UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BLVD
ARLINGTON, TEXAS 76011-4511

July 25, 2013

Lou Cortopassi, Vice President
and Chief Nuclear Officer
Omaha Public Power District
Fort Calhoun Station FC-2-4
P.O. Box 550
Fort Calhoun, NE 68023-0550

SUBJECT: FORT CALHOUN STATION – NRC POST-APPROVAL LICENSE RENEWAL INSPECTION REPORT 05000285/2013009

Dear Mr. Cortopassi:

On July 12, 2013, U.S. Nuclear Regulatory Commission inspectors completed a Post-Approval Site Inspection for License Renewal at your Fort Calhoun Station. The enclosed report documents the inspection findings, which were discussed on July 12, 2013, with you and other members of your staff.

The team reviewed selected procedures and records, observed activities, and interviewed personnel.

Based upon the results of this inspection, no findings of significance were identified.

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 component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Geoffrey Miller, Chief
Engineering Branch 2
Division of Reactor Safety

Docket: 50-285
License: DPR-40

cc w/enclosure:
Electronic Distribution for Fort Calhoun Station

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000285
License:	DPR-40
Report:	05000285/2013009
Applicant:	Omaha Public Power District
Facility:	Fort Calhoun Station
Location:	P.O. Box 310 Fort Calhoun, NE 68023
Dates:	May 13 – July 12, 2013
Inspectors:	G. Pick, Senior Reactor Inspector G. Meyer, Senior Reactor Inspector, Region 1 J. Rivera-Ortiz, Senior Reactor Inspector, Region 2 S. Makor, Reactor Inspector J. Melfi, Reactor Engineer, Reactor Projects Branch E
Approved By:	Geoffrey Miller, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000285/2013009; 05/13 – 07/12/2013; Fort Calhoun Station, Post-Approval Site Inspection for License Renewal

The report covers an inspection conducted by regional inspectors in accordance with NRC Manual Chapter 2515 and NRC Inspection Procedure 71003.

The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG–1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified Findings and Self-Revealing Findings

None

B. Licensee-Identified Violations

None

REPORT DETAILS

4. OTHER ACTIVITIES (OA)

4OA5 Other Activities Post-Approval Site Inspection for License Renewal (71003)

Phase 2 Inspection Activities

The Phase 2 Inspection activities are performed prior to, but within 6 months of the period of extended operation. The period of extended operation is the additional 20 years beyond the original 40-year licensed term. The period of extended operation for Fort Calhoun Station begins after midnight on August 9, 2013.

The team performed this inspection to evaluate whether the licensee: (1) completed actions required to comply with the license renewal license condition and commitments; (2) implemented the aging management programs and time-limited aging analyses as described in the updated safety analysis report; (3) followed the guidance in NEI 99-04, "Guidelines for Managing NRC Commitment Changes," for changing license renewal commitments and followed the guidance in 10 CFR 50.59 when making changes to the license renewal supplement; (4) identified, evaluated, and incorporated "newly identified" structures, systems, and components into their aging management programs; (5) implemented the aging management programs and time-limited aging analyses that agreed with those approved in the safety evaluation report and described in the updated safety analysis report; and (6) implemented operating experience review and corrective action programs that account for aging effects.

.01 Aging Management Programs with Associated Commitments

a. Inspection Scope

The team evaluated whether the licensee met the commitments and established aging management programs that effectively implemented activities to control the effects of aging. The team compared the commitments and aging management programs to the program descriptions in the updated safety analysis report supplement in NUREG-1782, "Safety Evaluation Report (SER) Related to the License Renewal of Fort Calhoun Station, Unit 1," and to the Generic Aging Lessons Learned (GALL) Report, Revisions 0 and 2, as appropriate.

The team reviewed supporting documents including implementing procedures, work orders, inspection reports, engineering evaluations, and condition reports; conducted interviews with licensee staff; and visually inspected structures, systems, and components, as needed, to evaluate whether the licensee completed the necessary actions to comply with the license conditions stipulated in the renewed facility operating license. The team interviewed the program owners for each program and other licensee personnel to evaluate whether the licensee completed the necessary actions to meet the commitments specified in the safety evaluation report.

NUREG-1782 and the updated safety analysis report supplement lists the aging management programs and associated commitments made during the license renewal application process.

During this inspection, the team reviewed 34 of the 41 commitments and closed 30 commitments. The team reviewed 22 aging management programs and 7 time-limited aging analyses. The team reviewed and closed 7 commitments during the Phase 1 inspection documented in NRC Inspection Report 05000285/2012009 (ADAMS ML12187A068). The team did not close Commitments 23, 24, 34, and 39.

Specific documents reviewed are listed in the report attachment.

b. Findings and Observations

1. B.1.6 Inservice Inspection Program and Commitment 6

The Inservice Inspection Program aging management program implemented the examination requirements of the ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," Subsections IWB, IWC, IWD, and IWF. The program consisted of periodic volumetric, surface, and/or visual examination of components and their supports for assessment, signs of degradation, and corrective actions. This program is in accordance with ASME Section XI, 1998 edition through the 2000 addenda.

The team reviewed license renewal documents, program documents, drawings, and implementing procedures. The team interviewed the program owner, as well as personnel who performed the inspections. From review of Program Basis Document PBD-2, "Inservice Inspection," Revision 14, and interviews with the program owner, the team determined that the licensee had established a program as described in the NRC safety evaluation report and the updated safety analysis report supplement. After selecting specific reactor vessel weld locations from inservice inspection drawings, the team verified that the Fourth Interval Inservice Inspection Plan identified appropriate examination requirements on an appropriate schedule to meet the ASME Section XI requirements, as modified by 10 CFR 50.55a. The team verified that inspection personnel performed satisfactory visual examinations for the containment accessible surfaces.

The team identified that Procedure SE-PM-AE-1004, "Preventive Maintenance Containment Building Structural Inspection," Revision 8, did not include specific guidance for the inspection of the containment liner test pipes and threaded caps located on the bottom of the containment floor. The general visual examination of containment accessible surfaces required by ASME Section XI, Subsection IWE, included these components. The test pipes provided the means to test the leak tightness and integrity of the containment liner welds with a gas medium prior to placing the concrete floor. The team identified that industry operating experience existed that described failure to inspect and identify inadequate sealing allowed direct exposure of the containment liner to water and required additional evaluation to demonstrate the design function of the liner was maintained. The licensee documented the need to inspect the threaded caps and test pipes in Condition Report 2013-11985.

Commitment 6 specified, "OPPD commits to applying recommended or mandated activities resulting from the Control Rod Drive Material Reliability Management Plan with regard to management of control element drive mechanism (CEDM) housings. OPPD will submit the revised aging management programs prior to the period of extended

operation to ensure that the revised aging management programs are adequate to manage the aging of the CEDM housings."

The team reviewed PBD-2, inspection reports for the CEDM seal housing examinations, and an industry operating experience evaluation of CEDM material issues. The licensee replaced the CEDM housings in 2006 with the replacement of the reactor vessel closure head. The new CEDM housings were redesigned to eliminate the number of welds susceptible to cracking. The team discussed the plans for evaluating the CEDMs with the program owner. The team determined that the licensee had (1) established a program for monitoring aging of the CEDMs; (2) established an appropriate examination method, eddy current inspection, to detect the aging effects of concern; (3) applied lessons learned from applicable operating experience; and (4) planned inspection of CEDM housing welds to meet the applicable ASME Section XI requirements. During this inspection, the licensee had not submitted the final aging management program to the NRC as stated in the commitment. The licensee tracked this item with Action Request 31873-01, which planned submission of the aging management program prior to the period of extended operation.

The team identified that the licensee had not updated PBD-2 to incorporate the results of the investigative activities that the licensee completed under the Control Rod Drive Material Reliability Management Plan. Specifically, the program basis document did not describe the method that would be implemented for managing the aging effects applicable to the CEDM housings. The licensee documented the failure to update PBD-2 in Condition Report 2013-11927.

Based on review of the actions implemented related to the Inservice Inspection Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded the corrective actions appropriately addressed the above identified issues and the licensee met the conditions of Commitment 6 prior to the period of extended operation.

2. B.2.1 Boric Acid Corrosion Prevention Program and Commitment 21

The Boric Acid Corrosion Prevention Program aging management program implemented administrative controls to (1) perform visual inspections of external surfaces that are potentially exposed to borated water leakage, (2) ensure timely discovery of leak path and removal of the boric acid residues, (3) perform assessments of degradation, and (4) perform follow-up inspections for adequacy of corrective actions. The licensee implemented this program in response to Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants," dated March 17, 1988.

The team determined that the licensee had established the Boric Acid Corrosion Control Program 25 years earlier in response to industry operating experience. The team verified that the baseline inspections had been completed for this program during prior outages.

The team interviewed the program owner and reviewed procedures, work orders, licensing documents, and condition reports that documented the results of boric acid walk downs. The team determined from record reviews that the licensee maintained an

appropriate boric acid corrosion program and took satisfactory actions in response to boric acid leaks. The team determined that Program Basis Document PBD-10, "Boric Acid Corrosion Control Program," Revision 14, provided a detailed outline of the program.

Commitment 21 specified:

> "Specific guidance will be added to the program basis document and applicable procedures to inspect components, structures, and electrical components where boric acid may have leaked.
>
> Add Spent Fuel Pool Cooling and Waste Disposal Systems to the program. Two areas not routinely inspected will be added to inspection scope.
>
> Specific guidance will be implemented for maintenance personnel to report boric acid leakage to the BAC (boric acid corrosion) program engineer."

The team verified that the licensee added guidance to Procedure SE-EQT-MX-002, "Carbon Steel and Low Alloy Steel Fasteners Inservice Testing Inspections," Revision 12. The team reviewed completed work orders for boric acid walk downs and component specific guidance found in site procedures. The component specific procedures covered duties and responsibilities, cleaning of reactor vessel studs, nuts, and washers, trending and monitoring, certification requirements for quality control inspectors, and multiple repair-rework procedures. The team determined that the licensee satisfactorily addressed the commitment through their inspections and in the procedures.

The team verified that the licensee added the spent fuel pool cooling and waste disposal systems to the list of applicable systems PBD-10. Additionally, the team verified that the licensee looked for evidence of boric acid corrosion when implementing Procedure QC-ST-MX-3003B, "Visual Inspection (VT-2) of Piping in the Purification Filter Vault (Room 62)," Revision 0, for Room 62, and Procedure QC-ST-CH-3001, "Chemical Volume Control System Refueling Leak Rate Test outside Containment," Revision 4, for Room 11.

The team verified that the licensee included specific guidance for maintenance personnel to report boric acid leakage to the boric acid corrosion program engineer in Procedure SO-M-100, "Conduct of Maintenance," Revision 57.

Based on review of the actions implemented related to the Boric Acid Corrosion Prevention Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded that the licensee met the conditions of Commitment 21 prior to the period of extended operation.

3. B.2.2 Service Water Reliability Program and Commitment 22

The Service Water Reliability Program aging management program monitored and detected aging effects through inspection and nondestructive evaluations. The program also involved some mitigation activities of periodic flushing and draining. The licensee based the aging management activities on EPRI TR-107396, "Closed Cooling Water

Chemistry Guideline," dated November 1997, for closed-cycle cooling water systems and Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment," dated July 18, 1989, for open-cycle cooling water systems.

The team reviewed the license renewal application, safety evaluation report, and updated safety analysis report, reviewed the program basis document, procedures, work instructions, inspection records, and corrective action documents, and interviewed the program owner. NRC reviewed aspects of this aging management program during baseline inspections in accordance with Inspection Procedure 71111.07, Heat Sink Performance.

Commitment 22 specified, "Inspections of various raw water and cooling water components will be added based on FCS Service Water Reliability Program susceptibility evaluation. These inspection activities will be commensurate with the GALL Program."

The team confirmed that Program Basis Document PBD-17, "Service Water Reliability Program," Revision 7, Table 7.1 identified numerous components and piping segments for evaluation. The team sampled four inspections in different cooling systems to verify that the licensee had performed the inspections.

Based on review of the actions implemented related to the Service Water Reliability Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded that the licensee met the conditions of Commitment 22 prior to the period of extended operation.

4. B.2.3 Diesel Fuel Monitoring and Storage Program and Commitments 12 and 13

The Diesel Fuel Monitoring and Storage Program aging management program monitored and controlled diesel fuel quality regarding water and other contaminants in accordance with the guidelines of the standards specified in the appendix and the Technical Specifications. The licensee minimized the exposure to fuel oil contaminants such as water and microbiological organisms by removal of water and sediment from tanks and by verifying the quality of new fuel oil before its introduction into the storage tanks.

The team reviewed the license renewal application, safety evaluation report, and updated safety analysis report, reviewed the program basis document, procedures, work instructions, inspection records, and corrective action documents, and interviewed the program owner. Also, the team walked down the in-plant fuel oil components associated with both emergency diesel generators, the diesel fire pump, the security diesel generator, and the auxiliary feedwater diesel pump.

The team determined that Procedure SO-T-16, "Diesel Fuel Monitoring and Storage Program," Revision 31, specified obtaining bottom samples from Fuel Oil Storages Tanks FO-1 and FO-10 but provided an inappropriate acceptance criterion for water content. Procedure SO-T-16 allowed water content up to 5.0 percent, which exceeded the allowed bulk sample content of 0.05 percent by 100 times. The team determined that the bottom samples for water content of these tanks had been below 0.05 percent routinely and that three samples in the last 10 years had exceeded 0.10 percent. The

licensee issued Condition Report 2013-11968 to evaluate the water content limit for bottom samples and to determine an appropriate limit.

The team noted that the program procedure for samples on the security diesel tank and the auxiliary feedwater diesel pump tank did not analyze nor specify limits for water content in bottom samples. Procedure SO-T-16 specified that personnel obtain bottom samples for microbes, sediment and other parameters but not water content. The team determined the failure to analyze for water in the bottom of the security diesel and auxiliary feedwater diesel pump tanks was contrary to the objective of the fuel oil program to prevent water in the bottom of the fuel oil tanks. The licensee initiated Condition Report 2013-11968 to evaluate the need for water content analysis for bottom samples taken from the security diesel and auxiliary feedwater diesel pump tanks and to determine appropriate limits.

Commitment 12 specified, “New fuel additions to the fire protection diesel fuel oil tank will be analyzed for water and sediment, and this water and sediment will be removed, to preclude water contamination, and the tank bottom will be monitored to ensure water or biological activity is not accumulating. UT and/or visual inspections will be performed in the other storage tanks which credit this program for aging management. The low point beyond the main tank is the bottom of the day tank, and a day tank sample will be drawn from the bottom of the tank and analyzed for water and sediment.

OPPD commits to performance of a one-time inspection to determine the condition of the fire protection fuel oil tank and verify that the tank is not in a degraded condition.”

