UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

October 7, 2011

Mr. Barry Allen
Site Vice President
FirstEnergy Nuclear Operating Company
Davis-Besse Nuclear Power Station
5501 North State Route 2, Mail Stop A-DB-3080
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION NRC LICENSE RENEWAL AGING MANAGEMENT FOLLOW-UP INSPECTION REPORT 05000346/2011012

Dear Mr. Allen:

On August 26, 2011, the U. S. Nuclear Regulatory Commission (NRC) completed a License Renewal follow-up inspection at your Davis-Besse Nuclear Power Station. The enclosed report documents the inspection results, which were discussed on August 26, 2011, with Mr. K. Byrd and other members of your staff in an exit meeting.

The purpose of this follow-up inspection was to re-examine some of the aging management programs (AMPs) and activities that support the application for renewed license for Davis-Besse. Since the submittal of your application, the NRC issued Revision 2 of NUREG-1801, "Generic Aging Lessons Learned (GALL) Report." The Office of Nuclear Reactor Regulation (NRR) addressed the differences between Revision 1, the revision used in your application, and Revision 2 through the use of Requests for Additional Information (RAIs). Although the inspectors were able to assess many programs during the previous inspection completed on May 13, 2011, (Inspection Report No. 05000346/2011010), we anticipated substantial changes in your application for several programs as a result of the RAIs. This inspection addressed development and implementation of those substantially changed aging management programs since the submittal of your original application to support a period of extended operation. As part of the inspection, the NRC examined procedures and representative records, interviewed personnel, and visually examined accessible portions of various systems, structures or components, to observe any effects of equipment aging.

The inspection concluded that the aging management license renewal activities were generally conducted as described in the license renewal application, as supplemented through your responses to requests for additional information from the NRC. The inspection also concluded that documentation supporting the application is generally in an auditable and retrievable form. Existing aging management programs were determined to be functioning adequately and, when all the programs are implemented as described in your license renewal application, there is reasonable assurance that the intended functions of vital plant systems, structures, and components will be maintained through the period of extended operation.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Ann Marie Stone, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-346; 72-014
License No. NPF-3

Enclosure: Inspection Report 05000346/2011012
w/Attachments: Supplemental Information

cc w/encl: Distribution via ListServ

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-346
License Nos:	NPF-3
Report No:	05000346/2011012
Licensee:	FirstEnergy Nuclear Operating Company
Facility:	Davis-Besse Nuclear Power Station
Location:	Oak Harbor, OH
Dates:	August 22 through August 26, 2011
Inspectors:	B. Jose, Senior Engineering Inspector (Lead) S. Sheldon, Senior Engineering Inspector V. Meghani, Engineering Inspector J. Susco, Technical Assistant, NRC HQ, DLR
Approved by:	Ann Marie Stone, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000346/2011012; 08/22/2011 – 08/26/2011; Davis-Besse Nuclear Power Station; License Renewal Inspection.

This follow-up inspection of the applicant's license renewal aging management processes was performed by three regional office inspectors and one inspector from NRC Head Quarters, Division of License Renewal. The inspectors used NRC Manual Chapter 2516 and NRC Inspection Procedure 71002 as guidance for performing this inspection. No “findings” as defined in NRC Manual Chapter 0612 were identified.

The team concluded, in general, the applicant performed their license renewal aging management review in accordance with the Davis-Besse license renewal application. No impediments to the applicant receiving an extended operating license were identified.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

No findings of significance were identified.

B. Licensee-Identified Violations

No violations of significance were identified.

REPORT DETAILS

1. INSPECTION SCOPE

This inspection was conducted by NRC Region III and Headquarters inspectors. The inspection was performed in accordance with NRC Manual Chapter 2516 and NRC Inspection Procedure 71002, "License Renewal Inspection," dated February 18, 2005.

This inspection looked at several RAI responses and several open item numbers (OINs), and some of the aging management programs as described in the license renewal application (LRA), and supplemental correspondences in their entirety.

The attachments to this report list the applicant personnel contacted, the documents reviewed, and the acronyms used.

2. VISUAL OBSERVATION OF PLANT EQUIPMENT

During this inspection, the inspectors performed walkdown inspections of portions of many of the plant structures. The walkdowns were intended to observe the current condition of the structures, and to assess the likelihood that a proposed aging management program would successfully manage any aging effects. Specific comments on the walkdown results are presented in the sections below.

The following structures were walked down:

- Spent fuel pool (including the Spent Fuel Pool, Fuel Transfer Pit, and Cask Pit Leak Detection System);
- Auxiliary building (portions at elevation 623' and elevation 603');
- Intake Structure (portions); and
- Water Treatment Building (portions).

3. REVIEW OF AGING MANAGEMENT PROGRAMS

The inspection assessed the adequacy of current implementation of existing aging management programs (AMPs) credited in the applicant's LRA. This included verification that current AMPs would ensure aging effects would be managed so there was reasonable assurance that an SSC's intended function would be maintained throughout the period of extended operation. For those programs indicated by the applicant as being consistent with NUREG 1801, "Generic Aging Lessons Learned (GALL) Report," the inspectors confirmed the applicant's program included the GALL attributes. For those programs, which the applicant indicated as new or being enhanced, the inspectors confirmed commitments existed and were sufficient to support future implementation. For those programs, where the applicant indicated they intended to take exception to the GALL, the inspectors reviewed the exceptions against the GALL recommendations and evaluated the acceptability of the applicant's proposal.

Since the submittal of the application, the NRC issued Revision 2 of the NUREG-1801, Generic Aging Lessons Learned (GALL) Report." The Office of Nuclear Reactor Regulation (NRR) addressed the differences between Revision 1, the revision used in the application, and Revision 2 through the use of Requests for Additional Information (RAI). As a result, the inspectors anticipated substantial changes to the application for several programs. Listed below are details of aging management programs (AMPs) reviewed in their entirety and programs that were reviewed partially for RAIs and OINs.

.1 Aboveground Steel Tanks Inspection Program (B.2.2)

The Aboveground Steel Tanks Inspection Program is an existing program, which with enhancements, will be consistent with NUREG-1801, Section XI.M29, "Aboveground Steel Tanks." Revision 2 of NUREG-1801 changed Section XI.M29 to "Aboveground Metallic Tanks." The Aboveground Steel Tanks Inspection Program manages the effects of corrosion on the external surfaces and inaccessible locations of the steel fire water storage tank, diesel oil storage tank, and Borated Water Storage Tank (BWST).

During the application review, the NRR staff raised concerns related to the frequency of tank bottom inspections, scoping of the BWST, inspections of sealant or caulking, and management of identified corrosion. The concerns were documented in RAIs B.2.2-1, 2, 3, and 4.

In letter L-11-153, which responded to RAI B.2.2-1, 2, 3, and 4, the applicant explained their management of identified corrosion and committed to enhance the Aboveground Steel Tanks Inspection Program to:

- Include in-scope tank bottom thickness measurements whenever the tanks are drained and at least once within five years after entering the period of extended operation;

- Manage the effects of cracking due to stress corrosion cracking of the stainless steel BWST; and

- Periodically inspect the sealant on the diesel fuel oil storage tank and BWST.

The inspectors reviewed revised program documentation and verified these enhancements were included. The inspectors concluded that implementation of the enhanced Aboveground Steel Tanks Inspection Program will provide reasonable assurance that the aging effects will be managed so the aboveground steel tanks will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.2 Air Quality Monitoring Program (B.2.3)

The Air Quality Monitoring Program is an existing plant specific program that was evaluated against the 10 elements described in Appendix A.1, Section A.1.2.3 of NUREG-1800, "The Standard Review Plan for License Renewal" (SRP-LR). The Air Quality Monitoring program ensures the Instrument Air System remains dry and free of contaminants and there are no aging effects requiring management. The program periodically samples the compressed air within components of the Instrument Air System for hydrocarbons, dew point, and particulates to verify proper air quality and to ensure the intended function of the system is maintained.

