	_Loss of material_	_External Surfaces Monitoring_	_VII.I-8_	_3.3.1-58_	_C 0301_
_132_	_Tubing_	_Pressure boundary_	_Steel_	_Raw water (Internal)_	_Loss of material_	_Fire Water_	_VII.G-24_	_3.3.1-68_	_A_
_133_	_Tubing_	_Pressure boundary_	_Steel_	_Air with borated water leakage (External)_	_Loss of material_	_Boric Acid Corrosion_	_VII.I-10_	_3.3.1-89_	_A_
_134_	_Tubing_	_Pressure boundary_	_Steel_	_Air-indoor uncontrolled (External)_	_Loss of material_	_External Surfaces Monitoring_	_VII.I-8_	_3.3.1-58_	_A_
_135_	_Tubing_	_Structural integrity_	_Steel_	_Air-indoor uncontrolled (Internal)_	_Loss of material_	_External Surfaces Monitoring_	_VII.I-8_	_3.3.1-58_	_C 0301_
_136_	_Tubing_	_Structural integrity_	_Steel_	_Raw water (Internal)_	_Loss of material_	_Fire Water_	_VII.G-24_	_3.3.1-68_	_A_

Table 3.3.2-14 Aging Management Review Results – Fire Protection System

Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
137	Tubing	Structural integrity	Steel	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A
138	Valve Body	Pressure boundary	Copper Alloy	Air-indoor uncontrolled (Internal)	None	None	VIII.I-2	3.4.1-41	Arrrr 0301
139	Valve Body	Pressure boundary	Copper Alloy	Air-outdoor (Internal)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting	N/A	N/A	G
140	Valve Body	Pressure boundary	Copper Alloy	Raw water (Internal)	Loss of material	Fire Water	VII.G-12	3.3.1-70	A
141	Valve Body	Pressure boundary	Copper Alloy	Air with borated water leakage (External)	None	None	VII.J-5	3.3.1-99	A
142	Valve Body	Pressure boundary	Copper Alloy	Air-indoor uncontrolled (External)	None	None	VIII.I-2	3.4.1-41	A
143	Valve Body	Pressure boundary	Copper Alloy	Air-outdoor (External)	Loss of material	External Surfaces Monitoring	N/A	N/A	G
144	Valve Body	Pressure boundary	Copper Alloy > 15% Zn	Air-indoor uncontrolled (Internal)	None	None	VIII.I-2	3.4.1-41	A

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
145	Valve Body	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (Internal)	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting	N/A	N/A	G
146	Valve Body	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (Internal)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting	N/A	N/A	G
147	Valve Body	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (Internal)	Loss of material	Selective Leaching Inspection	N/A	N/A	G
148	Valve Body	Pressure boundary	Copper Alloy > 15% Zn	Raw water (Internal)	Loss of material	Fire Water	VII.G-12	3.3.1-70	A
149	Valve Body	Pressure boundary	Copper Alloy > 15% Zn	Raw water (Internal)	Loss of material	Selective Leaching Inspection	VII.G-13	3.3.1-84	A
150	Valve Body	Pressure boundary	Copper Alloy > 15% Zn	Air-indoor uncontrolled (External)	None	None	VIII.I-2	3.4.1-41	A
151	Valve Body	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (External)	Cracking	External Surfaces Monitoring	N/A	N/A	G
152	Valve Body	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (External)	Loss of material	External Surfaces Monitoring	N/A	N/A	G
153	Valve Body	Pressure boundary	Copper Alloy > 15% Zn	Air-outdoor (External)	Loss of material	Selective Leaching Inspection	N/A	N/A	G

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
154	Valve Body	Pressure boundary	Gray Cast Iron	Air-indoor uncontrolled (Internal)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	C 0301
155	Valve Body	Pressure boundary	Gray Cast Iron	Air-outdoor (Internal)	Loss of material	External Surfaces Monitoring	VII.I-9	3.3.1-58	C 0301
156	Valve Body	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
157	Valve Body	Pressure boundary	Gray Cast Iron	Raw water (Internal)	Loss of material	Selective Leaching Inspection	VII.G-14	3.3.1-85	A
158	Valve Body	Pressure boundary	Gray Cast Iron	Air with borated water leakage (External)	Loss of material	Boric Acid Corrosion	VII.I-10	3.3.1-89	A
159	Valve Body	Pressure boundary	Gray Cast Iron	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A
160	Valve Body	Pressure boundary	Gray Cast Iron	Air-outdoor (External)	Loss of material	External Surfaces Monitoring	VII.I-9	3.3.1-58	A
161	Valve Body	Pressure boundary	Gray Cast Iron	Soil (External)	Loss of material	Buried Piping and Tanks Inspection	VII.G-25	3.3.1-19	A
162	Valve Body	Pressure boundary	Gray Cast Iron	Soil (External)	Loss of material	Selective Leaching Inspection	VII.G-15	3.3.1-85	A