Letter LIC-12-0064, “Deletion of License Renewal Commitments Due to Replacement of Components,” dated May 30, 2012, formally notified the NRC of the withdrawal of this commitment. The team reviewed the information related to installation of the tank in 2009. The team reviewed the supporting commitment change paperwork for this commitment. The licensee processed this commitment change as an administrative/non-technical change to their updated safety analysis report. The team disagreed with this categorization and concluded that the licensee should have implemented their 10 CFR 50.59 evaluation process.

The failure to process this change would be a minor violation as described in NRC Enforcement Manual, Section 2.11.d.6 since there was no reasonable likelihood that the change would ever require NRC approval in accordance with 10 CFR 50.59. By considering this as an administrative/non-technical change, the licensee failed to demonstrate an appropriate technical basis for the change to the commitment as described in their updated safety analysis report. The licensee documented this deficiency in Condition Report 2013-11920. This was one of multiple examples of incorrectly determining that 10 CFR 50.59 did not apply to this change. The other examples are documented in Sections 4OA5.01.b.5, 4OA5.01.b.9, 4OA5.01.b.10, and 4OA5.01.b.14 of this report.

Commitment 13 specified, “The fire protection day tank will be analyzed quarterly for water and sediment, semi-annually for microbiological activity, and will have a one-time boroscope inspection performed.”

The team verified that Procedure CH-ST-FP-0001, “Diesel Fire Pump Fuel Oil Sampling and Analysis,” Revision 8, required that personnel sample quarterly for water and

sediment and sample semi-annually for microbiological activity. The team identified no concerns from review of the one-time boroscope inspection of the diesel fire pump day tank. From walk down of the fuel oil components and review of plant records, the team identified no concerns.

Based on review of the actions implemented related to the Diesel Fuel Monitoring and Storage Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded that the licensee met the conditions of Commitment 13 and Commitment 12, based on the withdrawal of the commitment, prior to the period of extended operation.

5. B.2.4 Fatigue Monitoring Program and Commitments 23, 24, 25, 26, and 27

The Fatigue Monitoring Program aging management program monitored reactor coolant and associated systems for thermal fatigue, pressurizer surge line thermal stratification, and thermal fatigue of selected Class II and III components over the life of the plant to ensure that their operation does not result in exceeding the number of design basis transients included in the design basis of their respective design codes. The licensee based their fatigue monitoring program on industry automated cycle counting software, WESTEMS. Plant locations that cannot be counted automatically will continue to be counted manually. The licensee initiated a site specific evaluation to address environmental fatigue and planned to make appropriate program enhancements prior to the period of extended operation based on the evaluation results.

The team reviewed the applicable sections of the license renewal application, safety evaluation report, and final safety analysis report, reviewed the program basis document, implementing procedures, work instructions, inspection records, and corrective action documents, and interviewed the program owner. The team determined that the licensee: (1) developed an aging management program for monitoring fatigue of the in-scope components, (2) incorporated operating experience associated with fatigue monitoring, and (3) established Procedure SO-O-23, “Systems and Equipment Usage Data,” Revision 22, to count fatigue cycles manually, consistent with the licensing basis documents.

The team verified that the licensee counted cycles as described in Procedure SO-O-23 to verify the licensee had implemented the program in accordance with the program basis document. The team reviewed the following plant cycles:

- reactor coolant system heatup and cooldown cycles (cycles 63 through 77)
- loss of charging cycles (cycle 1)
- intermittent manual charging makeup cycles (cycles 52 through 76)
- maximum purification/emergency boration cycles (cycles 1 and 2)

The team reviewed calculations and technical documents associated with the implementation of WESTEMS to verify that the cycles counted by the program were consistent with the program scope as described in the licensing basis documents. The team identified that the licensee planned to use WESTEMS for fatigue monitoring of the following components:

- Reactor vessel primary structural shell and nozzles
- Pressurizer primary structural shell and nozzles
- Pressurizer surge line
- Steam generators normal feedwater nozzles
- Steam generators auxiliary feedwater nozzles
- Reactor coolant loop piping (hot and cold legs)
- Normal charging nozzles at reactor coolant pump
- Alternate charging nozzles at reactor coolant pump
- Letdown piping
- Safety injection/shutdown cooling nozzles at reactor coolant loop

The team identified that the updated safety analysis report supplement for license renewal submitted with the license renewal application, and approved in the NRC safety evaluation report, stated that the fatigue monitoring program would be based on the industry's automated cycle counting software, FatiguePro. However, the licensee revised the updated safety analysis report after the renewed operating license was issued to use WESTEMS as the cycle counting software without performing a 10 CFR 50.59 screening or evaluation. The team determined that FatiguePro represented a methodology described in the updated safety analysis report to demonstrate that the design function of the in-scope components will be maintained during the period of extended of operation. Therefore, a revision or replacement of the original methodology required an evaluation against the criteria in 10 CFR 50.59, as required by procedure NOD-QP-16, "Updated Safety Analysis Report (USAR)," Revision 22.

The failure to process this change would be a minor violation as described in NRC Enforcement Manual, Section 2.11.d.6 since there was no reasonable likelihood that the change would ever require NRC approval in accordance with 10 CFR 50.59. By considering this as an administrative/non-technical change, the licensee failed to demonstrate an appropriate technical basis for the change to the commitment as described in their updated safety analysis report. The licensee documented this deficiency in Condition Report 2013-10867.

The team determined that Procedure SO-O-23 did not reference the license renewal commitments implemented by the procedure. The licensee initiated corrective actions and documented the deficiencies in Condition Report 2013-10661

Commitment 23 specified:

> "Add the following to the scope of components subject to the FCS Fatigue Monitoring Program:
>
> Pressurizer Surge Line bounding locations, and elbow
>
> Class 2 and 3 components not included in the NUREG-1801 program which are subject to fatigue as an aging effect requiring management.
>
> The number of cycles assumed for the evaluation of the charging line nozzle will be included in the Fatigue Monitoring Program Basis Document, when it is generated, to assure that a CUF of 1.0 is not exceeded."

The team determined that the licensee tracked this commitment as Action Request 29783 and that the licensee had not completed the actions at the time of this inspection. The licensee informed the team that a preliminary fatigue evaluation considering environmental fatigue determined that the charging line nozzle could exceed the design limit prior to the end of the period of extended operation. The licensee used Condition Report 2011-10000 to track completion of this commitment. The licensee had to finalize the fatigue evaluation to then determine the appropriate approach for fatigue management. The licensee expected to complete the fatigue analysis for the charging line nozzle before the period of extended operation.

Follow-up and evaluation of the resolution for managing environmentally-assisted fatigue in the charging line nozzle as stated in Commitment 23 is an unresolved item: Unresolved Item 05000285/2013009-01, "Evaluation of Environmentally-Assisted Fatigue for Charging Line Nozzle."

Additionally, the team identified deficiencies in Program Basis Document PBD-31, "Fatigue Monitoring," Revision 2, associated with the guidance provided to effectively implement the program as stated in the licensing basis documents. Specifically, the team found that PBD-31 did not:

- identify the procedures that would implement the program objectives and elements as described in the GALL Report
- clearly identify the pressurizer surge line bounding locations that would be in the scope of the program
- clearly identify the Class 2 and 3 components not included in the NUREG-1801 that were subject to fatigue
- describe the transient cycles that would be tracked manually and with the WESTEMS counting software
- reference the vendor calculations and technical documents that supported the basis of the program and demonstrated compliance with the regulatory commitments
- include specific guidance for appropriate corrective actions to take in case a cycle count approaches the design limit

The team concluded that these deficiencies did not impact any fatigue evaluations or have any immediate impact on plant safety and that most of the deficiencies were administrative. The licensee documented the need to revise PBD-31 to correct these program deficiencies in Condition Report 2013-10658.

Commitment 24 specified, "Cycles which involve power changes, operating pressure and temperature variations, and feedwater additions with the plant in hot standby conditions will be conservatively estimated from a review of plant operating records to predict current cycles under the FMP. Once current number of cycles has been established, a review will be performed to determine if there is a potential for exceeding

the allowable cycles and should be managed. If so, they'll be counted and managed by the FMP."

The team determined that the licensee considered this commitment complete at the time of this inspection. The team determined that the licensee response to Request for Additional Information 4.3.1-1 provided the basis for this commitment. The team determined that the licensee specified they would perform a conservative estimate of cycles of specific types of cycles, as listed below, which were not being counted by existing plant procedures during the initial operating term:

(a) plant loading/unloading at 10 percent of full power per minute

(b) step load increase/decrease

(c) operating variations of +100 pounds per square inch and +6 degrees Fahrenheit from normal operating pressure and temperature

(d) feedwater additions of 300 gallons per minute at 32 degrees Fahrenheit with the plant in hotstandby condition

The team identified that the licensee planned to track cycles related to Items (a) and (b) in WESTEMS during the period of extended operation; however, the licensee set the cycles to date at zero since they had not previously counted them in plant procedures. For the operating variations in Item (c), the licensee did not estimate the current number of cycles since they did not monitor them in plant procedures because of their frequent daily occurrence and low fatigue contribution. For the feedwater additions in Item (d), the licensee did not estimate the actual number of cycles accumulated in the current operating term. The team determined that the licensee did not conservatively estimate the number of cycles nor perform an evaluation of whether the potential for exceeding the allowable cycles in the period of extended operation existed, as described in their response to Request for Additional Information 4.3.1-1. The licensee documented the failure to count the cycles as specified in this commitment in Condition Report 2013-10756.

Follow-up and evaluation of the resolution for estimating the number of cycles for Commitment 24 is an unresolved item: Unresolved Item 05000285/2013009-02, "Evaluation of Operating Cycles for Fatigue Monitoring Program."

Commitment 25 specified, "The limiting surge line welds will be inspected prior to the period of extended operation. The results of these inspections will be used to assess the appropriate approach for addressing environmentally-assisted fatigue of the surge lines. The approach would include one or more of the following options:

- further refinement of the fatigue analysis to lower the CUF(s) to below 1.0
- repair of the affected locations
- replacement of the affected locations

- management of the effects of fatigue by an inspection program that has been reviewed and approved by the NRC (e.g., periodic nondestructive examination of the affected locations at inspection intervals to be determined by a method accepted by the NRC)."

The team identified that the licensee selected an approach to manage fatigue of the surge line that further refined the fatigue analysis and would ensure the cumulative usage factor remained below 1.0 during the period of extended of operation. The team verified that the licensee inspected the four locations on the pressurizer surge line in 2001 during the Third Inservice Inspection Interval. However, the team determined that the licensee had scheduled a second set of pressurizer surge line weld inspections inconsistent with the commitment in the updated safety analysis report supplement. Specifically, the updated safety analysis report supplement specified that the surge line welds would be inspected during the Third Inservice Inspection Interval, Fourth Inservice Inspection Interval, and prior to the period of extended operation.

The license had planned to examine the pressurizer surge line welds prior to entering the period of extended operation. Because the plant had remained shut down for 2 years at the time of this inspection, the licensee extended the end of the Fourth Inservice Inspection Interval to 2015, as allowed by the ASME code. Consequently, the licensee rescheduled the examination of the pressurizer surge line welds for the next refueling outage, which would occur after the period of extended operation. The team determined that performing the inspection after August 9, 2013, would not meet this license renewal commitment. The licensee documented the need to complete the examination of the pressurizer surge line welds in Condition Report 2013-10806. The team verified that the licensee established a contract for nondestructive examination.

Commitment 26 specified, "As part of the Fatigue Management Program, the NSSS (*reactor coolant*) sampling piping will be analyzed and a stress calculation performed to determine the thermal stress range for the line."

The team reviewed PBD-31, reactor coolant system sample line sampling flow diagrams, and stress calculations performed for the in-scope reactor coolant system sampling lines. The team verified that the licensee performed an appropriate analysis that demonstrated that the in-scope reactor coolant sample lines would not exceed their design stress values during the period of extended operation. The licensee initiated Condition Report 2013-10811 to determine whether they would count cycles or demonstrate sufficient margin.

Commitment 27 specified, "These chemical and volume control system cycle counts (loss of charging, intermittent manual charging makeup cycles, and maximum purification/emergency boration cycles) are gross estimates due to incomplete logs. A condition report (CR) is being generated to address this issue within the corrective action program so that a more accurate transient count/determination can be performed for the indicated transients prior to entry into the period of extended operation."

The team verified that the licensee performed a historical review of calculations and corrective action documents to obtain a more accurate number of cycle counts for the number of chemical and volume control system cycles. The team verified that the cycle counts accounted for loss of charging, intermittent manual charging makeup cycles, and maximum purification/emergency boration cycles.

Based on review of the actions implemented related to the Fatigue Monitoring Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded the corrective actions appropriately addressed the above identified issues and the licensee met the conditions of Commitments 25, 26, and 27 prior to the period of extended operation.

Because the licensee had outstanding actions, Commitments 23 and 24 were not closed and will be reviewed during the Phase 3 inspection.

6. B.2.5 Fire Protection Program and Commitments 14 and 15

The Fire Protection Program aging management program provided administrative requirements for ensuring the operability of fire protection equipment required to ensure plant safe shutdown. The program included visual inspections, system flushing, and performance tests of fire barriers (penetration seals, fire doors, walls, ceilings, and floors), fire suppression system components (piping, valves, nozzles, yard hydrants and hose stations, sprinkler heads, and halon systems and cylinders), and the diesel fire pump.

The team reviewed plant procedures, inspection records and interviewed the program owner. The licensee did not create a program basis document for this program since it was a long standing program described in Procedure SO-G-102, "Fire Protection Program Plan." Instead, the licensee included references to the licensee renewal basis documents and listed affected fire protection procedures. The team identified that Procedure SO-G-102 did not:

- List all fire protection program implementing procedures related to license renewal;
- Summarize the license renewal commitments that affected the program; and
- Identify the special tests required as a result of license renewal (i.e., testing and/or replacement of the sprinklers and ultrasonic testing of susceptible, wetted portions of the above ground fire protection piping).

The licensee documented this deficiency in Condition Report 2013-11977.

Commitment 14 specified:

> "Additional guidance will be added to the diesel fire pump maintenance procedure to inspect the diesel fire pump fuel line and zinc plug for corrosion or mechanical damage.
>
> Specific guidance will be added to the halon and fire damper inspection procedures to inspect halon system components and fire dampers for corrosion, and mechanical and physical damage.
>
> Specific acceptance criteria will be added to the fire barrier inspection procedures for concrete walls, floors, and ceilings.

Specific guidance will be added to the fire door inspection procedure to inspect for wear and missing parts.

Specific guidance will be developed to replace or inspect in-scope sprinkler heads in accordance with NFPA-25.

Additional guidance will be added to one of the system valve cycling tests to improve system flushing.

Specific guidance will be developed for flow testing the in-scope sprinkler system."