The inspectors reviewed the applicant's responses to the RAIs described below:

RAI B.2.3-1 requested to justify why the LRA does not identify an aging effect as applicable for license renewal and credit the Air Quality Monitoring Program as a preventive program that manages this aging effect. In letter L-11-166, which responded to this RAI, the applicant concluded there were no aging effects/mechanisms requiring management and no aging management program was required in a dried air environment. The purpose of the Air Quality Monitoring Program was to ensure that the Instrument Air (IA) System remains dry and free of contaminants so that the components served by the IA system remain operable. Dry air treated to reduce its dew point well below the system operating temperature will not create an aging mechanism. The purpose of the program is not to prevent or mitigate aging degradation of IA components themselves. The preventive actions of the program such as, periodic sampling are designed to prevent the adverse effects of contaminants on downstream components such as safety-related air-operated valve actuators.

RAI B.2.3-2 requested the applicant to provide the frequency of periodic testing of contaminants and any industry standards used to determine the frequency. The applicant responded to this RAI in letter L-11-166 and stated that the test frequency is once per year and it is based on the recommendations of Institute of Nuclear Power Operations (INPO) Supplemental Operating Experience Report (SOER) 88-1, "Instrument Air System Failures."

RAI B.2.3-3 requested the basis for the acceptance criteria to ensure that the instrument air system remains dry and free of contaminants. In letter L-11-166, which responded to this RAI, the applicant stated the acceptance criteria are based on standard industry practices as recommended by ANSI/ISA-S7.3-1975.

RAI B.2.3-4 requested the applicant to specify any program enhancements resulting from corrective actions related to a particular operating experience described in the LRA. If so, provide additional details on the cause of the variance and associated corrective actions. The RAI further requested the applicant to confirm if any additional air samples exceeded the preventive maintenance limit since 2007. The applicant responded to this RAI in letter L-11-166, for the 2007 air sample that exceeded the preventive maintenance limit, there were no corrective actions taken resulting in program enhancements. The preventive maintenance limit was established as a threshold for further investigation. The single out-of-specification reading from 2007 was considered to be a long-term reliability issue because critical and non-critical air-operated valves are provided with "point of use" air filter-regulators. The applicant further stated, since 2007, air samples have not exceeded the preventive maintenance limit.

RAI B.2.3-5 requested to justify how periodic testing once a year ensures that the dew point is maintained well below the system operating temperature during normal operation, as well as during outages and maintenance, such that environment remains "dry-air." In response to this RAI the applicant responded, instrument air is designed to have a dew point of 18º F below the minimum local ambient temperature at 100 psig. In response to Generic Letter 88-014, the applicant committed to maintaining the instrument air system with a dew point of at least 35ºF below zero. A control room annunciator exists for instrument air dryer trouble, with one of the actuating devices being high moisture content in the desiccant. In addition to the periodic testing of contaminants performed each year, monthly dew point readings are taken downstream of each of the air dryers.

The inspectors noted no additional changes were needed for the program based on the above RAIs. The inspectors concluded the Air Quality Monitoring program will provide reasonable assurance that the Instrument Air system components will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.3 Boral Monitoring Program (B.2.5)

The Boral® Monitoring (BM) Program is a new program, credited for detecting aging effects of the Boral® neutron absorbers in the spent fuel racks.

The inspectors reviewed the applicant's BM Program to assess conformance with the AMP XI.M40 "Monitoring of Neutron-Absorbing Materials Other Than Boraflex" as described in Revision 2 of NUREG-1801. Specifically, this monitoring program is implemented to assure, degradation of the neutron-absorbing material used in spent fuel pools that could compromise the criticality analysis, will be detected. The X1.M40 AMP relies on periodic inspection, testing, monitoring, and analysis of the criticality design to assure the required 5 percent sub-criticality margin is maintained during the period of license renewal.

In the previous NRC inspection report (IR) 05000346/2011010, the inspectors concluded the BM Program as described by the applicant was not adequate to manage aging effects of the Boral® neutron absorbers in the spent fuel racks during the period of extended operation. Specifically, the BM Program did not: limit the maximum length of time for in-situ testing for Boral to 10 years; commit to specific physical Boral® tests (areal density, measurement of geometric changes in the material); and relate visual examination results to the acceptance criteria (e.g., 5 percent sub-criticality margin). Additionally, the Boral® material in the Davis-Besse fuel racks was enclosed in stainless steel sheathing, such that the applicant's proposed visual examination for detection of Boral® material degradation was not viable.

In letter L-11-134, the applicant responded to NRC RAI B.2.5-1 and committed to a revised Boral Monitoring program which does not have the limitations identified above. The inspectors reviewed the applicant's BM Program documentation, aging management review documents, applicable drawings and interviewed personnel responsible for the program to evaluate consistency with the AMP XI.M40. The revised program specifies in-situ testing at least once every 10 years, commits to employ in-situ neutron attenuation testing, and establishes the minimum acceptance criteria as the minimum B-10 areal density necessary to meet the assumptions in the spent fuel pool criticality analysis.

The inspectors concluded that implementation of the revised Boral® Monitoring Program will provide reasonable assurance that the aging effects will be managed so the spent fuel racks will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.4 Buried Piping and Tanks Inspection Program (B.2.7)

The Buried Piping and Tanks Inspection Program is an existing program that manages the aging effects on the external surfaces of piping, tanks and associated bolting exposed to a buried (soil) environment.

Although originally, the applicant described conformance with Revision 1 of NUREG 1801, the NRC staff had reviewed the applicant's program to assess differences in program requirements with operating experience that was incorporated into Revision 2 of NUREG-1801 AMP XI. M41, "Buried and Underground Piping and Tank Inspections." A number of differences had been the subject of NRC RAI B.2.7-1. In letters L-11-153 and L-11-203 which responded to RAI B.2.7-1, the applicant substantially revised the program to more closely align with Revision 2 of the NUREG-1801.

The inspectors reviewed program documentation, station procedures, aging management review documents, and interviewed personnel responsible for the program to assess consistency with Revision 2 of NUREG-1801 AMP XI. M41, "Buried and Underground Piping and Tank Inspections." The inspectors also observed sections of fire protection system piping that had been removed during modifications.

The inspectors concluded that implementation of the enhanced Buried Piping and Tanks Inspection Program will provide reasonable assurance that the aging effects will be managed so that buried piping and tanks will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.5 Closed Cooling Water Chemistry Program (B.2.8)

The Closed-Cycle Cooling Water (CCCW) Chemistry Program is an existing program, which is generally comparable to NUREG-1801, Section XI.M21, "Closed-Cycle Cooling Water System."

One question remained from IR 05000346/2011010 concerning how the applicant will inspect the internal condition of closed cooling water systems. This was the subject of RAI B.2.8-1. In letter L-11-153, which responded to RAI B.2.8-1, the applicant committed to enhance the Closed Cooling Water Chemistry program to document the results of periodic inspections of opportunity performed when components are opened for maintenance, repair or surveillance, and ensure that a representative sample of piping and components will be inspected on a 10-year interval with the first inspection taking place prior to entering the period of extended operation.

The inspectors reviewed revised program documentation and verified these enhancements were included. The inspectors concluded implementation of the enhanced Closed Cooling Water Chemistry program will provide reasonable assurance that the aging effects will be managed so the Closed Cooling Water system components will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.6 Collection, Drainage, and Treatment Components Inspection Program (B.2.9)

The Inspection of Collection Drainage and Treatment Inspection Program is a new program, and no corresponding Aging Management Program (AMP) exists in Revision 2 of NUREG 1801. The program will perform visual inspections of the surfaces of the in-scope steel or other metal components exposed to raw (untreated) water, that are not covered by other aging management programs, for evidence of loss of material, as well as cracking or reduction in heat transfer capability. Opportunistic inspections, when surfaces are accessible during maintenance, repair, or surveillance, will be performed to ensure the existing environmental conditions in collection, drainage, and treatment service are not causing material degradation that could result in a loss of the component's intended function during the period of extended operation.

The inspectors reviewed the applicant's responses to the RAIs described below:

RAI B.2.9-1 noted that a VT-3 or equivalent method may be satisfactory to detect general corrosion, but is not necessarily an acceptable method to detect crevice or pitting corrosion and that other comparable program in the Generic Aging Lessons Learned (GALL) report, XI.M32, "One Time Inspection," recommends VT-1 or equivalent for such conditions. In letter L-11-166, which responded to RAI B.2.9-1, the applicant revised the Section B.2.9, subsection "Detection of Aging Effects" to identify VT-1 instead of VT-3.