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	Component Type	Intended Function(s)	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801, Volume 2 Item	Table 1 Item	Notes
163	Valve Body	Pressure boundary	Steel	Air-indoor uncontrolled (Internal)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	C 0301
164	Valve Body	Pressure boundary	Steel	Raw water (Internal)	Cracking	TLAA	N/A	N/A	H 0339
165	Valve Body	Pressure boundary	Steel	Raw water (Internal)	Loss of material	Fire Water	VII.G-24	3.3.1-68	A
166	Valve Body	Pressure boundary	Steel	Air with borated water leakage (External)	Loss of material	Boric Acid Corrosion	VII.I-10	3.3.1-89	A
167	Valve Body	Pressure boundary	Steel	Air-indoor uncontrolled (External)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A
168	Valve Body	Structural integrity	Copper Alloy	Air-indoor uncontrolled (Internal)	None	None	VIII.I-2	3.4.1-41	A 0301
169	Valve Body	Structural integrity	Copper Alloy	Raw water (Internal)	Loss of material	Fire Water	VII.G-12	3.3.1-70	A
170	Valve Body	Structural integrity	Copper Alloy	Air-indoor uncontrolled (External)	None	None	VIII.I-2	3.4.1-41	A
171	Valve Body	Structural integrity	Gray Cast Iron	Air-indoor uncontrolled (Internal)	Loss of material	External Surfaces Monitoring	VII.I-8	3.3.1-58	A 0301

Table 3.3.2-14 Aging Management Review Results – Fire Protection System									
Row No.	***Component Type***	***Intended Function(s)***	***Material***	***Environment***	***Aging Effect Requiring Management***	***Aging Management Program***	***NUREG-1801, Volume 2 Item***	***Table 1 Item***	***Notes***
172	*Valve Body*	*Structural integrity*	*Gray Cast Iron*	*Raw water (Internal)*	*Loss of material*	*Fire Water*	*VII.G-24*	*3.3.1-68*	*A*
173	*Valve Body*	*Structural integrity*	*Gray Cast Iron*	*Raw water (Internal)*	*Loss of material*	*Selective Leaching Inspection*	*VII.G-14*	*3.3.1-85*	*A*
174	*Valve Body*	*Structural integrity*	*Gray Cast Iron*	*Air-indoor uncontrolled (External)*	*Loss of material*	*External Surfaces Monitoring*	*VII.I-8*	*3.3.1-58*	*A*

Affected LRA Section	**LRA Page No.**	**Affected Paragraph and Sentence**
Plant Specific Notes	**Page 3.3-549**	**Plans Specific Note 0321**

In response to RAI B.2.22-6, Plant Specific Note 0321 is revised as follows:

Plant-Specific Notes:	
0321	*The Selective Leaching Inspection will detect and characterize loss of material due to selective leaching at the air-water interface on the diesel fire ~~protection~~ pump.*

Affected LRA Section	**LRA Page No.**	**Affected Paragraph and Sentence**
Table 3.5.2-12	**Page 3.5-114**	**Rows 20 and 21**

In response to RAI 3.5.2.3.12-4, rows 20 and 21 of LRA Table 35.2-12, "Aging Management Review Results – Yard Structures" are revised as follows:

Table 3.5.2-12 Aging Management Review Results – Yard Structures

Row No.	***Component Type***	***Intended Function(s)***	***Material***	***Environment***	***Aging Effect Requiring Management***	***Aging Management Program***	***NUREG-1801, Volume 2 Item***	***Table 1 Item***	***Notes***
20	Wave Protection Dike Corrugated Pipe Casings	*EN, ~~SNS~~, SSR, SRE*	Galvinized Steel	Structural backfill	Loss of material	Structures Monitoring	N/A	N/A	H 0532
21	~~*Wave Protection Dike Piles*~~ *Not used.*	~~*SNS*~~	~~*Carbon Steel*~~	~~*Soil)*~~	~~*Loss of material*~~	~~*Structures Monitoring*~~	~~*N/A*~~	~~*N/A*~~	~~*H 0532*~~

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
Plant Specific Notes	**Page 3.5-170**	**Plans Specific Note 0532**

In response to RAI 3.5.2.3.12-4, Plant Specific Note 0532 is revised as follows:

Plant-Specific Notes:	
0532	*The Wave Protection Dike corrugated pipe casings ~~and Wave Protection Dike piles~~ buried in the wave protection dikes can be exposed to groundwater since some of the corrugated pipe casings are located below site groundwater elevation. Since these buried steel components can be in direct contact with groundwater, a raw water environment is conservatively used for aging evaluation.*