The team verified that the licensee had completed each of the required inspections prior to entering the period of extended operation. The team verified that the licensee added: (1) the fuel line and the zinc plug inspections to the diesel fire pump maintenance procedures; (2) guidance to inspect halon components and fire dampers for corrosion, mechanical and physical damage to the halon and damper maintenance procedures; (3) guidance to the fire barrier inspection procedures to evaluate the condition of concrete walls, floors, and ceilings; (4) guidance the fire door maintenance procedures to inspect for wear and missing parts; and (5) guidance to the procedures that included valve cycling to flush until the water ran clear.

The team verified that the licensee had scheduled the replacement of the sprinkler heads for the in-scope systems located in the diesel generator rooms and the auxiliary building basement for Calendar Year 2022, as required by NFPA 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems." For the sprinklers in the turbine building basement, the licensee will remove and test four sprinklers in Calendar Year 2022 and every 10 years thereafter in accordance with Preventive Maintenance Task 16451, "Testing of Sprinkler Heads in the Turbine Building Basement," Revision 0.

For flow testing the in scope sprinkler system, the team determined that the licensee would flow water up to but not past the riser valve (i.e., the normally wetted portions of their sprinkler system). The licensee initiated Condition Report 2013-10744 to correct the poorly worded commitment description, which implied water would flow to the sprinkler heads. During review of records, the team identified some instances that did not require that the water flow until clear during flushed and in other procedures did not specify the inspection criteria. The license documented these deficiencies in Condition Report 2013-10783, and initiated actions to review all other implementing procedures.

During review of the completed maintenance for measuring the zinc plug for the diesel fire pump, the team identified that the licensee did not require documenting the amount of anode remaining; consequently, the licensee could not easily trend whether the anode remaining would last until the next inspection. The licensee documented in Condition Report 2013-10766 the need to correct the procedure to establish a rate of loss of anode.

Commitment 15 specified, "Enhancements will be made to the Fire Protection Program prior to the period of extended operation to implement the requirements of the interim staff guidance (on wall thinning of piping due to corrosion)."

The team determined that the licensee had performed ultrasonic tests of the fire water piping in the turbine building basement. Also, the licensee had conducted ultrasonic tests of three locations on wetted portions of the fire water piping in the turbine building basement. The licensee selected these locations because they were stagnant and the lowest flow areas in the plant, which would be most conducive to corrosion and microbiologically-induced corrosion. Since the licensee had selected likely areas that would become blocked by corrosion and the commitment did not specify to include areas containing in-scope piping that affected post-fire safe shutdown equipment, the team found these actions satisfactory.

Based on review of the actions implemented related to the Fire Protection Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded the corrective actions appropriately addressed the above identified issues and the licensee met the conditions of Commitments 14 and 15 prior to the period of extended operation.

7. B.2.6 Overhead Load Handling System Inspection Program and Commitment 28

The Overhead Load Handling Systems Inspection Program aging management program implemented commitments made in response to Generic Letter 81-07, "Control of Heavy Loads at Nuclear Power Plants," dated February 3, 1981, and the maintenance monitoring requirements of 10 CFR 50.65. The program included assessment of crane lift capabilities, periodic inspections of structural components, and functional tests to assure their integrity. The team determined that this aging management program monitored for loss of material that resulted from corrosion. Further, the licensee had established this aging management program as a commodity group that included heavy load handling equipment and the fuel handling equipment.

The team interviewed the program owner; reviewed the scoping and aging management review documentation; and reviewed program documents. Although the licensee had included the fuel handling equipment in the Overhead Loads commodity group, the team determined that the licensee did not include these components in the program basis document. The team confirmed that the licensee had inspected the refueling equipment; however, the procedures for the refueling equipment did not include the appropriate commitment references for license renewal nor did they provide appropriate guidance related to the aging effect being evaluated. The licensee documented these deficiencies in Condition Report 2013-10872.

The team determined that the licensee had not established a database of inspection results as specified in Program Basis Document 40, "Overhead Loads and Handling Equipment," Revision 1, Section 4.3.5.C.1. The licensee documented the failure to have a database in Condition Report 2013-10688.

Commitment 28 specified:

> "Specific guidance will be added to applicable inspection procedures to inspect for degradation of expansion anchors and surrounding concrete.

Specific guidance will be added to applicable inspection procedures to identify acceptance criteria for general corrosion and degradation of expansion anchors and surrounding concrete.

Specific guidance will be added to applicable inspection procedures to initiate FCS corrective action documentation if excessive general corrosion or cracking of concrete around expansion anchors is identified."

During the Phase 1 inspection, the team reviewed Engineering Analysis EA-FC-00-143, "Overhead Load Handling Inspection Program," Revision 0 and the implementing procedures. The team determined that the implementing procedures did not include explicit guidance to look for aging effects during the maintenance activities. The licensee documented this deficiency in Condition Report 2012-05389. During this inspection, the team verified that the licensee had corrected the implementing procedures to specify the required information. The team concluded the licensee met this commitment.

Based on review of the actions implemented related to the Overhead Load Handling Systems Inspection Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded the corrective actions appropriately addressed the above identified issues and the licensee met the conditions of Commitment 28 prior to the period of extended operation.

8. B.2.7 Periodic Surveillance and Preventive Maintenance Program and Commitments 36 and 37

The Periodic Surveillance and Preventive Maintenance Program aging management program provided for periodic inspections and examinations of specific system and structural components using established nondestructive examination techniques. The inspection and examination techniques used and the periodicity of their performance provided reasonable assurance that age related degradation will not compromise the structure or component intended function(s) before the next scheduled inspection.

The team reviewed the updated safety analysis report supplement, the program basis document, implementing procedures and preventative maintenance tasks, completed inspections and maintenance records, the license renewal application, the safety evaluation report, and the correspondence to and from the NRC. The team interviewed the program owner and reviewed trending of data and evaluation of samples.

The licensee used this program as part of their overall maintenance strategy for the station that incorporates vendor recommendations, equipment operating history, industry best practices, and regulatory requirements associated with the maintenance of station structures, systems, and components. This program included all routine maintenance activities that prolong service life and ensure equipment reliability and operability during normal and emergency service as described in Program Basis Document PBD-13, "Preventative Maintenance," Revision 10. This program is a specific subset of the overall preventive maintenance process that applied to 20 specific systems and looked for loss of material and cracking of numerous components.

Commitment 36 specified, “The aging effects of hardening and loss of strength for elastomers are not included in the general corrosion of external surfaces program (B.3.3). Enhancements will be made to add these *aging effects requiring management* to preventive maintenance tasks under the PS/PM (B.2.7) to specifically perform hands on type inspections of elastomer expansion joints, seals, and vibration isolators within the scope of license renewal for hardening and loss of strength. Applicable PMs are performed at least once per refueling cycle (approximately 18 months).”

The team reviewed the established frequency for elastomer inspections and assessed whether the licensee had identified degraded elastomers. The team reviewed completed work orders for inspecting the condition of numerous components, drawings, and discussed the documented inspection activities and updates with the licensee. The team reviewed numerous completed work orders that included the guidance to evaluate the condition of the elastomers for cracking and loss of material.

The team determined that the licensee specified performing preventative maintenance at least once per refueling cycle (approximately 18 months); however, the frequency listed in several procedures specified performing the preventive maintenance every 54 months. The team determined from record reviews that the preventive maintenance tasks had been completed every 18 to 21 months. The licensee documented this discrepancy in Condition Report 2013-10865 and initiated actions to correct the preventive maintenance task frequencies.

Commitment 37 specified, “The portion of CCW that provides cooling to the SI leakage coolers is included within the scope of license renewal. The piping and components will be added to the license renewal database and the CCW AMR evaluation will be revised to include these components.”

The team verified that Letter LIC-03-0036, “Transmittal of Boundary Drawings Referenced in Responses to Potential Open Items for the Review of the License Renewal Application for Fort Calhoun Station, Unit 1,” dated March 14, 2003, demonstrated that the piping drawings included the component cooling water piping to the safety injection coolers. The team verified that the licensee included the affected components in the license renewal component database.

Based on review of the actions implemented related to the Periodic Surveillance and Preventive Maintenance Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded the corrective actions appropriately addressed the above identified issues and the licensee met the conditions of Commitments 36 and 37 prior to the period of extended operation.

9. B.2.8 Reactor Vessel Internal Inspection Program and Commitments 16 and 18

The Reactor Vessel Internals Inspection Program aging management program included the following elements for cast austenitic stainless steel and other reactor vessel internal components: (a) determination of the susceptibility of cast austenitic stainless steel components to thermal aging and neutron irradiation embrittlement, (b) identification of the most susceptible or limiting items, (c) development of appropriate inspection techniques to permit detection and characterizing of the feature (cracks) of interest and demonstrate the effectiveness of the proposed technique, (d) implementation of required

inspections prior to the period of extended operation, and (e) periodic monitoring of vessel internals vibration.

The team interviewed the program owner, reviewed surveillance records, and reviewed the program basis document. The licensee committed to follow industry programs and use state-of-the-art inspections to evaluate thermal embrittlement of cast austenitic stainless steel components. The team verified that the licensee had updated Program Basis Document PBD-44, "Reactor Vessel Internals Inspection," Revision 1, to list the recommendations of MRP-227A, "Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines," dated December 2011, for conduct of the inspections.

NRC issued Regulatory Issue Summary 2011-07, "License Renewal Submittal Information for Pressurized Reactor Internals Aging Management," dated July 21, 2011, which provided licensees with guidance for committing to the guidelines of MRP-227A. The licensee documented in Letter LIC-12-144, "Submittal of Reactor Vessel Internal (RVI) Component aging management program (AMP) for Fort Calhoun Station (FCS), Unit No. 1," dated September 27, 2012, that the facility met the conditions of a Category B facilities had to submit their Reactor Vessel Internals aging management program and inspection plans to NRC prior to October 1, 2012. The licensee documented the aging management and inspection programs in WCAP-17347-NP, "PWR Vessel Internals Program Plan for Aging Management of Reactor Internals at Fort Calhoun Station," Revision 1.

The team determined that the licensee met the conditions as described in Category B because they had committed to following the EPRI Materials Reliability Program (MRP). The team verified that headquarters personnel considered these actions more appropriate than following the plant specific commitments made at the time of their licensing. The team confirmed that GALL Report, Revision 2, specified that licensees should follow the guidance of MRP-227A.

The licensee informed the NRC of the changes to Commitments 16 and 18 in Letter LIC-13-0059, "Change to License Renewal Commitments Pertaining to Inspection of Reactor Vessel Internals," dated May 10, 2013. The team reviewed the supporting commitment change paperwork for this commitment. The licensee processed this commitment change as an administrative/non-technical change to their updated safety analysis report. The team disagreed with this categorization because the licensee had revised their method for meeting a commitment rather than clarifying a description. The team concluded that the licensee should have implemented their 10 CFR 50.59 evaluation process.

The failure to process this change would be a minor violation as described in NRC Enforcement Manual, Section 2.11.d.6 since there was no reasonable likelihood that the change would ever require NRC approval in accordance with 10 CFR 50.59. By considering this as an administrative/non-technical change, the licensee failed to demonstrate an appropriate technical basis for the change to the commitment as described in their updated safety analysis report. The licensee documented this deficiency in Condition Report 2013-12276.

The team confirmed that the licensee revised the core loading pattern and transitioned to low radial leakage fuel management in 1983 and to extreme low radial leakage fuel

management in 1992. The licensee revised the loading of partially burned fuel to reduce the effects of neutron fluence on the reactor vessel internals. Based on actual operating history, the licensee calculated the reactor vessel internals would experience approximately 20 years of operation at high neutron fluence and approximately 40 years of low neutron fluence through the end of the period of extended operation. These operating fluence conditions were conservative relative to the assumption in MRP-227A for operating for 30 years at high leakage levels and for 30 years at low leakage levels.

Commitment 16 specified, "Visual inspections of the core shrouds at Palisades and FCS in 1995 and 1993, respectively, revealed no panel separation and no missing bolts. Ten-year in-service inspections were performed at FCS in 1992 and will be performed again in 2003 and prior to the period of extended operation. The results of these inspections, the Palisades in-service inspection results, and the results of industry programs will be monitored to determine if additional action, such as ultrasonic inspection, is necessary.

The EPRI MRP is developing an action plan to address potential SCC of reactor vessel internals. OPPD is participating in this program and will take action, as necessary, in response to any recommendations and findings coming from the evaluation."

The team determined that the licensee planned to inspect the core shroud during the next outage following the reactor startup from the current plant shutdown that exceeded 2 years. The team confirmed that the licensee appropriately followed the ASME code when delaying the inspections. In addition, MRP-227A allowed the licensee up to the second outage after entering the period of extended operation to complete the reactor vessel internal inspections, including the core shroud.

Commitment 18 specified, "The following enhancements will be made to the Reactor Vessel Internals Inspection Program:

> A fluence and stress analysis will be performed to identify critical locations. A fracture mechanics analysis for critical locations will be performed to determine flaw acceptance criteria and resolution required to detect flaws. Appropriate inspection techniques will be implemented based on analyses.
>
> (For the RVI flow skirt)The fracture mechanics analysis committed to in Section B.2.8 of the LRA will be performed."

The team determined that the licensee revised their commitment and met the technical and time requirements specified in Regulatory Information Summary 2011-07. The team verified that headquarters personnel considered these actions more appropriate than following the plant specific commitments made at the time of their licensing. The team confirmed that GALL Report, Revision 2, specified that licensees should follow the guidance of MRP-227A.

Based on review of the actions implemented related to the Reactor Vessel Internals Inspection Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded the corrective actions appropriately addressed the above identified issues and the licensee met the conditions of Commitments 16 and 18 prior to the period of extended operation.

10. B.2.10 Structures Monitoring Program and Commitments 29, 30, 31, and 32

The Structures Monitoring Program aging management program required periodic visual inspection of designated structures and component supports to ensure that aging degradation will be detected, evaluated, and repaired prior to any loss of intended functions. The inspection requirements were based on numerous industry documents that required structures to be designed withstand seismic events and required implementation of periodic inspections.

The team performed general area walk downs of the auxiliary building and containment, interviewed the program owner, and reviewed the implementing procedures. The team determined that the licensee had included the three separate license renewal aging management programs represented by masonry walls, structural monitoring and water control structures into the four separate procedures that implemented the maintenance rule structural monitoring program. Program Basis Document PBD-42, "Structures Monitoring Program," Revision 1, described the structures monitoring program. The team interviewed the program owner.

The licensee divided their maintenance rule structural inspection program into four separate procedures that addressed the following major areas:

- Auxiliary Building
- Containment Building
- Intake Structure and Miscellaneous Structures
- Turbine Building

The team verified that each implementing procedure referenced the construction standards, included specific guidance for inspecting the structures, provided acceptance criteria for inspecting the structures.

During walk downs, the team identified brass fittings on a stainless steel test connection. From review of drawings the team determined that the field configuration did not match the design drawings. The licensee documented this design deficiency in Condition Report 2013-11830, which constituted a minor violation of configuration control since the brass caps had minimal effect on the stainless steel test connection piping.