RAI B.2.9-2 requested the basis for the acceptance criteria associated with this program. In letter L-11-166, which responded to RAI B.2.9-2, the applicant provided a description containing the basis for the acceptance criteria which was reviewed and accepted by the NRC staff.

RAI 3.3.1.68-1 was written for the fire protection and requested technical justification for using the Collection, Drainage, and Treatment Components Inspection Program instead of the Fire Water System Program to manage loss of material for steel and gray cast iron components exposed to raw water. In letter L-11-166, which responded to RAI 3.3.1.68-1, the applicant explained that the subject components were not within the scope of the Fire Water System Program and provided justification for including them in the Collection, Drainage, and Treatment Components Inspection Program. The response was reviewed and accepted by the NRC staff.

RAI B.2.9-3 requested the basis for why a one-time inspection would be sufficient for managing the effects of aging or a revision of the program to ensure periodic inspections. In letter L-11-218, which responded to RAI B.2.9-3, the applicant indicated that the program was revised to perform periodic inspections and also provided criteria for sample size, selection, frequency etc. The response was reviewed and accepted by the NRC staff.

RAI B.2.9-5 requested information on the parameters linked to detecting the loss of material, cracking, and reduction in heat transfer and also on the basis for detecting loss of material on inaccessible surfaces. In letter L-11-218, which responded to RAI B.2.9-5, the applicant provided information on the inspection parameters for the metallic components, and also revised the LRA to require use of volumetric inspections to detect loss of material on inaccessible surfaces. The response was reviewed and accepted by the NRC staff.

The inspectors reviewed revisions in response to the RAIs noted above. The inspectors concluded that implementation of the Collection, Drainage, and Treatment Components Inspection Program will provide reasonable assurance that the aging effects will be managed so that the components within the scope of the program will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.7 Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program (B.2.10)

The Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program is an existing program which manages aging effects of general corrosion on rails and other structural components of heavy load handling, components within the scope of NUREG-0612, and the light load handling components related to refueling activities. The program provides for periodic visual inspection of the components. The program is primarily concerned with structural components that make up the bridge and trolley.

The inspectors reviewed the applicant's responses to the RAIs described below:

RAI B.2.10-2 questioned whether the program is intended to be used to manage loss of preload for bolted connections of cranes and hoists and if so, requested the applicant to revise the LRA to clarify why there were no AMR line items for loss of preload for bolted connections. In letter L-11-153, which responded to RAI B.2.10-2, the applicant added new commitments for managing the loss of preload for bolted connections and revised the applicable sections of the LRA.

RAI 3.3.1.74-1 requested clarification whether the steel crane rails were being managed for loss of material due to wear and if so, additional information be provided on how it would be done. In letter L-11-166, which responded to RAI 3.3.1.74-1, the applicant confirmed that the program would manage the components for loss of material due to wear and revised applicable LRA Tables to address the concern.

The inspectors also reviewed condition report CR-G201-2011-94003 documenting discrepancies on the spent fuel pool cask crane end stop and rail bolts and determined that the applicant had performed an evaluation determining acceptability of the as-found condition and had initiated actions for the necessary document revisions.

The inspectors reviewed revisions in response to the RAIs noted above. The inspectors concluded implementation of the Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program will provide reasonable assurance that the aging effects will be managed so the in scope components will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.8 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B.2.11)

The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program that the applicant will implement prior to the period of extended operation. It is a one-time inspection program that tests a sample size of 20 percent or maximum of 25 cable connections based upon factors such as connection type, circuit application (medium, or low voltage), circuit loading (high load), and physical location (e.g., vibration, high temperature/humidity). Cable connections terminating within an active or passive device/enclosure from external sources are in scope of this program. Cable/wiring connections terminating within an active or passive device/enclosure from internal sources are not in scope of this program.

The inspectors reviewed the applicant's responses to the following RAIs:

RAI 3.6-3 requested justification for not including increased resistance of connections (galvanized and aluminum bolted connections) as an aging effect requiring management. In letter L-11-134, which responded to this RAI, the applicant confirmed that LRA section B.2.11 was revised to enhance the program to include high-voltage connections to confirm the absence of aging effects for the metallic electrical connections. Also, the applicant revised LRA Appendix A, Table A-1, commitment No. 5 to reflect this enhancement.

RAI B.2.11-1 requested a technical basis for the sample selection of cable connections for one-time inspection. In Letter L-11-134, which responded to this RAI, the applicant revised the "parameters monitored or inspected" and "detection of aging effects" program elements of LRA section B.2.11 to state that 20 percent of the electrical cable connection population with a maximum of 25 connections constituted a representative sample size and it is in alignment with NUREG 1801, Section XI.E6, Revision 2.

RAI B.2.11-2 requested an adequate program description consistent with the description provided in SRP-LR Revision 2, Table 3.0-1. In response to this RAI, the applicant stated in letter L-11-134, LRA Section A.1.11 was revised to provide an adequate program description in accordance with the guidelines in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," Revision 2, Table 3.0-1.

RAI B.2.11-3 requested a technical justification as to why only bolted connections were considered in the inspection sample criteria. In response to this RAI, the applicant stated in letter L-11-134, LRA Sections A.1.11 and B.2.11 were revised to include various connection types.

RAI B.2.11-4 requested the applicant to explain how aging of cable bus connections will be managed during the period of extended operation. The applicant responded to this RAI in letter L-11-134, LRA Sections A.1.11 and B.2.11 were revised to include various connection types and the metallic material of cable bus connections will be managed by the applicant's B.2.11 aging management program.

The inspectors reviewed revisions in response to the RAIs noted above. The inspectors concluded that implementation of the Electrical Cable Connections Program with the proposed enhancements will provide reasonable assurance that the aging effects will be managed so the in scope components will perform their intended function during the period of extended operation.

.9 <u>Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B.2.12)</u>

The Non-Environmentally Qualified (Non-EQ) Insulated Cables and Connections Program is a new program that the applicant will implement prior to the period of extended operation. This program will be consistent with the program described in NUREG-1801, Section XI.E1, "Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements." The Non-EQ insulated cables and connections program will apply to accessible insulated cables and connections installed in structures within the scope of license renewal and prone to adverse localized environments.

One question remained from IR 05000346/2011010 concerning the applicant's commitment to inspect all cable connections rather than a representative sample as reported in NRR audit report dated June 1, 2011. Neither the inspectors nor the applicant could find a documented commitment to this effect. Subsequently, the applicant issued OIN 377 to revise LRPD-05, Attachment 4.1, and LRA Section B.2.12 to remove reference to inspection of a "representative sample" of cables and connections in adverse localized environments (ALE) and specify that all accessible cables and connections in those ALEs will be inspected.

The inspectors reviewed revised program documentation and verified these enhancements were included. The inspectors concluded that implementation of the enhanced Electrical Cables and Connections program will provide reasonable assurance that the aging effects will be managed so the components in scope will perform their intended function during the period of extended operation.

.10 External Surfaces Monitoring Program (B.2.15)

The External Surfaces Monitoring Program is an existing program which, with enhancements, will be comparable to NUREG-1801, Section XI.M36, "External Surfaces Monitoring." The program manages aging effects by performing visual inspections of external surfaces for evidence of degradation such as corrosion, cracking or leakage. This program is implemented largely through system engineer walkdown checklists.

In IR 05000346/2011010, the inspectors identified several concerns with the program. In response, the applicant agreed to enhance the program to: (1) inspect accessible components at least once per fuel cycle; (2) include specific acceptance criteria in the checklist; (3) revise the procedures to include other applicable aging effects; and (4) strengthen the retention requirements to allow for subsequent retrieval and audit of the checklists. These actions were tracked by the applicant in OIN- 352. An additional question concerning how the applicant will inspect elastomeric components is the subject of RAI 3.3.2.2.5-1.

In letter L-11-238, the applicant committed to enhance the program to address the inspectors' and reviewers' concerns. The inspectors reviewed the revised program documentation and verified the following enhancements had been incorporated:

1. Accessible components that credit the ESM Program for aging management shall be inspected at least once per fuel cycle.