Affected LRA Section	**LRA Page No.**	**Affected Paragraph and Sentence**
Table A-1	**Page A-63**	**Commitment No. 13**

Based on the response to Supplemental Question – Makeup Pump Casing Inspections, license renewal future Commitment 13 in LRA Table A-1, "Davis-Besse License Renewal Commitments," is revised as follows:

Table A-1

Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
13	Implement the One-Time Inspection as described in LRA Section B.2.30. Enhance the One-Time Inspection to: • *Include enhanced visual (VT-1 or equivalent) and/or volumetric (RT or UT) ~~visual~~ inspections to detect and characterize cracking due to cyclic loading of the stainless steel makeup pump casings (DB-P37-1 and 2) of the Makeup and Purification System.* The one-time inspections will provide verification of the absence of cracking due to cyclic loading.	Prior to April 22, 2017	LRA FENOC Letter L-11-166 *and* *L-11-237*	A.1.30 B.2.30 Response to NRC RAI 3.3.2.2.4.3-1 from NRC Letter dated May 2, 2011 *and* *Supplemental Question – Makeup Pump Casing Inspections*

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
Table A-1	**Page A-65**	**Commitment No. 20, sixth and seventh bullets**

Based on the responses to RAI B.2.39-11 and RAI 3.5.2.3.12-4, the sixth and seventh bulleted items in license renewal future Commitment 20 in LRA Table A-1, "Davis-Besse License Renewal Commitments," are revised as follows:

Table A-1

Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
20	• *Obtain and evaluate for degradation a concrete core bore from two representative inaccessible concrete components of an in-scope structure subjected to aggressive groundwater prior to entering the period of extended operation.* Based on the results of the initial core bore sample, evaluate the need for collection and evaluation of representative concrete core bore samples at additional locations that may be identified during the period of extended operation as having aggressive groundwater infiltration. Select additional core bore sample locations based on the duration of observed aggressive groundwater infiltration. *Perform an inspection for loss of material for carbon steel structural components subject to aggressive groundwater. Require the use of the FENOC Corrective Action Program for identified concrete or ~~rebar~~ steel degradation.* • *Specify that, upon notification that a below-grade structural wall or other in-scope concrete or metal structural*	Prior to April 22, 2017	LRA ~~*and*~~ FENOC Letter L-11-153 *and L-11-237*	A.1.39 B.2.39 Responses to NRC RAIs B.2.39-3, B.2.39-4, B.2.39-5, B.2.39-6 and B.2.39-7 from NRC Letter dated April 5, 2011 *and B.2.39-11 and 3.5.2.3.12-4*

Table A-1

Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
	component will become accessible through excavation, a follow-up action is initiated to the responsible engineer to inspect the exposed surfaces for age-related degradation. Such inspections will include concrete examination using acceptance criteria from NUREG-1801 XI.S6 Program element 6. Degradation found that exceeds the acceptance criteria will be trended and processed through the FENOC Corrective Action Program.			*from NRC Letter dated July 21, 2011*

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
Table A-1	**Page A-69**	**Commitment No. 39**

Based on the response to RAI B.2.22-6, license renewal future Commitment 39 in LRA Table A-1, "Davis-Besse License Renewal Commitments," is revised as follows:

Table A-1

Davis-Besse License Renewal Commitments

Item Number	Commitment	Implementation Schedule	Source	Related LRA Section No./ Comments
39	Address the potential for borated water degradation of the steel containment vessel through the following actions: • *Access the inside surface of the embedded steel containment. A core bore will be completed by the end of 2014 (Phase 1). If necessary, a second core bore will be completed by the end of 2020 (Phase 2).* If there is evidence of the presence of borated water in contact with the steel containment vessel, conduct non-destructive testing (NDT) to determine what effect, if any, the borated water has had on the steel containment vessel. Based on the results of NDT, perform a study to determine the effect through the period of extended operation of any identified loss of thickness in the steel containment due to exposure to borated water.	~~Prior to April 22, 2017~~ *Phase 1 prior to December 31, 2014* *and* *Phase 2 prior to December 31, 2020*	FENOC Letter L-11-153 *and* *FENOC Letter L-11-237*	Response to NRC RAI B.2.22-2 from NRC Letter dated April 5, 2011, *and* *RAI B.22-6 from NRC Letter dated July 27, 2011*

Affected LRA Section	**LRA Page No.**	**Affected Paragraph and Sentence**
B.2.30	**Page B-121**	**"Scope" subsection of the "Enhancements" section, last paragraph**

Based on the response to Supplemental Question – Makeup Pump Casing Inspections, the last paragraph of the "Scope" subsection of the "Enhancements" section of Section B.2.30 is revised as follows:

The One-Time Inspection will also include enhanced visual (VT-1 or equivalent) and/or volumetric (RT or UT) ~~visual and volumetric~~ inspections to detect and characterize cracking due to cyclic loading of the stainless steel makeup pump casings (DB-P37-1 and 2) of the Makeup and Purification System. The one-time inspections will provide verification of the absence of cracking due to cyclic loading.