During the walk down of the tendon gallery, the team identified a grease pile below tendon H-2067, approximately 4 feet in diameter and 1 foot high. The team determined that the grease exceeded the 10 percent allowable leakage amount specified in the ASME code. The licensee initiated actions to issue a 90-day report as required by Technical Specification 5.21. The licensee determined this tendon had a gasket cocked during reassembly that, combined with an unusually high temperature (101°F), allowed the grease to reach the point that reduced the viscosity and allowed the grease to leak out. The licensee verified that this vertical hoop tendon was tested during the current outage. The licensee documented the deficiency in Condition Report 2013-10804.

The team determined that the technical specifications specified that the licensee would comply with Regulatory Guide 1.35, "Inservice Inspection of Ungrouted Tendons in Prestressed Concrete Containments," Revision 1, which specified a maximum of

5 percent allowed leakage. The team confirmed that the ASME code specified the tendons remained functional with 10 percent leakage. The licensee documented this deficiency in Condition Report 2013-12270.

Commitment 29 specified, “For concrete at FCS, even though OPPD has concluded that the *aging effects requiring management* identified for concrete in the GALL Report are not applicable due to the plant's operating experience. OPPD has committed to be consistent with the GALL Report and monitor for the possibility of the *aging effects requiring management* with the programs identified in the GALL Report.”

The team verified that the licensee had inspected their in-scope structures in accordance with the procedures that implemented their maintenance rule structures monitoring program. The licensee had completed these inspections that incorporated the license renewal commitments prior to entering the period of extended operation.

Commitment 30 specified, “A periodic task will be initiated as part of the structures monitoring program to take ground water samples on a five year frequency and compare the evaluation results to previous samples.”

During this inspection, the team verified that the licensee had included references to license renewal in the groundwater program and the implementing sample procedure. The team reviewed some groundwater samples taken by chemistry personnel in response to industry initiatives as specified in their groundwater monitoring program. The team confirmed that the ground water was not detrimental to underground structures. The license documented the failure to have a 5-year periodic task in Condition Report 2013-09273 and initiated actions to develop the preventive maintenance task.

Commitment 31 specified that “OPPD will perform a one-time inspection of the circulating water discharge tunnel per the structures monitoring program (B.2.10). The circulating water discharge tunnel will be included within the scope of license renewal as part of the intake structure.” The safety evaluation report and updated safety analysis report identified that the inspections would occur prior to entering the period of extended operation.

As documented in Inspection Report 05000285/2012009, the licensee conducted an underwater inspection of approximately 10 percent of the circulating water discharge tunnel instead of draining the discharge tunnel and performing a 100 percent inspection. Letter LIC-12-0172, “Change to License Renewal Commitment Regarding Circulating Water Discharge Tunnel Inspection,” dated December 13, 2012, revised the commitment to conduct an underwater inspection of 10 percent of the discharge tunnel every 6 years. The team verified that the licensee had established a preventive maintenance task to inspect the discharge tunnel every 6 years. From discussions with the program engineer, the team determined that the licensee will inspect a different 10 percent each inspection. Based upon the inspection results from the first inspection and the amount of surface area being inspected, the team concluded the licensee had made an appropriate revision to this commitment.

The team determined that the licensee had not revised the program basis documents to reflect the change from a one-time to a periodic inspection activity. The licensee initiated Condition Report 2013-10880 to document the need to update PBD-42 to

describe this inspection as periodic versus one-time. Also, the condition report discussed the need to update Program Basis Document PBD-29, "One-Time Inspection Program," to eliminate discussion of the circulating water discharge structure as a one-time inspection.

The team reviewed the supporting commitment change paperwork for this commitment. The licensee processed this commitment change as an administrative/non-technical change to their updated safety analysis report. The team disagreed with this categorization because the licensee had revised their method for meeting a commitment rather than clarifying a description. The team concluded that the licensee should have implemented their 10 CFR 50.59 evaluation process.

The failure to process this change would be a minor violation as described in NRC Enforcement Manual, Section 2.11.d.6 since there was no reasonable likelihood that the change would ever require NRC approval in accordance with 10 CFR 50.59. By considering this as an administrative/non-technical change, the licensee failed to demonstrate an appropriate technical basis for the change to the commitment as described in their updated safety analysis report. The licensee documented this deficiency in Condition Report 2013-12276.

Commitment 32 specified that "The following FCS-specific tasks will be added to the SMP:

1) Performance of periodic sampling and evaluation of ground water

2) Guidance to inspect structural components when exposed by excavation

3) Specific acceptance criteria will be added to inspection procedures to be commensurate with industry codes, standards, and guidelines.

XI.S5 (*masonry walls*)

4) Specific guidance will be added to inspect masonry walls for cracking and condition of steel bracing.

XI.S6 (*structures monitoring*)

5) Specific guidance will be added for inspection of component supports, new fuel storage rack, and the plant-specific components identified in the LRA Section 3 tables. Aging management activities related to these components will be commensurate with industry standards and practices as identified in the NUREG-1801 Structures Monitoring Program criteria.

6) Additional guidance commensurate with industry codes, standards, and guidelines, will be added to inspection procedures.

XI.S7 (*water control structures*)

7) Additional guidance will be added to the inspection procedure to identify specific parameters to inspect.

8) Additional guidance will be added to review maintenance activities since last inspection."

From review of the four implementing procedures, the conduct of maintenance procedure, and the ground water program, the team confirmed that the licensee: (1) added the reference to license renewal to the groundwater program and sampling procedure; (2) specified requirements in Procedure SO-M-100, “Conduct of Maintenance,” Revision 57, to inspect structural components when exposed by excavation; (3) added specific acceptance criteria for inspecting the different types of structures to each implementing procedure; (4) included requirements to inspect masonry walls for cracking and condition of steel bracing; (5) added specific requirements to inspect component supports, new fuel storage rack, and other plant-specific components in accordance with industry practices; (6) added additional definitions and guidance discussed in industry standards; (7) included guidelines for parameters to consider; and (8) required review of the last inspection information to ensure changes would be identified.

Based on review of the actions implemented related to the Structures Monitoring Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded the corrective actions appropriately addressed the above identified issues and the licensee met the conditions of Commitments 29, 30, 31, and 32 prior to the period of extended operation.

11. B.3.2 Buried Piping and Components Program and Commitment 19

The Buried Piping and Components Program aging management program required inspection of buried piping, tanks, and valves whenever they are uncovered due to excavation for maintenance or modifications. Piping and component coatings and wrappings were inspected for degraded conditions that could be indicative of possible surface corrosion of the protected metal beneath. The licensee planned to establish and adjust the scope and periodicity of inspections based on the inspection results.

The team reviewed the updated safety analysis report supplement, the program basis document, implementing procedures and preventative maintenance tasks, completed inspections and maintenance records, the license renewal application, the safety evaluation report, and the correspondence to and from the NRC. The team interviewed the program owner.

The team determined that the licensee had removed sludge from the Fuel Oil Tank FO-1 in both 2005 and 2009. The licensee performed both inspections in response to license renewal commitments. Following the 2005 inspection, the licensee documented significant pitting in Condition Report 2005-01600. The team determined that the licensee had implemented the industry initiative related to risk ranking and scheduling pipe excavations for their buried and underground piping. The requirements described in Program Basis Document PBD-28, “Buried Piping and Components,” Revision 8, implemented the requirements described in NEI 09-14, “Guideline for the Management of Underground Piping and Tank Integrity,” Revision 1.

The team determined that the program being implemented by the licensee to meet the industry initiative and guidelines exceeded the opportunistic requirements specified in the GALL Report, Revision 0. The licensee had scheduled the excavations and inspections of the highest risk segments. The licensee described their process to

evaluate the risk of the remaining segments and begin the process of excavating additional piping sections after completing the first round of inspections.

Because of the pitting identified in 2005, the licensee initiated Engineering Change 37583, "Line the Interior of Diesel Fuel Oil Storage Tank FO 1," Revision 0, to remove the old coating, inspect, and apply a new coating. The team determined that the suction pipe in Fuel Oil Tank FO-1 was six inches above the tank floor and the sludge removed during each inspection did not exceed a depth of two inches. The team concluded the licensee took actions to manage the effects of aging for these underground storage tanks.

Commitment 19 specified, "As identified in the FCS license renewal application, the Buried Surfaces External Corrosion Program is a new program that will be implemented at FCS prior to the period of extended operation. The new program will include the following items to make it consistent with GALL XI.M34, 'Buried Piping and Tanks Inspection' criteria:

- A revision has been completed to the FCS maintenance control procedure to require engineering evaluation of concrete, piping, and piping coatings whenever excavations are performed.

- Current routine inspections of diesel fuel oil tanks within the scope of license renewal will be annotated as commitments required to meet license renewal requirements.

- A program basis document will be developed which will define the program requirements and compile industry and FCS operating experience related to buried components."

The team verified that the licensee: (1) revised the conduct of maintenance procedure to require engineering evaluations of concrete, piping and pipe coatings whenever piping was excavated; (2) annotated the routine inspection procedures for the fuel oil tanks within the scope of license renewal that they had included the license renewal requirements; and (3) developed Program Basis Document PBD-28, "Buried Piping and Components."

Based on review of the actions implemented related to the Buried Piping and Components Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded that the licensee met the conditions of Commitment 19 prior to the period of extended operation.

12. B.3.3 General Corrosion of External Surface Program and Commitment 20

The General Corrosion of External Surfaces Program aging management program implemented systematic inspections and observations to detect corrosion of external surfaces and conditions that can result in corrosion such as damaged coatings and fluid leaks. Inspections and observations include (1) rounds by operators, (2) system engineer walk downs, and (3) refueling interval inspections inside containment in accordance with Regulatory Guide 1.54, "Quality Assurance Requirements for Protective Coatings Applied to Water-Controlled Nuclear Power Plants."

The team reviewed the updated safety analysis report supplement, the program basis document, and implementing procedures, completed inspections, the license renewal application, the safety evaluation report, and the correspondence to and from the NRC. The team interviewed the program owner.

The team verified that the licensee added guidance to plant procedures that required both system engineers and operators to look for excessive corrosion and excessive cracking of elastomers. The procedures required that system engineers review inaccessible areas once they are accessible during outages. The procedures provided guidance on evaluating the different types of aging effects.

Commitment 20 specified, "Procedures will be revised to include acceptance criteria that a visual indication of loss of material or cracking of elastomer ventilation components identified by the accountable Operator or Engineer will not necessarily lead to an unacceptable component."

The team verified that the licensee included guidance for engineers in Procedure PED-SEI-20, "Duties and Responsibilities of System Engineering Personnel," Revision 21, and for operators in Procedure SO-O-1, "Conduct of Operations," Revision 100, to monitor and document loss of material from metal components (corrosion) and cracking of elastomer ventilation components.

Based on review of the actions implemented related to the General Corrosion of External Surfaces Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded that the licensee met the conditions of Commitment 20 prior to the period of extended operation.

13. B.3.4 Cables and Connections Program and Commitments 35 and 41

The Cables and Connections Program aging management program was a new program that provided aging management of (1) non-environmentally qualified electrical cables and connections exposed to an adverse localized environment caused by heat, radiation, or moisture; (2) non-environmentally qualified electrical cables used in instrumentation circuits that are sensitive to reduction in conductor insulation resistance, and are exposed to an adverse localized environment caused by heat, radiation, or moisture; and (3) non-environmentally qualified inaccessible medium-voltage cables exposed to an adverse localized environment caused by moisture and voltage exposure.

Aging management was provided by the following actions:

(1) Accessible electrical cables and connections installed in adverse localized environments will be inspected prior to the period of extended operation and at least once every 10 years for cable and connector jacket surface anomalies, such as embrittlement, discoloration, cracking, swelling, or surface contamination.

(2) Electrical cables used in circuits with sensitive, low-level signals, such as radiation monitoring and nuclear instrumentation, are tested as part of the instrumentation loop calibration at the normal calibration frequency.

(3) In-scope medium voltage cables exposed to significant moisture and significant voltage will be tested prior to the period of extended operation and at least once every 10 years to provide an indication of the condition of the conductor insulation. The test will be a state-of-the-art test at the time the test is performed.

This program considers the technical information and guidance provided in numerous documents listed in the attachment. The program also addressed fuses as required by Commitment 41.

The team interviewed the program owner; reviewed inspection records, implementing procedures, and program documents; and reviewed the license renewal application and the safety evaluation report. Program Basis Document PBD-30, "Cables and Connections," Revision 1, described the methods the licensee planned to use to implement the inspections consistent with GALL Report, Revision 0, for each of these aging management programs, which included requirements to manage the aging effects for fuses.

Commitment 35 specified:

> "For non-EQ cables and connections within the scope of license renewal and subject to an aging management review:
>
> OPPD will implement a program and inspection consistent with that described in XI.E1 of the GALL Report.
>
> OPPD will implement a program and inspection consistent with that described in XI.E2 of the GALL Report.
>
> OPPD will implement a program and inspection consistent with that described in XI.E3 of the GALL Report."

The team verified that PBD-30 provided an accurate description of the aging management programs for cables and connections exposed to adverse localized environments, instrumentation circuits and inaccessible medium voltage cables. The licensee had initiated Condition Report 2013-03198 that documented eleven specific open items that needed to be included in the Cables and Connections aging management program prior to entering the period of extended operations. The team interviewed licensee staff on the status of each open item and determined that the licensee had completed or was in the process of completing nine of the open items. The licensee had not completed Open Item 5 or Open Item 6.

The team verified that the licensee had inspected and tested their in-scope inaccessible medium voltage cables. The licensee had placed the testing of the cables on a 6-year frequency with annual inspections of the manholes. In addition, the licensee had installed an alarm system to detect level increases in the manholes (refer to Section 4OA5.01.b.10, Commitment 31).

Open Item 5 required that the licensee identify their localized adverse environments in an Engineering Analysis for inaccessible and accessible cables and connections, along with their in-scope manholes. Open Item 6 required that the licensee create model work orders that required performing 100 percent visual inspection for accessible cables and

connections in the turbine building, containment building, intake structure, and auxiliary buildings. The licensee had completed the initial inspections and required that the model work orders specify a frequency not to exceed the 10-year interval specified in their aging management programs. The team concluded that the licensee would complete these open items prior to the period of extended operation.

Commitment 41 specified, "OPPD will manage the aging of fuse holders in accordance with ISG-5."

The licensee included the fuses in the Maintenance Rule, as well as the Cables and Connections aging management program. The fuse holders provided mechanical support for the fuse to maintain electrical contact when the circuit current is at or below the current rating of the fuse. The licensee planned to manage the effects of aging by visually inspecting fuse holders as directed by work orders and procedures.

The team determined that the licensee: (1) reviewed drawings to validate the location of fuse holders, (2) visually inspected readily accessible fuses holders, which included up some of the junction boxes, and (3) used their corrective action program to document deficiencies.