2. Add acceptance criteria to the System Walkdown Check List.

3. Add inspection parameters to the System Walkdown Check List, as follows:

   Metallic Components

   - corrosion and material wastage (loss of material);
   - leakage from or onto external surfaces (loss of material) ;
   - worn, flaking, or oxide-coated surfaces (loss of material);
   - corrosion stains on thermal insulation (loss of material);
   - protective coating degradation (cracking, flaking, and blistering);
   - leakage for detection of cracks on the external surfaces of stainless steel; components exposed to an air environment containing halides; and

- fouling (build up of dirt or other foreign material) for cooling coil/radiator tubes and fins.

Polymers and Elastomers

- surface cracking, crazing, scuffing, and dimensional change (e.g., “ballooning” and “necking”);
- discoloration;
- exposure of internal reinforcement for reinforced elastomers; and
- hardening as evidenced by a loss of suppleness during manipulation where the component and material are appropriate to manipulation.

4. Add a record retention requirement to retain the System Walkdown Check List to document the results of the inspection.

The program basis document lists the following specific acceptance criteria:

- The acceptance criteria for the metallic components in the scope of the External Surfaces Monitoring Program are: No unacceptable visual indications of cracking and loss of material that would lead to loss of function prior to the next scheduled inspection.

- The acceptance criteria for the non-metallic components in the scope of the External Surfaces Monitoring Program will be: No unacceptable visual indications of loss of material, cracks, or discoloration that would lead to loss of function prior to the next scheduled inspection and of no hardening as evidenced by a loss of suppleness during manipulation.

- The acceptance criteria for the cooling coil and radiator components in the scope of the External Surfaces Monitoring Program and exposed to an air-outdoor environment will be: No unacceptable visual indications of fouling (buildup of dirt or other foreign material) for cooling coil/radiator tubes and fins that would lead to loss of function prior to the next scheduled inspection.

The inspectors concluded implementation of the enhanced External Surfaces Monitoring Program will provide reasonable assurance that the aging effects will be managed so the in-scope systems will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.11 Fatigue Monitoring Program (B.2.16)

The fatigue monitoring program is an existing program which, when enhanced, will be comparable to Section X.M1, “Fatigue Monitoring,” of the GALL Report. The fatigue monitoring program manages fatigue of select primary and secondary components, including the reactor vessel, reactor internals, pressurizer, and steam generators by tracking thermal cycles. The program provides an analytical basis for confirming the actual number of cycles does not exceed the number of cycles used in the design analysis and the cumulative usage is maintained below the allowable limit or that appropriate corrective actions are taken to maintain component cumulative fatigue usage below the allowable limit during the period of extended operation.

During the application review, NRR staff raised concerns related to document discrepancies; the most-limiting locations may not have been analyzed; actual transient severity versus design transient severity; use of an inspection program versus a preventative action program; establishing program acceptance criteria; review of operating experience; and cycle counting. The concerns were documented in RAIs B.2.16-1 through B.2.16-7.

In Letter L-11-166, which responded to RAIs B.2.16-1 through B.2.16-7, the applicant answered NRR RAIs and committed to enhancements to evaluate additional plant-specific component locations that may be more limiting than those considered in NUREG/CR-6260; provide for updates of the fatigue usage calculations if the allowable cycle limit is approached; and establishing acceptance criteria for maintaining the cumulative usage below the Code design limit of 1.0 throughout the period of extended operation. The inspectors reviewed revised program documentation and verified these enhancements were included. The inspectors also reviewed other program documentation, the existing program (including the transient status log from the most-recent outage), condition reports, and interviewed the applicant's staff responsible for the program.

The inspectors noted NRR, during their review of the application, had identified the licensee could not locate the fatigue analysis for Class I valves. This issue is a current licensing basis issue and is considered an Unresolved Item pending further review (URI 05000346/2011012-01) Unable to Locate Fatigue Analysis for Class I Valves.

While not directly part of the fatigue monitoring program, during their review of the program, the inspectors noted that in LRA Table 3.3.1, Item 3.3.1-01, the applicant stated that, for steel cranes, fatigue analysis is a TLAA, and further evaluation is documented in LRA Section 3.3.2.2.1. In LRA Section 3.3.2.2.1, the applicant indicated that fatigue TLAA evaluations are addressed in Section 4. However, there is no discussion of fatigue TLAAs of steel cranes in LRA Section 4. The applicant issued OIN-378 to track completion of the changes required to the LRA and license renewal program documents in order to document disposition of steel crane cycles as TLAAs.

While reviewing the existing program, the inspectors noted that in Attachment 3 of the program, for transient 30, the column "Estimated Date to Reach Limit" is marked as "N/A." This is incorrect, as "Pressurizer Spray Nozzle" is a monitored transient. The applicant issued SAP Notification 600704256 to track the correction of this error.

The inspectors concluded that implementation of the enhanced Fatigue Monitoring Program will provide reasonable assurance that the aging effects due to cyclic fatigue will be managed so that the program components will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.12 Fuel Oil Chemistry Program (B.2.20)

The Fuel Oil Chemistry Program is an existing program that, with enhancements, will be consistent with NUREG 1801, Chapter XI, Program XI.M30, Fuel Oil Chemistry.

In IR 05000346/2011010, the inspectors identified a concern that the program did not include periodic testing for microbiological activity. In letter L-11-238, the applicant

agreed to enhance the program to test for microbiological activity at least quarterly and to amend the application to reflect this enhancement. This was tracked by the applicant in OIN-368. The inspectors verified the program basis document had been revised accordingly.

The inspectors concluded the Fuel Oil Chemistry Program effectively manages aging effects. Continued implementation of the enhanced fuel oil chemistry program will provide reasonable assurance that the aging effects will be managed so the fuel oil system will continue to perform its intended function, consistent with the current licensing basis, for the period of extended operation.

.13 Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B.2.21)

The Non-EQ Inaccessible Medium-Voltage Cable Program is a new program that the applicant will implement prior to the period of extended operation. The program, when implemented will be comparable to that described in NUREG-1801, Section XI.E3, "Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements." This program applies to inaccessible (e.g., in conduit or direct-buried) medium-voltage cables within the scope of license renewal that are exposed to significant moisture simultaneously with applied voltage. This program includes a commitment to test these cables once every 10 years and the first test to be completed prior to the period of extended operation to provide an indication of the condition of the conductor insulation. The specific type of test to be performed will be determined prior to the expiration of the current license.

In addition, manholes associated with inaccessible non-EQ medium-voltage cables will be inspected for water accumulation and the water removed, as necessary. These inspections for water collection will be conducted at least once every two years, with the initial inspection to be completed prior to the period of extended operation.

One question remained from IR 05000346/2011010 concerning manholes MHSA2 and MHSB2, where 4.16 kV cables were found submerged in water. The applicant had issued Condition Report (CR) 11-92055 and Notification 600682819 to investigate and propose appropriate solution to this issue. The inspectors reviewed the above documents and interviewed the systems engineer. The systems engineer informed the inspectors that based on the recommendations of the CR, a new Notification 600704051 was issued to Design Engineering to issue design change to install sump pumps in these man holes in a timely manner.

The inspectors did not identify any additional concerns with this program and concluded the Non-EQ Inaccessible Medium-Voltage Cable Program, when implemented as described, will effectively manage aging effects. Implementation of this program will provide reasonable assurance that the effects of aging will be managed such that components within the scope of the program will perform their intended functions for the period of extended operation.

.14 Leak Chase Monitoring Program (B.2.25)

The Leak Chase Monitoring Program is an existing program, which has no corresponding Aging Management Program (AMP) described in NUREG-1801. This program was evaluated against the 10 elements of an AMP described in Appendix A.1, Section A.1.2.3 of NUREG-1800. The Leak Chase Monitoring Program is credited, in conjunction with the PWR Water Chemistry Program, and, for the spent fuel pool,

Technical Specifications requirements for monitoring spent fuel pool level, for detecting loss of material due to age-related degradation for the spent fuel pool, the fuel transfer pit, and the cask pit liners. The program includes periodic monitoring of the leak chase system, which permits early determination and localization of leakage.