Affected LRA Section	**LRA Page No.**	**Affected Paragraph and Sentence**
B.2.30	**Page B-123**	**Aging Management Program Element: "Detection of Aging Effects" – new third (last) paragraph (Table)**

The NRC initiated a telephone conference call with FENOC on August 22, 2011, to discuss the FENOC Supplemental Response – Methods for One-Time Inspections, submitted in FENOC letter L-11-238 dated August 17, 2011. NRC stated that there were two inconsistencies in the response provided. The FENOC response provided in letter L-11-238 dated August 17, 2011, is replaced in its entirety. LRA Section B.2.30, "One-Time Inspection," Aging Management Program Element "Detection of Aging Effects," is revised to include a new third (last) paragraph that consists of a table identifying the types of inspections that are planned to be performed, as follows:

B.2.30 ONE-TIME INSPECTION

Aging Management Program Elements

- Detection of Aging Effects

Parameters Monitored or Inspected And Aging Effect for Specific Component			
Aging Effect	***Aging Mechanism***	***Parameter Monitored***	***Inspection Method*** [(1)]
Loss of Material	*Crevice Corrosion*	*Surface Condition, Wall Thickness*	*Visual (VT-1 or equivalent) and/or Volumetric (RT or UT)*
Loss of Material	*Galvanic Corrosion*	*Surface Condition, Wall Thickness*	*Visual (VT-3 or equivalent) and/or Volumetric (RT or UT)*
Loss of Material	*General Corrosion*	*Surface Condition, Wall Thickness*	*Visual (VT-3 or equivalent) and/or Volumetric (RT or UT)*
Loss of Material	*MIC*	*Surface Condition, Wall Thickness*	*Visual (VT-3 or equivalent) and/or Volumetric (RT or UT)*
Loss of Material	*Pitting Corrosion*	*Surface Condition, Wall Thickness*	*Visual (VT-1 or equivalent) and/or Volumetric (RT or UT)*
Loss of Material	*Erosion*	*Surface Condition, Wall Thickness*	*Visual (VT-3 or equivalent) and/or Volumetric (RT or UT)*
Reduction of Heat Transfer	*Fouling*	*Tube Fouling*	*Visual (VT-3 or equivalent) or Enhanced VT-1 for CASS*
Cracking	*SCC or Cyclic Loading*	*Surface Condition, Cracks*	*Enhanced Visual (EVT-1 or equivalent) or Surface Examination (magnetic particle, liquid penetrant, or Volumetric (RT or UT)*

(1) Examinations of code components will follow procedures consistent with the requirements of the ASME Code and 10 CFR 50 Appendix B. Non-code examinations will be performed in accordance with site procedures.

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
B.2.39	**Page B-155**	**Parameters Monitored or Inspected subsection of the Enhancements section**

In response to RAI 3.5.2.3.12-4, the Parameters Monitored or Inspected subsection of the Enhancements section of Section B.2.39, "Structures Monitoring Program" is revised as follows:

- **Parameters Monitored or Inspected**

  Davis-Besse's area groundwater is aggressive and operating experience has shown that structural elements have experienced degradation. Although there is no evidence that the aggressive groundwater has contributed to structural degradation, a special provision in the program will be implemented to monitor below-grade inaccessible concrete components before and during the period of extended operation. FENOC will perform a below-grade examination of concrete below elevation 570 feet (groundwater elevation) of an in-scope structure prior to the period of extended operation. That inspection will include concrete examination using acceptance criteria from NUREG-1801 XI.S6 Program element 6. The below-grade examination of concrete below elevation 570 feet may be conducted during maintenance activities. *FENOC will perform an inspection for loss of material for carbon steel structural components subject to aggressive groundwater.* Degradation found that exceeds the acceptance criteria will be trended and processed through the Corrective Action Program.

  The program procedure will be enhanced by specifying that, upon notification that a below-grade structural wall or other in-scope concrete or metal structural component will become accessible through excavation, a follow-up action is initiated to the responsible engineer to inspect the exposed surfaces for age-related degradation. Such inspections will include concrete examination using acceptance criteria from NUREG-1801 XI.S6 Program element 6. Degradation found that exceeds the acceptance criteria will be trended and processed through the Corrective Action Program.