Based on review of the actions implemented related to the Cables and Connections Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded the corrective actions appropriately addressed the above identified issues and the licensee met the conditions of Commitments 35 and 41 prior to the period of extended operation.

14. B.3.5 One-Time Inspection Program and Commitments 7, 8, 9, 10, and 11

The One-Time Inspection Program aging management program was a new program that implemented one-time inspections of internal surfaces of selected components to verify the effectiveness of mitigating programs such as the chemistry and diesel fuel oil programs. Inspections will be performed using suitable techniques at the most susceptible locations to verify that aging effects are not occurring or that the aging effect is progressing at such a slow rate it will not impact the intended function during the period of extended operation.

The team reviewed the program basis document, license renewal application, NRC safety evaluation report, updated safety analysis report, completed work orders, examination results, implementing procedures, evaluations of operating experience, and corrective action documents. The interviewed the program owner and inspection personnel.

The team determined that the licensee had: (1) established a program for one-time inspections of the in-scope components as described in their license basis; (2) performed one-time inspections of components exposed to different combinations of material type and environment; (3) confirmed that the licensee incorporated operating experience associated with one-time inspections; and (4) addressed conditions adverse to quality identified during one-time inspections. The team confirmed that the licensee established one-time inspections that could appropriately assess whether aging effects had occurred in the systems and components being evaluated.

Commitment 7 specified, “Develop the one-time inspection program which reflects the program elements of GALL AMP XI.M32, and other commitments in response to the NRC staff’s review, as documented in responses to staff requests for additional information and potential open items.”

The team determined that Program Basis Document PBD-29, “One-Time Inspection,” Revision 7, properly reflected the aging management program elements described in the GALL Report, Revision 0, Section XI.M32. The team confirmed that the licensee had 12 work orders for one-time inspections of fire protection components that remained pending but scheduled for completion prior to the period of extended operation.

Commitment 8 specified, “OPPD has conservatively included loss of material as an aging effect requiring management for Alloy 600 in borated treated water ‘To validate the effectiveness of the chemistry program, OPPD will determine the worst-case location for the potential occurrence of this aging effect requiring management and perform a one-time inspection of this location prior to the period of extended operation.’”

The licensee replaced the pressurizer in 2006 that replaced the in-scope Alloy 600 locations with Alloy 690 material. The licensee withdrew this commitment in Letter LIC-12-0064. The team reviewed the supporting commitment change paperwork for this commitment. The licensee processed this commitment change as an administrative/non-technical change to their updated safety analysis report. The team disagreed with this categorization and concluded that the licensee should have implemented their 10 CFR 50.59 evaluation process.

The failure to process this change would be a minor violation as described in NRC Enforcement Manual, Section 2.11.d.6 since there was no reasonable likelihood that the change would ever require NRC approval in accordance with 10 CFR 50.59. By considering this as an administrative/non-technical change, the licensee failed to demonstrate an appropriate technical basis for the change to the commitment as described in their updated safety analysis report. The licensee documented this deficiency in Condition Report 2013-11920.

Commitment 9 specified, “OPPD will continue to visually inspect and perform a dye-penetrant exam on the two remaining reactor coolant pump thermal barriers when the rotating assemblies are refurbished. In addition, an air drop test will also be performed on the seal water coolers to ensure tube integrity. FCS will credit the One-Time Inspection Program for these reactor coolant pump thermal barrier and seal water cooler tubes.”

From review of records, the team verified that the licensee had performed visual and dye penetrant examinations for the Trains B and D reactor coolant pump covers/thermal barriers. Similarly, the team verified that the licensee performed air drop tests performed on each of the four reactor coolant pump coolers. The team identified no concerns or aging effects from review of the test results.

Commitment 10 specified, “OPPD commits to the requirements in GALL Report Section XI.M32 relative to the inspection of small-bore reactor coolant system piping and to base inspections on those locations where small-bore piping is subject to thermal cycling stratification and turbulent penetration.”

PBD-29 identified five small-bore piping categories that needed to be inspected: (a) pressurizer associated piping, (b) chemical and volume control system to pressurizer spray, (c) power operated relief valves, (d) reactor vessel closure head vent pipe, and (e) reactor coolant gas vent system (3/8 and 1-inch diameter tubing). The team determined that the licensee had cancelled all but 1 of 17 inspections of reactor coolant system small-bore piping based on a stress analysis performed for Commitment 26 of the Fatigue Monitoring Program aging management program. The analysis evaluated whether the combination of thermal and mechanical cyclic loading on the evaluated lines would exceed the stresses in ASME B31.1 at the end of the period of extended operation. For the single inspection, the licensee had volumetrically examined a section of 3/8-inch diameter tubing located adjacent to Valve RC-139, reactor coolant system Loop 2 hot leg sample line isolation valve. The licensee examined the tubing section using eddy current testing from the outside surface of the tube.

The team identified concerns related to using an evaluation instead of performing the required inspections and using a questionable volumetric examination technique. The team determined that the evaluation was not consistent with the requirements in GALL Report, Revision 0, Section XI.M32, and their program basis document. Specifically, the team determined that:

- The licensee used engineering evaluations as an alternative to one-time inspection or destructive testing of an appropriate sample population. The team determined that the licensee should have used the stress analysis as an input to select the limiting components. The GALL Report specified that the licensee should consider time in service, severity of operating conditions, and lowest design margin to identify bounding locations.

- The licensee used an eddy current examination technique that would not effectively confirm whether a crack had initiated or grow because of stress corrosion cracking or cyclic loading. The team determined that selecting 3/8-inch diameter tubing was not a representative sample of small-bore piping less than 4-inches nominal pipe size, including pipe, fittings, and branch connections. The team identified that the calibration standard did not contain any circumferential flaws and the flaws in the standard ranged from 20 to 100 percent through wall. The licensee credited this technique as a volumetric examination even though the technique could not readily detect the 20 percent through wall flaw in the calibration block.

The team determined that performing the inspection after August 9, 2013, would not meet this license renewal commitment. The licensee documented these deficiencies and the need to complete the examination of the small bore piping welds in Condition Report 2013-11992. The team verified that the licensee established a contract for nondestructive examination services.

The licensee identified that they had 129 butt welds and 45 socket welds, and had plans to inspect 14 butt welds and 7 socket welds, respectively. The licensee contracted a nondestructive examination firm to inspect the welds. The licensee had previously radiographed three socket welds in 2009. The licensee will destructively examine four socket welds removed during replacement of the chemical and volume control system piping during the extended shutdown. The licensee replaced the piping because the

stress analysis determined that the piping had exceeded its stress values. The licensee identified the representative sample based upon the type of connection, accessibility and keeping exposure as low as reasonably achievable. The licensee indicated that the highest stress locations had been removed.

Commitment 11 specified, "Worst-case locations will be evaluated and identified, taking into account severity of condition, time of service, and lowest design margin, as part of the implementation of the one-time inspection program (B.3.5) prior to the period of extended operation."

The team verified that PBD-29 contained a susceptibility evaluation methodology to select the components that would receive a one-time inspection. The licensee evaluated several material/environment combinations with associated aging effects and established the number of inspection samples in accordance with the guidance in Report TR-107514, "Age-Related Degradation Inspection Method and Demonstration," Section 4 – Sampling Program Description. The licensee then regrouped the material/environment combinations in "susceptibility evaluations," for which a sample of components were selected for inspection based on their age and operating conditions. The team determined that the licensee planned to complete 10 percent of a representative sample of small-bore piping described in GALL Report, Revision 2. The team identified no concerns related to the sample program methodology.

Based on review of the actions implemented related to the One-Time Inspection Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded the corrective actions appropriately addressed the above identified issues and the licensee met the conditions of Commitments 7, 8, 9, 10, and 11 prior to the period of extended operation.

15. B.3.6 Selective Leaching Program and Commitment 33

The Selective Leaching Program aging management program implements inspection requirements for susceptible components for indication of selective leaching through dezincification or graphitization.

Commitment 33 specified, "Develop the selective leaching program which reflects the program elements of GALL AMP XI.M33, as clarified in LRA Section B.3.6, and other commitments in response to the NRC staff's review, as documented in the responses to staff RAIs and potential open items (POIs)"

The team reviewed the applicable sections of the license renewal application, safety evaluation report, and final safety analysis report, reviewed the program basis document, procedures, work instructions, inspection records, and corrective action documents, and interviewed the program owner. The licensee concluded that selective leaching was not occurring in brass and bronze based on over 45 visual inspections that had no indications of selective leaching. The team sampled six inspections from both brass and bronze inspections and confirmed the licensee conclusions.

The licensee had completed two inspections of grey cast iron, planned to inspect two additional components, and revised work orders to include visual inspections for selective leaching in 18 preventive maintenance tasks that would be completed

subsequent to the period of extended operations. Because of an insufficient number of visual inspections combined with the known presence of selective leaching in a similar environment, the team concluded the licensee had insufficient data to demonstrate that this aging effect would not occur. Because grey cast iron components typically failed because of other aging mechanisms such as general corrosion and pitting, the team determined that opportunities would arise to evaluate for the presence of selective leaching. For example, the team determined that the licensee recently replaced the fire water system jockey pump because of exterior corrosion of the base. The licensee initiated actions to establish an aging management program for grey cast iron that would include destructive testing. The licensee documented the intent to develop an ongoing aging management program in Condition Report 2013-12039.

The team identified that the Buried Pipe Program aging management program implementing procedures should ensure that any fire protection fittings removed for destructive testing and evaluation for selective leaching of the grey cast iron. The licensee documented this deficiency in Condition Report 2013-11889.

Based on review of the actions implemented related to the Selective Leaching Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. The team concluded the corrective actions appropriately addressed the above identified issues and the licensee met the conditions of Commitment 33 prior to the period of extended operation with implementation of the Selective Leaching Program aging management program.

16. B.3.7 Thermal Aging Embrittlement of Cast Austenitic Stainless Steel and Commitments 34 and 39

The Thermal Aging Embrittlement of Cast Austenitic Stainless Steel Program aging management program included evaluation of the reactor coolant piping as bounded by the leak-before-break analysis, assessment of other cast austenitic stainless steel components for susceptibility to thermal embrittlement, and performance of volumetric inspection of piping or component-specific flaw tolerance evaluation for susceptible components.

The team reviewed program basis document, reviewed scoping evaluations, the license renewal application, the NRC safety evaluation report, and the updated safety analysis report supplement and interviewed the program owner. The team identified that the licensee documented this aging management program in Program Basis Document PBD-39, “Thermal Aging Embrittlement of Cast Austenitic Stainless Steel,” Revision 1

Commitment 34 specified, “Develop the thermal aging embrittlement of cast austinetic stainless steel program that reflects the program elements of GALL AMP XI.M12, and other commitments in response to the NRC staff's review, as documented in the responses to staff requests for additional information and potential open items.”

The team determined that the licensee opted to manage thermal aging embrittlement of cast austinetic stainless steel components in the reactor coolant system through a flaw tolerance evaluation of the main reactor coolant system cast austinetic stainless steel piping. The licensee evaluated the maximum flaw size that could remain in service until

the end of the period of extended operation considering thermal aging embrittlement and using the methodology recommended in the GALL Report (i.e. ASME, Section XI, Subsection IWB-3640). However, the team identified two deficiencies associated with the assumptions and conclusions in the flaw tolerance evaluation:

- The licensee inappropriately ruled out stress corrosion cracking effects in the flaw tolerance evaluation performed for the reactor coolant system cast austinetic stainless steel piping based on the effectiveness of the Water Chemistry Program aging management program (i.e., concluding that stress corrosion cracking was not a credible aging effect requiring management). The team determined that the license renewal application and safety evaluation report described that the licensee credited the thermal aging embrittlement of cast austinetic stainless steel aging management program for managing crack initiation and growth due to stress corrosion cracking and loss of fracture toughness due to thermal aging embrittlement.

- The conclusions about the resulting postulated flaw sizes did not provide any correlation between the postulated flaw sizes and the detection capability of the non-destructive in-service inspection examination technique currently used or expected to be used. The team determined that postulating flaws without confirming that a qualified non-destructive examination technique could detect the flaws provided insufficient technical justification to reasonably assure that the applicable aging effects would be managed.

The team determined that the licensee documented this deficiency in Condition Report 2013-11991. Follow-up and evaluation of licensee corrective actions to address thermal aging embrittlement of cast austinetic stainless steel components in accordance with the GALL Report and the licensing basis is an unresolved item: Unresolved Item 05000285/2013009-03, “Flaw Tolerance Evaluation for Thermal Aging Embrittlement of CASS Components.”

The team identified that the licensee had not evaluated other cast austinetic stainless steel components (as listed below) in the reactor coolant system for susceptibility to thermal aging embrittlement in accordance with the GALL Report, Revision 0 and the license renewal application. Consequently, the licensee did not include these components in the scope of the flaw tolerance evaluation nor performed any volumetric examination to detect and size cracks. The licensee had replaced two of the nozzles when they replaced their pressurizer in 2006. The affected reactor coolant system nozzles included:

- RC-PIPE-2501Q-CHARGE-NOZZ
- RC-PIPE-2501Q-DRAIN-NOZZ
- RC-PIPE-25011-PM-NOZZ
- RC-PIPE-2501Q-PMS-NOZZ
- RC-PIPE-2501Q-SDC-INLET-NOZZ
- RC-PIPE-2501Q-SDC-OUT-NOZZ

The team determined that the licensee documented this deficiency in Condition Report 2013-11991. Follow-up and evaluation of licensee corrective actions to address thermal aging embrittlement of the six cast austinetic stainless steel nozzles in the

reactor coolant system as stated in Commitment 34 is an unresolved item: Unresolved Item 05000285/2013009-04, Thermal Aging Embrittlement of CASS Nozzles in the Reactor Coolant System.

Commitment 39 specified, “OPPD will complete a plant-specific leak before break (LBB) analysis using the latest LBB criteria. OPPD will submit to the NRC a license amendment request containing the plant-specific LBB evaluation.”

At the time of this inspection, the licensee did not have a leak-before-break analysis for their existing power level. Report WCAP-17262-NP, “Technical Basis for Eliminating Large Primary Loop Pipe Rupture as the Structural Design Basis for Fort Calhoun Unit 1,” Revision 0, provided a leak-before-break evaluation at the extended power uprate conditions. During the owner acceptance review of the leak-before-break evaluation at the extended power uprate conditions, the licensee identified that some stress locations on the hot leg and cold leg reactor vessel nozzles at the extended power uprate were lower than those calculated for their current license basis locations. Consequently, the licensee initiated actions to perform the leak-before-break calculation to 60 years at the current operating conditions. The licensee initiated Condition Report 2013-10952 to track completion of the leak-before-break analysis for current power levels.

Verification that the licensee submitted their leak-before-break analysis prior to entering the period of extended operation as stated on Commitment 39 is an unresolved item: Unresolved Item 05000285/2013009-05, “Submittal of Leak-Before-Break Analysis.”