In Letters L-11-153 and L-11-238, the applicant responded to RAIs B.2.25-1 through B.2.25-8 and committed to program enhancements to include specific acceptance criteria in the program; perform pH and iron content tests on leakage samples; perform more frequent preventative maintenance of the leak chase system; and inspect for leakage migrating through to accessible surfaces. The inspectors reviewed the revised program documentation and verified these enhancements were included. In addition, the inspectors reviewed other program documentation, the existing program (including leakage rate data from 2001 to present), condition reports, and interviewed the applicant's staff responsible for the program. The inspectors also walked down the accessible portions of the leak chase system, Room 109 where boric acid leakage was previously observed and noted in CR 11-90368, and other accessible surfaces associated with the spent fuel pool. All were observed to be in good material condition.

During the application review, NRR staff raised concerns related to the scope of the program; materials identified in the program; the relation of the program to surveillances; maintaining the integrity of the leak chase system; monitoring and trending; acceptance criteria; aging effects identified; incorporation of operating experience; and additional information required in the USFAR supplement. The concerns were documented in RAIs B.2.25-1 through B.2.25-8.

The inspectors concluded that implementation of the enhanced Leak Chase Monitoring Program, in conjunction with the PWR Water Chemistry Program, and for the spent fuel pool, Technical Specifications requirements for monitoring spent fuel pool level, will provide reasonable assurance that the loss of material due to age-related degradation for the spent fuel pool, the fuel transfer pit, and the cask pit liners will be detected early enough such that the liners continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.15 Masonry Wall Program (B.2.27)

The Masonry Wall Program (MWP) is an existing program based on NRC IE Bulletin 80-11, "Masonry Wall Design," and NRC Information Notice (IN) 87-67, "Lessons Learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11," and applies to the walls in proximity of or having attachment to safety-related (SR) equipment. The MWP consists of inspection activities to detect cracking of masonry walls and degradation of steel edge supports or bracing on masonry walls within the scope of license renewal. The program elements which include scope, monitoring, trending, and acceptance criteria of the Masonry Wall Program will be enhanced and the description of the enhancements is contained in License Renewal Commitment 12.

RAI B.2.39-5 requested justification for masonry wall inspection frequency exceeding five years. In letter L-11-153 which responded to the RAI B.2.39-5, the applicant revised the LRA to require inspections at least at every five years and also revised Commitment 12 to specify inspections at least every five years with provisions for more frequent inspections in areas where significant loss of material or cracking is observed.

The inspectors reviewed revisions in response to the RAI noted above. The inspectors concluded that implementation of the Inspection of enhanced Masonry Wall Program will

provide reasonable assurance that the aging effects will be managed so the in scope walls will continue to perform their intended function, consistent with the current licensing basis for the period of extended operation.

.16 One-Time Inspection Program (B.2.30)

The One-Time Inspection (OTI) Program is a new program that will require one-time inspections to verify the effectiveness of mitigation aging management programs; to confirm age-related degradation is not occurring, is insignificant, or is occurring slowly such that components' intended functions will be maintained through the period of extended operation. One-time inspections are required to verify the effectiveness of the Fuel Oil Chemistry Program, Lubricating Oil Analysis Program, and the PWR Water Chemistry Program for managing loss of material, cracking, or reduction in heat transfer in the closed cooling water, treated water, fuel oil, and lubricating oil environments.

Although originally, the applicant described conformance with Revision 1 of NUREG 1801, the NRC staff had reviewed the applicant's program to assess differences in program requirements incorporated into Revision 2 of NUREG-1801 AMP XI. M32, "One-Time Inspection" program. A number of differences had been the subject of NRC RAIs B.2.30-1, B.2.30-2 and B.2.30-3. In letter L-11-218, which responded to these RAIs, the applicant substantially revised the program to more closely align with Revision 2 of the NUREG-1801.

RAI B.2.30-1 requested the applicant to state the planned sample size for the One-Time Inspections and the basis for why the sample size will be representative of aging effects in the systems, and will be sufficient to verify the system-wide effectiveness of the chemistry programs. The applicant responded to this RAI in letter L-11-218 and stated the LRA Section B.2.30 is revised to address the planned sample size for the One-Time Inspections of the components managed by the PWR Water Chemistry, Fuel Oil Chemistry, and Lubricating Oil Analysis Programs. The sample size is 20 percent of the population (defined as components having the same material, environment, and aging effect combination) or a maximum of 25 components. The sample population will be determined by engineering evaluation, and where practical, will be focused on the (bounding or lead) components considered most susceptible to aging degradation due to time in service, the severity of the operating conditions, and the lowest design margin. The inspections must occur within the ten-year period prior to the period of extended operation to be credited for the program.

RAI B.2.30-2 requested the applicant to revise LRA section A.1.30 to be consistent with and provide the equivalent information as stated within SRP-LR, Revision 2, Table 3.0-1 GALL Report AMP XI.M32, "One-Time Inspection" Program. The applicant responded to this RAI in letter L-11-218 and stated the LRA Section A.1.30 is revised to state this program cannot be used for structures or components with known age-related degradation mechanisms or when the environment in the period of extended operation is not expected to be equivalent to that in the prior 40 years. Periodic inspections should be proposed in these cases.

RAI B.2.30-3 requested the applicant to revise LRA Appendix A.3, Table A-1, "License Renewal Commitment List," for the One-Time Inspection Program to include a commitment to perform a future review of operating experience to confirm the effectiveness of this program or state why such a review is not necessary. In Letter L-11-218, which responded to this RAI, the applicant stated existing license renewal Commitment Number 43 ensured the current station operating experience review

process included future reviews of plant-specific and industry operating experience to confirm the effectiveness of the license renewal aging management programs, to determine the need for programs to be enhanced, or indicate a need to develop new aging management programs. Therefore, a separate operating experience commitment for the One-Time Inspection Program is not necessary.

As documented in IR 05000346/2011010, the inspectors had identified the OTI Program was not consistent with AMP X1.M32 of Revision 2 of NUREG 1801 which stated "For components managed by the AMP XI.M2, Water Chemistry"; AMP XI.M30, "Fuel Oil Chemistry"; and AMP XI.M39, "Lubricating Oil Analysis," programs, a representative sample size is 20 percent of the population (defined as components having the same material, environment, and aging effect combination) or a maximum of 25 components." Instead, the applicant's program stated determination of a representative sample size was based on an assessment of materials, environment, aging effects and operating experience, but did not define neither a methodology for implementing this process nor, a minimum representative sample size. The inspectors had also identified the applicant's program did not include the NUREG-1801 AMP XI.M32 (Revisions 1 and 2) constraint to credit or schedule one-time inspections no earlier than 10 years prior to the period of extended operation. The applicant had issued OINs 364 and 365 to update the LRA which will correct these issues. The inspectors reviewed the resolution of these OINs and verified the LRA has been revised appropriately.

The inspectors reviewed program documentation, station procedures, aging management review documents, and interviewed personnel responsible for the program to assess consistency with Revision 2 of NUREG-1801 AMP XI. M32, "One-Time Inspection" program. During the review of program documentation, the inspectors noted some misleading and confusing text in the last paragraph of LRPD-05, Attachment 2.11, Revision 4. The applicant issued OIN 375 to revise the document appropriately. Also, the inspectors noted multiple sections of LRPD-05, Attachment 2.11 needed to be revised to refer to visual and/or volumetric inspections for cracking due to cyclic loading of the makeup pump. The applicant issued OIN 376 to capture this concern and revise the document appropriately.

The inspectors concluded that implementation of the enhanced One-Time Inspection Program will provide reasonable assurance that Fuel Oil Chemistry Program, Lubricating Oil Analysis Program, and the PWR Water Chemistry Program will be effective in managing loss of material, cracking, or reduction in heat transfer in the closed cooling water, treated water, fuel oil, and lubricating oil for the period of extended operation.

.17 Open-Cycle Cooling Water Program (B.2.31)

The Open-Cycle Cooling Water Program is an existing program that is consistent with the 10 elements of an effective aging management program as described in NUREG-1801 Section XI.M20, "Open-Cycle Cooling Water System, with exceptions. The program consists of inspections, surveillances, and testing to detect and evaluate fouling, loss of material, and cracking, combined with chemical treatments and cleaning activities to minimize fouling, loss of material, and cracking.

RAI B.2.31-1 requested the applicant to describe the aging management activities in the Open-Cycle Cooling Water Program that will be used to manage cracking of the copper alloy components with greater than 15 percent zinc that are exposed to raw water. Also, if this will be the program used to manage cracking of copper alloy components, then the LRA should be updated to reflect this as an exemption to the GALL AMP XI.M20. In

response to this RAI the applicant stated in letter L-11-218, the Open-Cycle Cooling Water Program was revised to remove cracking as an aging effect that will be managed. There are no aging management activities in the program that will be used to manage cracking of the copper alloy components exposed to raw water. Stress corrosion cracking or intergranular attack in the identified copper alloys in a raw water environment in only a potential for stations whose operating experience indicated the presence of ammonia or ammonium salt in raw water. The applicant conducted a review of the plant specific operating experience for license renewal. The results of this review showed no evidence of ammonia or ammonium salt in raw water or cracking of copper alloys in the associated systems.

The inspectors reviewed revised program documentation and verified these revisions were included. The inspectors concluded implementation of the revised Open-Cycle Cooling Water program will provide reasonable assurance that the aging effects will be managed so the Open-Cycle Cooling Water system components will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.18 Pressurized Water Reactor (PWR) Vessel Internals Program (B.2.32)

The PWR Reactor Vessel Internals (RVI) Program is a new plant-specific program, which will manage the effects of age-related degradation mechanisms that are applicable in general to the PWR RVI components at the facility. The aging effects for RVI components include: void swelling; various forms of cracking such as stress corrosion cracking (SCC) or intergranular attack (IGA) and irradiation-assisted stress corrosion cracking (IASCC); loss of preload due to stress relaxation; reduction in fracture toughness due to radiation and thermal embrittlement; and loss of material due to wear. The PWR RVI Program is based on the examination requirements for Babcock and Wilcox (B&W) designed PWRs provided in EPRI Topical Report 1016596, "Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227-Rev. 0)," along with the implementation guidance described in Nuclear Energy Institute (NEI) 03-08, “Guideline for the Management of Materials Issues.”

In IR 05000346/2011010, the inspectors identified a concern with regard to the LRA Table 3.1.2-2, Rows 145 to 152, where the CSA vent valve assembly was shown to have an intended function of “support” as opposed to a “flow control” function. The applicant had captured this concern in OIN 357. The inspectors reviewed the resolution of this OIN and confirmed the applicant in revised the LRA Table 3.1.2-2 to show the valve disc function as flow control. Also, in the above IR, inspectors had raised a concern regarding the operating experience (OE) program element for the PWR vessel internals program (LRA Section B.2.32) such that the element may have to be revised to address plant-specific OE related to the observed discoloration and apparent pitting of all four Reactor Vessel Vent Valves during the 16th refueling outage. The applicant captured this concern in OIN 370 and CR 11-94671. The inspectors reviewed the resolution of the above OIN and CR and observed that the applicant did confirm the presence of discoloration but, due to insufficient clarity of the inspection video, pitting was not confirmed. The discontinuities in the darkened seating surface could have been construed to be pitting. Since there was no evidence that the observed discoloration was an active aging mechanism, specifically, pitting due to corrosion, the applicant concluded there was no requirement to include the noted OE in the LRA.

RAI 3.1.2.2-1 requested the applicant to describe and justify how the Cast Austenitic Stainless Steel (CASS) plenum cylinder reinforcing plate will be managed for reduction in fracture toughness by the PWR Vessel Internals Program. In response to this RAI, the applicant stated in letter L-11-166, reduction in fracture toughness of the CASS plenum cylinder reinforcing plate will be managed indirectly by inspection techniques of the PWR Vessel Internals Program as applied to the most susceptible components, in accordance with the materials reliability project (MRP) guidance in MRP-227.

The inspectors reviewed revisions in response to the concerns noted above. The inspectors concluded that implementation of the PWR Vessel Internals Program will provide reasonable assurance that the aging effects will be managed so the in scope components will perform their intended function during the period of extended operation.

.19 Reactor Head Closure Studs Program (B.2.34)

In IR 05000346/2011010, this section was documented as B.2.33 in error.

The Reactor Head Closure Studs (RHCS) Aging Management Program manages cracking and loss of material for the RHCS assemblies (studs, nuts, and washers). Specifically, this program provides for monitoring and preventive activities to manage stud cracking due to stress corrosion cracking and loss of material due to wear, and general pitting and corrosion. The RHCS Program is an existing program implemented through station procedures which are based on the examination and inspection requirements identified in the American Society of Mechanical Engineers (ASME) Code, Section XI, Subsection IWB, and Table IWB 2500-1. The applicant stated, with enhancement, this program will be consistent with the elements of an effective aging management program as described in NUREG-1801, Section XI.M3, “Reactor Head Closure Studs Program.” The specific enhancement was to select an alternate stable lubricant that is compatible with the fastener material and the environment including a precaution against use of compounds containing sulfur.

In IR 05000346/2011010, the inspectors had identified a minor reference error in Table A-1 of the LRA. The Table A-1 lacked a reference to LRA Section B.2.34 which described the RHCS Program and the applicant issued OIN-355 to track correction of this reference error. The inspectors reviewed the resolution of OIN-355 and confirmed the LRA Table A-1 was revised accordingly.

The inspectors had no further concerns and concluded the RHCS Program will continue to appropriately manage aging effects and provide reasonable assurance that the intended function of the RHCS will be maintained through the period of extended operation.

.20 Selective Leaching of Materials (B.2.36)

The Selective Leaching of Materials Program is a new program that consist of one-time visual inspection, hardness measurement, and alternative detection techniques of selected components that are susceptible to selective leaching. The program will determine if selective leaching is occurring and, if found, whether the aging mechanism will affect the ability of the component to perform its intended function.

RAI B.2.36-1 requested justification as to why one time inspection will not be conducted within five years prior to entering the period of extended operation. In letter L-11-153 which responded to RAI B.2.36-1, the applicant revised the LRA, Appendix A, Section

A.1.36 to specify conducting the inspection activities within the last five years prior to entering the period of extended operation.

RAI B.2.36-2 requested justification for using sampling criteria different than the one recommended in GALL AMP XI.M33, “Selective Leaching,” or to revise the criteria to be consistent with the GALL. In letter L-11-153 which responded to RAI B.2.36-2, the applicant revised the LRA, Section B.2.36 to make the sampling criteria consistent with the GALL.

RAI B.2.36-4 noted that the GALL, Report Rev. 2, AMP XI.M33 recommendations in the Acceptance Criteria” program element were not addressed in the program. In letter L-11-218 which responded to RAI B.2.36-4, the applicant revised LRA, Section B.2.36 to add the acceptance criteria to be consistent with the GALL report.

The inspectors reviewed revisions in response to the RAIs noted above. The inspectors concluded that implementation of the Inspection of the Selective Leaching of Materials Program will provide reasonable assurance that the aging effects will be managed so the in scope components will perform their intended function during the period of extended operation.

.21 Structures Monitoring Program (B.2.39)

In IR 05000346/2011010, this section was notated as B.2.38 in error.

The Structures Monitoring Program is an existing program that manages aging effects on the plant structures and structural components. The existing program will be enhanced to include all structures within the License Renewal scope and to be consistent with the NUREG-1801 AMP XI.S6, "Structural Monitoring.".