Based on review of the actions implemented related to the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation. Based on the need to complete two separate evaluations related to Commitment 34, the team will keep this commitment open and review the evaluations during the Phase 3 follow-up inspection. Also, since the licensee had not completed the leak-before-break evaluation and submitted a license amendment request, the team will keep Commitment 39 open.

17. Commitment 38

Commitment 38 specified, “For commitments listed in the Safety Evaluation Report, OPPD will include this list of commitments in an appropriate subsection of the FCS updated safety analysis report supplement for license renewal.”

The team verified that the licensee had developed updated safety analysis report, Chapter 15, “License Renewal Supplement.” The supplement included Section 15.4, “License Renewal Commitment Listing,” Revision 3. The team verified that the commitments listed in Section 15.4 matched the commitments listed in the safety evaluation report.

Based on review of the timeliness and adequacy of the actions implemented, the team determined that the licensee met the conditions of Commitment 38.

.02 Aging Management Programs without any Associated Commitments

a. Inspection Scope

The team evaluated whether the licensee met the commitments listed below, as described in NUREG-1782, "Safety Evaluation Report (SER) Related to the License Renewal of Fort Calhoun Station, Unit 1." The team verified that the licensee implemented procedures, documented inspection results, initiated corrective action documents, and provided training to implementing personnel.

The team reviewed supporting documents including implementing procedures, work orders, inspection reports, engineering evaluations, and condition reports; conducted interviews with licensee staff, including the program owners; observed in-process outage activities; and performed visual inspection of structures, systems, and components including those not accessible during power operation to verify that the licensee completed the necessary actions to comply with the license conditions stipulated in the renewed facility operating license.

Specific documents reviewed are listed in the report attachment.

b. Findings and Observations

1. B.1.1 Bolting Integrity Program

The Bolting Integrity Program aging management program included periodic inspection of closure and structural bolting for indications of potential problems, including loss of material, crack initiation, and loss of preload. The program implemented guidelines on materials selection, strength and hardness properties, installation procedures, lubricants and sealants, corrosion considerations in the selection and installation of pressure-retaining bolting, and enhanced inspection techniques.

The team reviewed the Bolting Integrity Program aging management program basis documents, implementing procedures, selected work orders and corrective actions documents, and interviewed the program owner.

The team verified that Procedure MD-AD-0007, "Bolting," Revision 8, implemented the guidelines and requirements of the industry standards referenced in the license renewal application. The team confirmed that the licensee established controls for protecting the reactor vessel head studs from boric acid. The licensee used lubricants that protected and would not cause cracking of bolting. The team verified that personnel were familiar with the requirements of the bolting procedure.

Based on review of the actions implemented related to the Bolting Integrity Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation.

2. B.1.2 Chemistry Program

The Chemistry Program aging management program managed the aging effects of material loss (corrosion), cracking and fouling by means of controlling water chemistry to minimize contaminant concentration in accordance with industry guidelines. There were

no enhancements and no commitments for the program as part of the license renewal application.

The team reviewed the license renewal application, safety evaluation report, and the updated safety analysis report, program procedures, work instructions, and analysis records, and interviewed the program owner. The team reviewed the computer record system, Fort Calhoun Station Chemistry – Laboratory Information Management System, to evaluate ongoing chemistry control of various primary, secondary, and auxiliary chemistries, including the corrosion inhibitors used in closed cooling systems.

Based on review of the actions implemented related to the Chemistry Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation.

3. B.1.3 Containment Inservice Inspection Program

The Containment Inservice Inspection Program aging management program implemented the examination requirements of ASME Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components,* Subsection IWE, and Subsection IWL for the containment structure and support components. The licensee implemented the programs through periodic visual inspection of concrete and metallic surfaces, periodic visual inspection and sample tendon testing for signs of degradation, and surface and volumetric inspection of pressure retaining components for signs of degradation.

The team reviewed the licensing basis, program basis documents, implementing procedures, and related work orders to verify that the licensee implemented the program as described in the license renewal application. The team interviewed the program owner regarding this program and verified that the licensee updated the implementing procedures. The team reviewed the last two inservice inspection reports

Based on review of the actions implemented related to the Containment Inservice Inspection Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation.

4. B.1.4 Containment Leak Rate Program

The Containment Leak Rate Program aging management program implemented the requirements of 10 CFR Part 50, Appendix J, and Technical Specification 5.19. The program monitors leakage rates through containment liner/welds, penetrations, fittings, and other access openings for detecting degradation of the containment pressure boundary. Corrective actions are taken if leakage rates exceed acceptance criteria.

The team verified that the licensee appropriately implemented the requirements for performance-based leak rate testing of the containment structure. The team reviewed the program basis document, implementing procedures and test results. The team discussed the program with the program owner. From review of a summary of historical data for integrated and local leak rate tests since the plant began testing, the team determined that the licensee had continued to improve the condition of the penetrations by reducing both the as-found and as-left leakage numbers. The team determined that the licensee had two large decreases in the leakage rate when they (1) adopted their

Appendix J leak rate program and (2) implemented the performance-based method of testing. From review of the data history and a leak rate data table, the team confirmed that the licensee managed and monitored their penetrations for degrading performance.

Because of the extended shutdown, the licensee planned to baseline the leakage from all their penetrations upon startup from the extended outage. The team determined the licensee planned to implement appropriate actions based upon the plant conditions.

Based on review of the actions implemented related to the Containment Leak Rate Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation.

5. B.1.5 Flow Accelerated Corrosion Program

The Flow Accelerated Corrosion Program aging management program implemented administrative controls to conduct appropriate analysis and baseline inspections, determined extent of thinning, replaced/repaired components, and performed follow-up inspections to confirm or quantify and take longer-term corrective actions. The program relies on implementation of NSAC-202L-R3, "Recommendations for an Effective Flow-Accelerated Corrosion Program."

The team verified that Program Basis Document PBD-3, "Flow Accelerated Corrosion," Revision 10a, used the latest industry guidance to implement the flow accelerated corrosion program. The team noted that the licensee had upgraded the version of the industry program documents to the latest version, which also agreed with GALL Report, Revision 2. The team determined that the program owner effectively monitored and tracked susceptible locations to prevent failures of susceptible piping configurations. The team verified that the licensee implemented the flow accelerated program as described in the license renewal application and the safety evaluation report.

Based on review of the actions implemented related to the Flow Accelerated Corrosion Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation.

6. B.2.9 Steam Generator Program

The Steam Generator Program aging management program consisted of inspection scope, frequency, and acceptance criteria for various steam generator components, including the plugging and repair of flawed tubes in accordance with the plant Technical Specifications and the guidance of NEI 97-06, "Steam Generator Program Guidelines."

The team interviewed the program owner and verified that the licensee included license renewal requirements in the program description. The licensee described the steam generator program requirements and specifications in Program Basis Document PBD-1, "Steam Generator Program," Revision 19. The team verified that the program basis document described applicable regulatory requirements, implementing procedures, and training. The program basis document included historical resources and outage reports. The team verified that baseline inservice inspections had reviewed this program.

The licensee installed replacement steam generators in 2006, which were fabricated with Alloy 690 material to better resist stress corrosion cracking. The team reviewed the eddy current test results from the 2008 refueling outage. The team interviewed licensee staff and reviewed the timeline associated with the replacement activities and component enhancements.

The team reviewed work order packages, the annunciator response procedure, surveillance test procedures, preventative maintenance for the steam generator tube sheet annulus and sludge removal, and visual inspection reports for the steam generator secondary side. The team verified that the licensee enhanced the annunciator response procedure related to loose parts monitoring. The team reviewed PED-SEI-42, Steam Generator Program, Revision 12, which was credited and provided guidance for implementing the Steam Generator Program and Steam Generator tube integrity. The licensee clarified that the steam generator program included aging management activities and updated the program scope to include plant specific components identified as in-scope in the license renewal application.

Based on review of the actions implemented related to the Steam Generator Program aging management program, the team concluded the aging management program would effectively manage the effects of aging during the period of extended operation.

.03 Time-Limited Aging Analyses

a. Inspection Scope

The team evaluated whether the licensee completed the time-limited aging analyses as described the safety evaluation report. The team verified whether the licensee conducted appropriate evaluations that demonstrated the time-dependent aging effects continued to meet design requirements throughout the period of extended operation. The team discussed the analyses with the program owner, the license renewal project manager and/or with design engineers.

b. Findings and Observations

1. Reactor Vessel Embrittlement

The updated safety analysis report supplement for license renewal identified the following four analyses affected by neutron embrittlement as time-limited aging analyses:

- Pressure/Temperature Curves
- Low Temperature Overpressure Protection Power Operated Relief Valve Setpoints
- Pressurized Thermal Shock
- Reactor Vessel Upper Shelf Energy

The team verified that the NRC safety evaluation report described that the licensee had appropriately evaluated these four time-limited aging analyses for the period of extended

operation and that the updated safety analysis report supplement provided adequate summary of the time-limited aging analyses to satisfy 10 CFR 54.21. The NRC safety evaluation report did not identify future actions or commitment items due prior to the period of extended operation.

Based on review of the actions implemented related to this time-limited aging analysis, the team concluded the licensee performed evaluations that demonstrated that the component would continue to function through the period of extended operation without any adverse effects from the applicable aging effects

2. Metal Fatigue

The updated safety analysis report supplement for license renewal stated that there are three distinct issues considered separately under the time-limited aging analyses for metal fatigue and that each of these issues is managed by the Fatigue Monitoring Program aging management program:

- Reactor Coolant and associated systems thermal fatigue
- Pressurizer Surge Line Thermal Stratification
- Fatigue of Class 2 and 3 components

The team verified that the NRC safety evaluation report described that the licensee had appropriately evaluated these three issues and that the planned actions and commitments will ensure that the subject components will be adequately managed during the period of extended operation to satisfy 10 CFR 54.21c(1). The team confirmed that the updated safety analysis report supplement provided an adequate description of the metal fatigue time-limited aging analyses to satisfy 10 CFR 54.21(d).

Based on the review of licensee's actions implemented to meet the regulatory commitments for the Fatigue Monitoring Program, the team concluded the licensee had not completed all the evaluations associated with this time-limited aging analysis. As discussed in Section 4OA5.01.b.5 of this inspection report, the team identified two unresolved items associated with the Fatigue Monitoring Program aging management program commitments, which will require resolution and follow-up inspection to obtain reasonable assurance that the design function of the affected components will be maintained during the period of extended operation.

3. Concrete Tendon Pre-Stress

The plant pre-stressed the containment wall and dome by means of unbonded post tensioned tendons. The pre-stress on the containment tendons decreased over the plant life as a result of elastic deformation, creep and shrinkage of concrete, anchorage seating losses, tendon wire friction, stress relaxation and corrosion. The licensee monitored and confirmed the pre-stressing tendon integrity by a regular program of tendon surveillance. The updated safety analysis report contained curves showing anticipated variation of tendon force with time, together with the lower limit curves to be applied to surveillance readings. The calculated pre-stress at end of plant life exceeds by a reasonable margin the intensity required to meet the design criteria.

The team reviewed the calculations performed and graphs generated after the last two tendon surveillances and discussed the results with licensee personnel. The team

verified that the tendon lift-off force has reached a steady state plateau that exceeds the lower limit by a significant margin and concluded that the tendon prestress would remain at or near this level through the period of extended operation. The team noted that these tendons had followed the typical curve for decreasing amount of pre-stress until an equilibrium was reached.

Based on review of the actions implemented related to this time-limited aging analysis, the team concluded the licensee performed evaluations that demonstrated that the component would continue to function through the period of extended operation without any adverse effects from the applicable aging effects.

4. Containment Liner Plate and Penetration Sleeve Fatigue

The licensee designed the containment liner and penetration sleeves to be leak-tight under all postulated loading combinations by limiting strains to those values that have been shown to result in leak-tight pressure vessels. The containment fatigue analysis indicated that when the maximum compressive strain in the liner was reached under operating conditions and subsequent cyclic temperature variations were applied to the liner, there was no significant change in stress and strain in concrete or steel for the second cyclic load indicating that shakedown had occurred during the first cycle of loading. Also, the investigation for 500 cycles of loading for the liner steel, anchor steel and anchor welds resulted in a computed cumulative usage factor of 0.05, which was within the allowable usage factor of 1.0.

The team verified that the NRC safety evaluation report described that the licensee had performed an appropriate analysis of these components that demonstrated they would continue to perform their function into the period of extended operation. The team confirmed that the updated safety analysis report supplement provided an adequate description of the containment liner plate and penetration sleeve fatigue time-limited aging analyses to satisfy 10 CFR 54.21(d).

Based on review of the actions implemented related to this time-limited aging analysis, the team concluded the licensee performed evaluations that demonstrated that the component would continue to function through the period of extended operation without any adverse effects from the applicable aging effects.

5. Reactor Coolant Pump Flywheel Fatigue

The time-limited aging analysis for Reactor Coolant Pump Flywheel Fatigue was an existing analysis that will be credited for the period of extended operation. The reactor coolant pump motor flywheels provide inertia to ensure a slow decrease in reactor coolant flow in order to prevent fuel damage from a loss of power to the reactor coolant pumps. During operation at normal speed, a flywheel has sufficient kinetic energy to produce high-energy missiles and excessive vibration of the reactor coolant pump assembly if the flywheel should fail. Overspeed of the pump rotor assembly during a transient increases both the kinetic energy of the flywheel and the potential for failure. The licensee performed fracture analyses on the flywheels based on possible overspeed conditions, stress level, flaw size, temperature, and fracture toughness at critical location(s) of interest in the flywheel. This analysis predicted the number of starting/stopping cyles before flywheel failure.

The licensee examined the resistance to rupture of the reactor coolant pump flywheels at 120 percent overspeed. The licensee determined that over 185,000 complete cycles from zero to 120 percent overspeed would be required to cause a crack to grow to critical size. The team confirmed that this number of cycles would not be exceeded by extending the licensing period to 60 years. To do so would require more than eight pump starts per day. The team confirmed that the General Electric produced reactor coolant pump flywheel analyses remained valid for the period of extended operation.

During the 1996 refueling outage, the licensee replaced the Reactor Coolant Pump RC-3B motor with a motor manufactured by ABB Industries. The license performed a crack growth analysis that demonstrated that critical flaw growth would not occur with fewer than 10,000 complete cycles from zero to 120 percent overspeed. The team confirmed the licensee would not exceed this number of cycles during the period of extended operation. The analysis demonstrated the licensee would need to start the pump once every 2 days.

Based on review of the actions implemented related to this time-limited aging analysis, the team concluded the licensee performed evaluations that demonstrated that the component would continue to function through the period of extended operation without any adverse effects from the applicable aging effects.

6. Leak-Before-Break Analysis

The licensee committed to perform a plant-specific leak-before-break analysis prior to the period of extended operation. This analysis will consider a 60-year life and thermal aging effects of the cast austinetic stainless steel components in the reactor coolant system.