Although originally, the applicant described conformance with Revision 1 of NUREG 1801, the NRC staff had reviewed the applicant’s program to assess differences in the program requirements and the description in Revision 2 of NUREG-1801 AMP XI.S6, "Structural Monitoring." A number of differences had been the subject of NRC RAIs B.2.4-1, B.2.4-2, B.2.39-4, B.2.39-5, B.2.39-6, and B.2.39-8. In L-11-153, which responded to these RAIs, the applicant provided additional information and commitments to more closely align with Revision 2 of the NUREG-1801. RAI B.2.4-1 was initiated for the Bolting Integrity Program and requested additional information on the specific inspection technique utilized to manage loss of material, loss of preload, cracking, and stress corrosion cracking, and on the use of volumetric and surface examination. RAI B.2.4-2 requested clarifications regarding the differences in the guidance documents used by the applicant and the recommended guidance in NUREG-1801 Revision 2. The applicant provided an explanation on how the intent of the NUREG-1801 Revision 2 recommendation was met by their program. The applicant’s responses to RAIs B.2.4-1 and B.2.4-2 are being evaluated by the NRC staff and also affect the bolts under the Structural Monitoring Program scope. The applicant had issued OIN 367 to update the LRA to ensure that Structural Monitoring Program and the Water Control Structures Inspection program also reflect the same aging management requirements. In response to RAI B.2.39-4, the applicant revised the LRA to include a new commitment to enhance the program to require personnel qualifications commensurate with ACI 349.3R as specified in the NUREG-1801 Revision 2. In response to RAI B.2.39-5, the applicant revised the LRA to include enhancements and new commitment to specify that structures and masonry walls be inspected at least once every five years to be consistent with the NUREG-1801 Revision 2. In response to RAI

B.2.39-6, the applicant revised the LRA to include enhancements and new commitments to include a quantitative acceptance criteria per guidance in ACI 349.3R and to require a baseline inspection of the structures within the license renewal scope prior to entering the extended period operation. In response to RAI B.2.39-8, the applicant revised the LRA to include a new commitment to incorporate the preventive actions of the Research Council for Structural Connections "Specification for Structural Joints Using ASTM A325 or A490 Bolts" into their specifications and procedures.

The inspectors reviewed program documentation, station procedures, aging management review documents, and interviewed personnel responsible for the program to assess consistency with Revision 2 of NUREG-1801 AMP XI.S6, "Structural Monitoring Program." The inspectors also walked down portions of the Intake Structure and Auxiliary Building. In response to inspector's questions regarding inconsistencies between the program and the NUREG-1801 Revision 2, the applicant issued three new OINs to include further enhancements for alignment with the NUREG-1801 Revision 2. OIN 380 required enhancing the program documents to address the elastomeric vibration isolators, structural sealants, and structural bolts under elements of "Parameters Monitored or Inspected," "Detection of Aging Effects," and "Acceptance Criteria," as applicable. OIN 381 was issued to enhance the description of the Station Blackout (SBO) structural components to include cable support structures for electrical pathways in the switchyard and from the switchyard to the transformers. OIN 382 was issued to enhance the list of in-scope elastomeric components to include the elastomeric vibration isolators. While reviewing selected condition reports noted under the Operating Experience, the inspectors identified the need for concrete repair on the switchyard tower foundations was identified in condition report CR-G201-2008-43692 in 2008 but the work order as well as the condition reports were closed without performance of work because the Western District Energy Delivery section of First Energy, which was responsible for the work, decided that the work was not needed. No justification was documented for not needing the repair. The applicant issued OIN 383 to perform repair or evaluation for the current condition as well as from the aging management perspective, and to evaluate the process for addressing the degraded conditions in the switchyard.

The inspectors concluded that subject to NRC acceptance of the RAI responses discussed above, the implementation of the enhanced Structural Monitoring Program will provide reasonable assurance that the aging effects will be managed so that structures will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

.22 Water Control Structures Inspection Program (B.2.40)

The Water Control Structures Program is an existing program that manages aging effects of the Intake Structure, fore bay, Service Water Discharge Structure and the structural components within these structures. The Water Controls Structures Inspection Program is implemented as part of the Structures Monitoring Program. The program will be enhanced to be consistent with NUREG-1801, Section XI.S7, "Regulatory Guide 1.127, "Inspection of Water Control Structures Associated with Nuclear Power Plants."

Although originally, the applicant described conformance with Revision 1 of NUREG 1801, the NRC staff had reviewed the applicant's program to assess differences in program requirements and the description in Revision 2 of NUREG-1801 AMP XI.S6, "Structural Monitoring." A number of differences had been the subject of NRC RAIs B.2.4-1, B.2.4-2, B.2.39-3, B.2.39-6, B.2.39-8, and 3.5.2.3.12-2. In letters L-11-153, and

L-11-166, which responded to these RAIs, the applicant provided additional information and commitments to more closely align with Revision 2 of the NUREG-1801. RAI B.2.4-1 was initiated for the Bolting Integrity Program and requested additional information on the specific inspection technique utilized to manage loss of material, loss of preload, cracking, and stress corrosion cracking, and on the use of volumetric and surface examination. RAI B.2.4-2 requested clarifications regarding the differences in the guidance documents used by the applicant and the recommended guidance in NUREG-1801 Revision 2. The applicant provided an explanation on how the intent of the NUREG-1801 Revision 2 recommendation was met by their program. The applicant responses to RAIs B.2.4-1 and B.2.4-2 are being evaluated by the NRC staff and also affect the bolts under the Structural Monitoring Program and Water Control Structures scope. The applicant had issued OIN 367 to update the LRA to ensure that Structural Monitoring Program and the Water Control Structures Inspection program also reflect the same aging management requirements. In response to RAI B.2.39-3 regarding concerns about the concrete and steel degradation subjected to aggressive groundwater environment, the applicant revised the LRA to include a new commitment to enhance the program to require obtaining and evaluating a concrete core bore from a representative inaccessible concrete component prior to entering the period of extended operations, and for using the results of the evaluation for determining the need for additional sampling. The applicant's response is being reviewed by the NRC staff. In response to RAI B.2.39-6, the applicant revised the LRA to include enhancements and new commitments to include a quantitative acceptance criteria per guidance in ACI 349.3R and to require a baseline inspection of the structures within the license renewal scope prior to entering the extended period operation. In response to RAI B.2.39-8, the applicant revised the LRA to include a new commitment to incorporate the preventive actions of the Research Council for Structural Connections "Specification for Structural Joints Using ASTM A325 or A490 Bolts" into their specifications and procedures. RAI 3.5.2.3.12-2 requested additional clarification on how the structural monitoring program would be used to manage loss of material on the galvanized steel wave protection dike corrugated pipe casings and carbon steel wave protection dike piles exposed to structural backfill as the structural monitoring program in large measure is visual and these components are located underground. The applicant's response indicated that the program will monitor aging of the components during opportunistic inspections and will also use information from other aging management programs such as Buried Piping and Tank Inspection programs. The applicant's response is being reviewed by the NRC staff.

The inspectors reviewed program documentation, station procedures, aging management review documents, and interviewed personnel responsible for the program to assess consistency with Revision 2 of NUREG-1801 AMP XI.S7, "Regulatory Guide 1.127, Inspection of Water Control Structures Associated with Nuclear Power Plants." The inspectors also walked down portions of the Intake Structure. In response to inspector's questions regarding inconsistencies between the program and the NUREG-1801 Revision 2, the applicant issued OIN 379 to include further enhancements for alignment with the NUREG-1801 Revision 2. OIN 379 required enhancements to include acceptance criteria for bolts, and for degradation of piles and sheeting under the Acceptance Criteria program element. The inspectors noted that the procedure revision identified in OIN 366 was completed and that the OIN was closed.

It should be noted that during the triennial heat sink performance inspection, the inspectors identified an issue related to the degradation of the safety-related portion of the intake canal. This issue is a current licensing issue and will be discussed in IR 05000346/2011004.

The inspectors concluded that that subject to NRC acceptance of the RAI responses discussed above, the implementation of the enhanced Water Control Structures Inspection Program will provide reasonable assurance that the aging effects will be managed so that structures will continue to perform their intended function, consistent with the current licensing basis, for the period of extended operation.

4. EXIT MEETING SUMMARY

The results of this inspection were discussed on August 26, 2011, with Mr. K. Byrd, and other members of the Davis-Besse staff in an exit meeting. The applicant acknowledged the inspection results and presented no dissenting comments.