At the time of this inspection, the licensee did not have a leak-before-break analysis for their existing power level. Report WCAP-17262-NP provided a leak-before-break evaluation at the extended power uprate conditions. During the owner acceptance review of the leak-before-break evaluation at the extended power uprate conditions, the licensee identified that some stress locations on the hot leg and cold leg reactor vessel nozzles at the extended power uprate were lower than those calculated for their current license basis locations.

As discussed in Section 4OA5.01.b.16, this time-limited aging analysis required the submittal of a license amendment request. The team will evaluate licensee actions related to this time-limited aging analysis during the Phase 3 inspection when closing Unresolved Item 05000285/2013009-05.

7. Replacement Steam Generator Analysis

The licensee replaced the steam generators in 2006. The steam generator design utilized a flow accelerated corrosion analysis for the feed ring. This calculation was based on a 40-year design life for the steam generators. Because the design life for the replacement steam generators encompasses the period of extended operation, the flow accelerated corrosion analysis remained valid for the period of extended operation.

The team determined that the feed ring would be resistant to flow accelerated corrosion based on the materials used in fabrication and the shaping factors used to form the feed

ring. The team identified no concerns with the method used to perform the evaluation nor the conclusions. The feed ring calculation demonstrated the component would last 40 years based upon the expected amount of flow-accelerated corrosion. Since the licensee had installed replacement steam generators in 2006 with a 40-year life, the steam generators had 13 additional years of analyzed life beyond the end of the period of extended operation.

Based on review of the actions implemented related to this time-limited aging analysis, the team concluded the licensee performed evaluations that demonstrated that the component would continue to function through the period of extended operation without any adverse effects from the applicable aging effects.

.04 Newly Identified Components

a. Inspection Scope

The team evaluated whether the licensee reviewed and identified newly identified components and incorporated these components into the appropriate aging management programs.

b. Observations and Findings

The licensee compared the plant equipment database used to prepare the license renewal application to the master equipment list to evaluate whether they had inadvertently excluded any components from the scoping and screening process. Similarly, the licensee evaluated components originally considered outside the scope of license renewal but subsequent plant modifications required them to be included in the scope of components subject to aging management review. Additionally, the licensee reviewed engineering change packages completed since the issuance of the renewed license to identify those engineering changes that could potentially result in newly identified components under 10 CFR 54.37(b) (e.g. safety classification changes to components, and/or plant configuration changes). The licensee identified eight valves in the ventilation system that required managing for aging effects that were not included in the original scoping results. The licensee generated Action Request 00026137 to include the aging management of these components in the next revision of the updated safety analysis report.

Procedure PED-GEI-83, “10 CFR 54.37(b) Review Process,” Revision 4, provided guidance on how to identify structures, systems, and components within the scope of 10 CFR 54.37(b). The team determined that an action item required periodic update of the updated safety analysis report to implement procedure PED-GEI-83 and ensure compliance with 10 CFR 54.37(b). However, the team identified that the licensee did not have any guidance in current administrative procedures to ensure that structures, systems, and components applicable to 10CFR 54.37(b) were systematically reported with each updated safety analysis report revision. The licensee initiated Condition Report 2013-10871 to revise Procedure NL-02, “Nuclear Licensing Department,” to incorporate the reporting requirements of 10 CFR 54.37(b). The team confirmed that the licensee planned to revise the updated final safety analysis report.

On the basis of the sample selected for review, the team determined that the licensee took appropriate actions to identify “newly identified” structures, systems, and

components. The team determined that the licensee had established an appropriate scope and appropriately evaluated for management of aging affects.

.05 Verification of Updated Safety Analysis Supplement

a. Inspection Scope

The team evaluated whether the licensee revised the updated safety analysis report supplement to reflect the aging management program and time-limited aging analysis descriptions in the safety evaluation report. The team compared the aging management program and time-limited aging analysis descriptions to the programs being implemented to determine whether they matched the programs being implemented and whether the licensee had incorporated the newly identified components into the updated safety analysis report supplement.

b. Observations and Findings

The supplement updated safety analysis report Section 15.2, "Programs and Activities for Managing the Effects of Aging," Revision 1, listed the aging management programs submitted in the license renewal application. Overall, the licensee had accurately transferred the information from the license renewal application to updated safety analysis report Section 15.2. The team identified the following differences from the license renewal application:

- Changed the referenced fatigue monitoring software from Fatigue Pro to WESTEMS (note this was a potential methodology change discussed in Section 4OA5.01.b.5)
- Removed document numbers from the descriptions of industry document
- Updated flow accelerated corrosion program to reflect the current industry guidelines
- Updated the Alloy 600 program information to reflect NRC orders
- Updated the inservice inspection program to match the fourth inservice interval ASME code
- Added descriptions of commitments to some inspections
- Modified program titles to match onsite programs

Condition Report 2013-10809 documented that the licensee would need to update their updated safety analysis report after they completed implementing their commitments to accurately reflect the status of their aging management programs and their commitments. With the exception of the conversion from Fatigue Pro to WESTEMS, the team considered these changes administrative.

Based on the minor differences between the license renewal application and the updated safety analysis report supplement, the team determined that the licensee

appropriately described their aging management programs in the updated safety analysis report.

.06 Review of Administrative Controls

a. Inspection Scope

The team reviewed administrative controls related to changing commitments, identifying and incorporating operating experience related to aging effects, and identifying deficiencies in the corrective action program attributable to aging effects. The team evaluated whether the licensee updated aging management programs to account for operating experience issued since the licensee had received the renewed license and any changes to the GALL Report or other approved topical reports.

The team reviewed the corrective action program to evaluate whether the applicant established a method to evaluate the effects of aging and to identify deficiencies that may have resulted from aging effects.

The team sampled corrective action documents, interviewed personnel, evaluated corrective actions implemented, and reviewed process documents during this inspection.

b. Observations and Findings

The licensee initiated a gap analysis to identify the actual differences that affected their aging management programs as a result of the differences between GALL Report, Revision 0 and Revision 2.

At the time of this inspection the licensee had completed their analysis of the differences between GALL Report Revision 0 and Revision 2. The team reviewed the licensee assessments during review of the aging management programs. The team did not identify any differences other than those identified by the licensee. The team returned the proprietary information reviewed during this analysis to the licensee.

The team will review incorporation of aging effect reviews of passive components in their operating experience and corrective action programs during the Phase 3 inspection.

.07 Follow-up of Events and Notices of Enforcement Discretion

.1 (Closed) Unresolved Item 05000285/2012009-01: Evaluation of Future Discharge Tunnel Inspection Plans

During the Phase 1 inspection, the team determined that the licensee planned to conduct the discharge tunnel inspection after entering the period of extended operation. The licensee had performed a 10 CFR 50.59 evaluation that justified allowing the inspection to occur until after they entered the period of extended operation. Because the license condition specified that the inspection would be completed prior to entering the period of extended operation, the licensee implemented an alternative inspection technique.

The licensee conducted an underwater inspection of approximately 10 percent of the circulating water discharge tunnel instead of draining the discharge tunnel and

performing a 100 percent inspection. Letter LIC-12-0172, "Change to License Renewal Commitment Regarding Circulating Water Discharge Tunnel Inspection," dated December 13, 2012, revised the commitment to conduct underwater inspection of 10 percent of the discharge tunnel every 6 years. The team verified that the licensee had established a preventive maintenance task to inspect the discharge tunnel every 6 years. From discussions with the program engineer, the team determined that the licensee will inspect a different 10 percent each inspection. Based upon the inspection results from the first inspection and the amount of surface area being inspected, the team identified no concerns with the revision to this commitment.

The team closed this unresolved item.

.2 (Closed) Unresolved Item 05000285/2012009-02: Impact of Wetting on Safety-Related Cables

During the inspection of Manhole 31, the team determined that the cables were routed in conduit and questioned whether the water could drain to Manhole 5. When Manhole 5 floods an open path exists for water to travel into the conduit and become trapped in the conduit low spots in Manhole 31. The licensee documented this deficiency in Condition Report 2012-04997. Licensee records indicated that Manhole 5 had filled three times in 14 years (since 1998) since they began to keep records. In addition, the team determined that the licensee specified they would address water intrusion into the manholes prior to startup from the extended shutdown in response to Notice of Violation 05000285/2011006-02.

During this inspection, the team determined that the licensee had implemented level monitoring of Manholes 5 and 31 in April. The team confirmed that the level monitoring system would send messages to the shift manager. Procedure ARP-MLM-1, "Wireless Remote Level Alarms for Manhole Level Monitors," Revision 0, provided guidance to operators for responding to a blocked sensor or high water level alarm through a satellite paging system. The procedure provided guidance to the operators for responding to the alarms and referenced a maintenance procedure. Procedure EM-FLP-AE-0001, "Inspection and Dewatering of Manholes," Revision 0, provided the necessary steps to install a sump pump and dewater the manholes.

Because the licensee had recently implemented the monitoring system, the team determined that insufficient operating history and experience existed to evaluate the effectiveness of the monitoring system.

The team reviewed testing conducted on the cables and determined that the wetting had not affected the cables. The team was confident that the licensee would establish the guidelines for effective monitoring and testing of the level monitoring system. Because this level monitoring system had been recently installed, the team will review the performance of this system during the Phase 3 inspection.

Since this item is being tracked as Violation 05000285/2011006-02 (refer to Section 4OA5.07.3), the team closed this unresolved item.

.3 (Open) Violation 05000285/2011006-02: Inadequate Corrective Actions to Ensure the Reliability of the Raw Water Pump Power Cables

The licensee indicated that the corrective actions for this violation also addressed the issues related to Unresolved Item 05000285/2012009-02. As discussed in Section 4OA5.07.2 above, this violation will track the corrective actions for Unresolved Item 05000285/2012009-02.

Further, the team determined that the licensee initiated Condition Report 2013-11857 that documented the system had not actuated the pagers as required. The team concluded that, although the licensee had installed an alarm system to identify a high water level, the licensee had insufficient time to demonstrate reliability and effectiveness of the system.

.4 (Closed) Unresolved Item 05000285/2012009-03: Assess Corrective Actions and Determine Structural Effect of Water Intrusion and Boric Acid on Interior Containment Walls

During the last inspection, the team identified that the licensee continued to experience a significant amount of leakage from the reactor cavity liner and had initiated a root cause evaluation. The licensee documented this deficiency in Condition Report 2012-00116. In addition, the previous inspection had questioned the cause and impact of the borated water leakage on the structure based upon a signification amount of brown staining on the Steam Generator bay walls, as documented in Condition Report 2012-05067.

The team reviewed the licensee evaluation and planned corrective actions related to the excessive leakage through the reactor cavity liner and into the concrete. The team independently evaluated the contractor report and confirmed that the leakage did not impact the structural integrity of the refueling cavity concrete or reinforcing steel. The team determined that the licensee performed an appropriate apparent cause evaluation and identified the likely cause of the excessive amount of water. The licensee concluded that the water emanated from degraded seals on the sand box covers, detector well covers, and/or the reactor vessel seal ring. The team reviewed the drawing markups and photographs taken of the cast-in-place steel sleeve for Steam Generator B. The team confirmed that the rust stains resulted from moisture on the wall causing corrosion of carbon steel on the exterior of the wall.

The team closed this unresolved item.

40A6 Meetings, Including Exit

The team presented the initial inspection results to Mr. Lou Cortopassi, Vice President and Chief Nuclear Officer and other members of the licensee staff during an initial exit meeting conducted on June 7, 2012. The licensee acknowledged the NRC inspection observations. The team retained no proprietary information and verified that no proprietary information was documented in this report.

The team conducted a final exit meeting on July 12, 2013, with Mr. Lou Cortopassi, Vice President and Chief Nuclear Officer and other members of the licensee staff, after reviewing supplemental information provided by the licensee. The team retained no

proprietary information and verified that no proprietary information was documented in this report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

M. Bakhit, Nuclear Engineer
L. Cortopassi, Vice President and Chief Nuclear Officer
T. Dukarski, Chemistry
M. Edwards, Licensing Engineer
K. Erdman, Engineering Programs Supervisor
B. Huebner, Mechanical Lead
J. Johnston, Program Engineer
B. Lisowyj, Manager, Material Projects
K. Maassen, Program Engineer
E. Matzke, Compliance Engineer
G. Miller, Supervisor, Nuclear Engineering
R. Short, Assistant Engineering Director
T. Simpkin, Nuclear Oversight Manager
J. Sweeley, System Engineer
P. Turner, Program Engineer

NRC Personnel

B. Fu, Mechanical Engineer, Division of License Renewal
J. Kirkland, Senior Resident Inspector
J. Medoff, Senior Mechanical Engineer, Division of License Renewal
J. Wingebach, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened	Item	Description
05000285/2013009-01	URI	Evaluation of Environmentally-Assisted Fatigue for Charging Line Nozzle (Section 4OA5.01.b.5)
05000285/2013009-02	URI	Evaluation of Operating Cycles for Fatigue Monitoring Program (Section 4OA5.01.b.5)
05000285/2013009-03	URI	Flaw Tolerance Evaluation for Thermal Aging Embrittlement of CASS Components (Section 4OA5.01.b.16)
05000285/2013009-04	URI	Thermal Aging Embrittlement of CASS Nozzles in the Reactor Coolant System (Section 4OA5.01.b.16)
05000285/2013009-05	URI	Submittal of Leak-Before-Break Analysis (Section 4OA5.01.b.16)

Closed	Item	Description
05000285/2012009-001	URI	Evaluation of Future Discharge Tunnel Inspection Plans (Section 4OA5.07.1)
05000285/2012009-002	URI	Impact of Wetting on Safety-Related Cables (Section 4OA5.07.2)
05000285/2012009-003	URI	Assess Corrective Actions and Determine Structural Effect of Water Intrusion and Boric Acid on Interior Containment Walls (Section 4OA5.07.4)

Discussed	Item	Description
05000285/2011006-02	VIO	Inadequate Corrective Actions to Ensure the Reliability of the Raw Water Pump Power Cables (Section 4OA5.07.3)

COMMITMENTS

The inspectors reviewed and closed the following Commitments during this inspection: 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 37, 38, and 41

Although reviewed, the following commitments remain open following this inspection: 23, 24, 34, and 39.

NRC closed Commitments 1, 2, 3, 4, 5, 17, and 40 in Inspection Report 05000285/2012009.