The inspectors noted proprietary documents were reviewed during the course of the inspection. The applicant confirmed all such proprietary documents were returned or the copies destroyed and the likely content of the report would not involve the proprietary material.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Applicants

B. Allen	Davis-Besse Site Vice President
B. Boles	Director, Site Operations
K. Byrd	Director, Site Performance Improvement
C. Custer	License Renewal Project Manager
S. Dort	Site License Renewal Lead
L. Hinkle	Site License Renewal Mechanical Lead
D. Kosloff	Site License Renewal Civil Lead (Contractor)
A. McAllister	Site License Renewal Electrical Lead
J. Tweddell	Site License Renewal Audit Support electrical Lead
J. Thomas	Site License Renewal Audit Support Technical Lead
J. Hester	Site License Renewal Audit Central Lead
K. Nesser	Fleet Licensing, Davis-Besse Station
D. Chew	Leak Chase Monitoring Program Owner
S. Slosnerick	Fatigue Monitoring Program Owner
J. Hartigan	Principal Engineer

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened,

05000346/2011012-01	URI	Unable to Locate Fatigue Analysis for Class I Valves (Section 3.11)

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply the NRC inspectors reviewed the documents in their entirety, but rather, selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

LICENSE RENEWAL DOCUMENTS

License Renewal Application

License Renewal Action Items (Written as a Result of the Inspection)

OIN 375; One-Time Inspection Program; August 23, 2011
OIN 376; One-Time Inspection Program; August 23, 2011
OIN 377; Electrical Cables and Connections Program; August 24, 2011
OIN 378; Fatigue Monitoring Program; August 25, 2011
OIN 379; Water Control Structures Program; August 25, 2011
OIN 380; Structural Monitoring Program; August 25, 2011
OIN 381; Structural Monitoring Program; August 25, 2011
OIN 382; Structural Monitoring Program; August 25, 2011
OIN 383; Structural Monitoring Program; August 26 2011

License Renewal Aging Management Program Basis Documents

LRPD-05 Attachment 2.1; Aboveground Steel Tanks Inspection Program; Revision 3
LRPD-05 Attachment 2.5; Buried Piping and Tanks Inspection Program; Revision 3
LRPD-05 Attachment 2.6b; Closed Cooling Water Chemistry Program; Revision 3
LRPD-05 Attachment 2.6c; Fuel Oil Chemistry Program; Revision 3
LRPD-05 Attachment 2.7; External Surfaces Monitoring Program; Revision 2
LRPD-05; Attachment 2.8a; Fire Water Program; Revision 2
LRPD-05 Attachment 3.9; Boral Monitoring Program; Revision 2
LRPD-02; TLAA and Exemption Evaluation Results; Revision 4
LRPD-05; Attachment 5.2; Fatigue Monitoring Program; Revision 3
LRPD-05; Attachment 3.3; Leak Chase Monitoring Program; Revision 1
LRPD-05; Attachment 3.6; Water Control Structures Inspection Program; Revision 1
LRPD-05; Attachment 3.7; Structures Monitoring Program; Revision 1

License Renewal Aging Management Review Reports
LRAMR-M11; Aging Management Review of Compressed Air and Gas System; Revision 0
LRAMR-M07; Aging Management Review of the Service Water System; Revision 0
LRAMR-E01; Aging Management Review of Electrical Component Commodity Groups; Revision 2
LRAMR-M02; Aging Management Review of the Reactor Vessel Internals, Revision 3
LRAMR-M12; Aging Management Review of the Fire Protection System; Revision 2

CURRENT PLANT DOCUMENTS

Corrective Action Documents
CR 11-92055; Water Discovered in Manhole SB2; dated March 29, 2011
CR 11-94003; Spent Fuel Pool Cask Crane End Stop and Rail Bolting; dated May 2, 2011
CR 11-94671; Reactor Internals Vent Valve Test and Inspection; dated may 12, 2011

CR 08-43692; Switchyard Tower foundations Degraded; dated July 24, 2008
CR 05-03497; AFW Turbine Exhaust Missile Barrier Degradation; dated June 22, 2005

Drawings
2183; Rack Construction PWR Spent Fuel Storage Racks; Revision 5
2184; Rack Construction PWR Spent Fuel Storage Racks; Revision 3
C-51; Yard Utilities Sections and Details; Revision 29
C-52; Yard Utilities Sections and Details; Revision 33
C-53; Yard Utilities Sections and Details; Revision 41
C-248; Liner Plate Spent Fuel Pool Bulkhead Gate Details, Revision 7
FSK-M-101; Fuel Transfer Pit, Spent Fuel Pool, Cask Pit, Leak Chase Channel Drains to Open Funnels Monitoring System; Revision 1

Procedures
NOP-ER-2007; Underground Piping and Tank Integrity Program; Revision 1
DB-SP-04400; Spent Fuel Pool, Fuel Transfer Pit, and Cask Pit Leak Detection System Test, Revision 2 (including testing results since 2001)
DB-PF-04705; Component Cooling Water System Heat Exchanger 2; Revision7
EN-DP-00355; Determination of Allowable Operating Transient Cycles; Revision 6 (including transient status log created following operating cycle 16)
EN-DP-01511; Design Guidelines for Maintenance Rule Evaluation of Structures; Revision 0

Surveillances
200351575; Emergency Diesel Generator 1-2 Fuel Oil Day Tank Drain Sample; January 9, 2011
200354764; Emergency Diesel Generator 1-2 Fuel Oil Day Tank Drain Sample; February 5, 2011
200357961; Emergency Diesel Generator 1-2 Fuel Oil Day Tank Drain Sample; March 5, 2011
200363958; Emergency Diesel Generator 1-2 Fuel Oil Day Tank Drain Sample; April 4, 2011
200363967; Emergency Diesel Generator 2 Fuel Oil Day Tank Sample; April 5, 2011
PM 0789; “Sub018-01 Instrument Air Dyer 3 & 4”
PM 5764; “Sub018-01 Instrument Air Dyer 1 & 2”
PM 5959; “Instrument Air Sample Particulate & Condensable Hydrocarbons”

Work Orders
WO 200342566; Inst Air Rcvr 1 & 2 Dew Point; Revision 0
WO 200339266; Inst Air Rcvr 1 & 2 Dew Point; Revision 0
WO 200224674; IA *Sample* Partic/conden Hydrocarbons; Revision 0
WO 200324668; IA *Sample* Partic/conden Hydrocarbons; Revision 0
WO 200299458; Spent Fuel Cask Crane Inspection; dated February 18, 2010

License Renewal Related Miscellaneous Documents
NUREG-1801; Generic Aging Lessons Learned (GALL) Report; Revision 2; dated December 2010
L-11-134; Reply to Requests for Additional Information; May 5, 2011 (ML11131A073)
L-11-153; Reply to Requests for Additional Information; May 24, 2011 (ML11151A090)
L-11-166; Reply to Requests for Additional Information; June 3, 2011 (ML11159A132)
L-11-203; Reply to Requests for Additional Information; June 17, 2011 (ML11172A389)
L-11-218; Reply to Requests for Additional Information; July 22, 2011 (ML11208C274)
L-11-238; Reply to Requests for Additional Information; August 17, 2011 (ML11231A966)
Change Notice No. 11-107; USFAR Update of Table 5.1-8, Transient Cycles Design Life
CMAA Specification #70; Specifications for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes; 2000 Revision

LIST OF ACRONYMS USED

AMP	Aging Management Program
AMR	Aging Management Report
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
B&W	Babcock and Wilcox
CASS	Cast Austenitic Stainless Steel
CCCW	Closed Cycle Cooling Water
CFR	Code of Federal Regulations
CR	Condition Report
EPRI	Electric Power Research Institute
EQ	Environmental Qualification
FENOC	First Energy Nuclear Operating Company
IASCC	Irradiation Assisted Stress Corrosion Cracking
IGA	Intergranular Attack
ISI	In-service Inspection
LR	License Renewal
LRA	License Renewal Application
MRP	Material Reliability Program
MWP	Masonry Wall Program
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OIN	Open Item Number
PWR	Pressurized Water Reactor
RAI	Request for Additional Information
RVI	Reactor Vessel Internal
SCC	Stress Corrosion Cracking
SER	Safety Evaluation Report
SMP	Structures Monitoring Program
SRP	Standard Review Plan
SSC	Systems, Structures, and Components
SW	Service Water
USAR	Updated Safety Analysis Report
VT	Visual Testing
WO	Work Order

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Sincerely,

/RA/

Ann Marie Stone, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-346; 72-014
License No. NPF-3

Enclosure: Inspection Report 05000346/2011012
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