DOCUMENTS REVIEWED

General

CONDITION REPORTS

2013-10658*	2013-10661*	2013-10688*	2013-10697*	2013-10701*	2013-10706*
2013-10715*	2013-10720*	2013-10744*	2013-10756*	2013-10766*	2013-10783*
2013-10804*	2013-10806*	2013-10808*	2013-10809*	2013-10811*	2013-10865*
2013-10866*	2013-10867*	2013-10871*	2013-10872*	2013-10880*	2013-10952*
2013-11830*	2013-10889*	2013-11920*	2013-11925*	2013-11927*	2013-11930*
2013-11968*	2013-11977*	2013-11985*	2013-11991*	2013-11992*	2013-12027*
2013-12039*	2013-12270*	2013-12276*			

*identified during this inspection

AUDITS AND ASSESSMENTS

NUMBER	TITLE	DATE
2009-01244	License Renewal Self-Assessment	November 10, 2010
2010-01538	Engineering Programs Self-Assessment of License Renewal	August 29, 2011

LICENSE RENEWAL

NUMBER	TITLE	REVISION/DATE
NUREG-1782	Safety Evaluation Report Related to the License Renewal of Fort Calhoun Station	October 31, 2003
USAR 15.1	License Renewal Supplement	5
USAR 15.1	License Renewal Supplement – Introduction	7
USAR 15.2	License Renewal Supplement – Programs and Activities for Managing the Effects of Aging	0
USAR 15.3	License Renewal Supplement – Evaluation of Time-Limited Aging Analyses	0
USAR 15.4	License Renewal Supplement – License Renewal Commitment Listing	0
PBD-34	License Renewal	3

MISCELLANEOUS

NUMBER	TITLE	DATE
LIC-02-0147	Responses to Request for Additional Information (RAI) for the Review of the License Renewal Application for Fort Calhoun Station, Unit 1	December 19, 2002
LIC-03-0035	Responses to Potential Open Items for the Review of the License Renewal Application for Fort Calhoun Station	March 14, 2003
LTR-PEUS-13-19	GALL Gap Resolution Report for Fort Calhoun Station	March 2013

MISCELLANEOUS

TITLE
Commitment list with status of implementation for each commitment
Inspection Report 05000285/2002007
Inspection Report 05000285/2003007

Aging Management Programs with Associated Commitments

B.1.6 Inservice Inspection Program and Commitment 6

DRAWINGS

NUMBER	TITLE	REVISION
11405-S-28	Reactor Plant Reactor Steel Supports	4
A-1	ISI Isometric Drawing: Reactor Pressure Vessel Welds	2
A-1B	Reactor Pressure Vessel	0
A-2	ISI Isometric – Reactor Pressure Vessel Lower Head	2
A-2A	ISI Isometric – Reactor Pressure Vessel Closure Head	5
A-8	ISI Isometric Drawing: Main Reactor Coolant-Loop 1	6
A-9	ISI Isometric Drawing: Main Reactor Coolant-Loop 2	6
L 24049	Testing Arrangement of Containment Liner Bottom	2

MISCELLANEOUS

NUMBER	TITLE	REVISION/DATE
	Fort Calhoun Station Fourth Interval ISI Program Plan – In-service Inspection Program Plan 2003-2013 Interval	5
AR 00031873	CEDM Cracking	January 3, 2003

MISCELLANEOUS

NUMBER	TITLE	REVISION/DATE
EA-FC-00-137	Program Evaluation for License Renewal: Inservice Inspection Program	0
LIC-01-0095	Fort Calhoun Station Control Element Drive Mechanism (CEDM) Housing Reliability Management	October 15, 2001
LIC-02-0007	Fort Calhoun Station Discussion of Control Element Drive Mechanism (CEDM) Housing Reliability	January 25, 2002
WCAP-17727-NP	Fort Calhoun CEDM Upper Housing Evaluation	0
WDI-PJF-1305131-FSR-002	Omaha Public Power District – Fort Calhoun Station CEDM Seal Housing Eddy Current Examination	June 23, 2011
Work Request 00196567	Reactor Vessel Closure Head – Need to Volumetrically Inspect CEDM Upper Housing in RFO 28	May 18, 2013

PROCEDURES

NUMBER	TITLE	REVISION
PBD-2	In-service Inspection Program	14
PED-GEI-55	Instructions for ASME Section XI Repair/Replacement Process	19
SE-PM-AE-1004	Preventive Maintenance: Containment Building Structural Inspection	8

B.2.1 Boric Acid Corrosion Prevention Program and Commitment 21

CONDITION REPORTS

2007-05075	2008-03682	2008-03683	2008-03993	2008-05384	2008-05468
2008-05584	2008-07075	2009-00300	2009-04346	2009-04347	2009-04348
2009-04475	2009-05583	2009-05617	2009-06145	2010-00761	2010-01721
2010-01730	2010-01784	2010-01792	2010-01804	2010-04396	2010-04741
2010-05159	2010-05271	2010-05393	2010-05436	2010-05452	2010-06842

CONDITION REPORTS

2011-02761	2011-02877	2011-03636	2011-04156	2011-04157	2011-04158
2011-04159	2011-04161	2011-04162	2011-04163		

PROCEDURES

NUMBER	TITLE	REVISION
PBD-10	Boric Acid Corrosion Control Program	14
PED-SEI-11	Trend Monitoring Analysis	5
MM-RR-CEDM-01202	Repair-Rework, CEDM Disassembly, Inspection, and Reassembly	5
MM-RR-RC-0010	Repair-Rework, Inspecting and Cleaning Reactor Coolant Pump Studs	2
MM-RR-RC-0313	Reactor Vessel Closure Head Flange Preparation	11
MM-RR-RC-1000	Cleaning of Reactor Vessel Studs, Nuts and Washers	15
PE-RR-ICI-0300	Incore Instrument Adapter Hub Removal/Cleaning and Bullet Nose Installation	18
PED-SEI-020	Duties and Responsibilities of System Engineering Personnel	18
PE-RR-RC-0101	Repair-0Rework, Opening of Steam Generator Primary Side	22
PE-RR-RC-0103	Pressurizer Manway Cover Removal	20
QCP-200	Certification Requirements for Quality Control Inspectors	38
QCP-400	Visual Inspection	15
SE-EQT-MX-0002	Carbon Steel and Low Alloy Steel Fasteners Inservice Testing Inspections	12
SO-C-2	FCS Quality Assurance Records	98
SO-M-100	Standing Order, Conduct of Maintenance	57
PE-RR-VX-0416S	Inspection and Diaphragm Replacement Safety	8

PROCEDURES

NUMBER	TITLE	REVISION
	Related ITT-0Grinnell Model 2461-026-0M Diaphragm Valves	
QC-ST-CH-3001	Surveillance Test, Chemical and Volume Control System Refueling Leak Rate Test Outside Containment	4
QC-ST-MX-3003B	Visual Inspection (VT-02) of Piping in the Purification Filter Vault (Room 62)	0

Work Order 00383498-1

B.2.2 Service Water Reliability Program and Commitment 22

LICENSE RENEWAL

NUMBER	TITLE	REVISION/DATE
EA-FC-00-087	Cooling Water Corrosion Program Evaluation for License Renewal	0
Generic Letter 89-13	Service Water System Problems Affecting Safety-Related Equipment	November 18, 1989
PBD-17	Service Water Reliability	7
TR-107396	Closed Cooling Water Chemistry Guidelines	November 1997

MISCELLANEOUS

TITLE
Condition Report 2012-04338
PMID 1757-2, “Perform Shell Side Inspection,” Revision 0
Work Order 00167575-1

PROCEDURES

NUMBER	TITLE	REVISION
MM-RR-RW-0001	Removal and Installation of Raw Water Pumps	38
MM-RR-RW-0002	Raw Water Pump Disassembly, Inspection, Repair, and Reassembly	9

QUALITY CONTROL INSPECTION REPORTS

20070013 20070014 20070015

B.2.3 Diesel Fuel Monitoring and Storage Program and Commitments 12 and 13

CONDITION REPORTS

2002-00819 2003-00587 2007-00238 2009-03093 2011-05903 2013-11968*

* identified by the team

MISCELLANEOUS

TITLE
Results of FO-1 bottom samples for water and sediment for 10 years
Results of FO-10 bottom samples for water and sediment for 10 years
Results of FO-30 samples for water and sediment for 9 years
Standard ASTM D2709, “Standard Test Method for Water and Sediment in Middle Distillate Fuels by Centrifuge”
Standard ASTM D4057, “Standard Practice for Manual Sampling of Petroleum and Petroleum Products”

PROCEDURES:

NUMBER	TITLE	REVISION
SO-T-16	Diesel Fuel Monitoring and Storage Program	31a
CH-ANL-MI-0010	Determination of Water and Sediment in Diesel Fuel	5

PROCEDURES:

NUMBER	TITLE	REVISION
CH-ANL-MI-0028	Determination of Bacteria by Biosan Lab Sani-Check Tests	5
CH-SMP-MI-0002	Diesel Fuel Sampling	14
CH-ST-FP-0001	Diesel Fire Pump Fuel Oil Sampling and Analysis	8
GM-PM-MX-0300A	Defuel, Clean, Inspect, and Refuel Diesel Fuel Oil Storage Tank FO-1	2
GM-PM-MX-0300B	Defuel, Clean, Inspect, and Refuel Diesel Fuel Oil Storage Tank FO-10	1

QUALITY CONTROL INSPECTION REPORTS

20030474 20090236

WORK ORDERS

00119450-1 00202273-1

B.2.4 Fatigue Monitoring Program and Commitments 23, 24, 25, 26, and 27

CONDITION REPORTS

1997-00179 2003-00975 2011-00614 2013-10808*

* identified during this inspection

CALCULATIONS

NUMBER	TITLE	REVISION
CN-PAFM-10-15	Fort Calhoun: Transfer Function Database Development for CVCS Charging Nozzles	0
CN-PAFM-10-19	Transfer Function Database Development and Fatigue Monitoring for Fort Calhoun Pressurizer Surge Line Elbow	0
CN-PAFM-10-25	Fort Calhoun Thermal Event Monitoring Models for Reactor Vessel and RCL Piping	1

CALCULATIONS

NUMBER	TITLE	REVISION
CN-PAFM-10-28	Fort Calhoun Safety Injection/Shutdown Cooling System WESTEMS Monitoring Model	0
CN-PAFM-10-38	Fort Calhoun CVCS WESTEMS Monitoring Model	1
CN-PAFM-11-8	Fort Calhoun Pressurizer Thermal Hydraulic Model	0
CN-PAFM-11-10	Fort Calhoun Thermal Event Monitoring Models for Pressurizer and Associated Nozzles	0
CN-PAFM-11-12	Fort Calhoun WESTEMS Projects	1
EA-FC-99-004	Evaluation of CVCS for Thermal Transient Induced Fatigue	0
EA-FC-00-131	Reactor Coolant System Scoping, Screening, and Aging Management Review for License Renewal	1
EA-FC-00-132	Program Evaluation for License Renewal: Fatigue Monitoring Program	0
SIR-03-113 (FC06964)	Fort Calhoun ASME Class 1 and Environmental Fatigue Analysis for the Pressurizer Surge Line	0
0900553.310	Structural Integrity Associates – Fort Calhoun NSSS Drain and Sample Line Fatigue Evaluations	0
0900553.311	Structural Integrity Associates – Fort Calhoun NSSS Drain and Sample Line Fatigue Evaluations	0

DRAWINGS

NUMBER	TITLE	REVISION/DATE
11405-M-12	Primary Plant Sampling System Flow Diagram, Sheet 1	67
11405-M-253	Flow Diagram Steam Generator Feedwater and Blowdown P&ID, Sheet 1	96
A-14	Fort Calhoun Station – ISI Isometric A-14, Sheet 1	6
D-4078	Reactor Coolant Gas Vent System P&ID	October 25, 2012

DRAWINGS

NUMBER	TITLE	REVISION/DATE
D-4078	Reactor Coolant Gas Vent System P&ID	14
E-23866-210-110	Reactor Coolant System Flow Diagram P&ID	November 12, 2009
E-23866-210-110	Reactor Coolant System Flow Diagram P&ID, Sheet 1	July 10, 2012
E-23866-210-110	Reactor Coolant System Flow Diagram P&ID, Sh 1A	7
E-23866-210-110	Reactor Coolant System Flow Diagram P&ID, Sh 1	73
FW-2127	Isometric Drawing: Feedwater System, Sheet 1	May 2, 1970
RC-2076	Isometric Drawing: Reactor Coolant System – Sampling Line RC-138	April 2, 1970
RC-2077	Isometric Drawing: Reactor Coolant System – Sampling Line RC-139	April 2, 1970
RC-2119	Isometric Drawing: Reactor Coolant System – Sampling Line RC-102	May 26, 1970

EXAMINATION REPORTS

NUMBER	TITLE	DATE
76-UT	Calibration Data Sheet – Ultrasonic Examination of Pressurizer Surge Line, Weld 10-PSG-10/06	March 30, 2001
77-UT	Calibration Data Sheet – Ultrasonic Examination of Pressurizer Surge Line, Weld 10-PSG-10/07	March 30, 2001
79-UT	Calibration Data Sheet – Ultrasonic Examination of Pressurizer Surge Line, Weld 10-PSG-10/08	March 30, 2001
80-UT	Calibration Data Sheet – Ultrasonic Examination of Pressurizer Surge Line, Weld 10-PSG-10/09	April 4, 2001

MISCELLANEOUS

NUMBER	TITLE	DATE
AR 00029783	Fatigue Monitoring Program Enhancements for License Renewal	March 20, 2001
EC49655	USAR Change Form for USAR-15.1, License Renewal Supplement, Revision 5	June 21, 2010
LIC-12-0140	Licensee Event Report 2012-016, Revision 0, for the Fort Calhoun Station	September 17, 2012
LIC-13-0035	Licensee Event Report 2013-002, Revision 0, for the Fort Calhoun Station	March 26, 2013
OE 2009-0421	NRC Regulatory Issue Summary 2008-30 Fatigue Analysis Of Nuclear Power Plant Components	March 13, 2009
OE 2011-1920	76 FR 60939 – Docket ID NRC'2011'0229 – Metal Fatigue Analysis Performed by Computer Software	October 10, 2011

PROCEDURES

NUMBER	TITLE	REVISION
PBD-31	Program Basis Document – Fatigue Monitoring	1 & 2
SO-O-23	Standing Order – Systems and Equipment Usage Data	22

B.2.5 Fire Protection Program and Commitments 14 and 15

CONDITION REPORTS

2007-03273

LICENSE RENEWAL

NUMBER	TITLE	REVISION
EA-FC- 00-085	Fire Protection Program Evaluation for License Renewal	0

PROCEDURES

NUMBER	TITLE	REVISION
EM-ST-FP-0058	Visual and Functional Test of Control Room Walk-In Cabinet Halon Fire Protection System	9
EM-ST-FP-0059	Visual and Functional Test of Cable Spread Room Halon Fire Protection Fire Protection System	9
EM-ST-FP-0060	Visual and Functional Test of Switchgear Room Halon Fire Protection System	7
GM-PM-MX-0501	Inspection and Repetitive Maintenance for Alarmed RCA Doors	12
GM-RM-FP-M01	Fire Door Inspection and Repetitive Maintenance	12
GM-ST-FP-0002	Fire Door Eighteen Month Inspection	13
GM-ST-FP-0003	Semi-annual Cable Spread Room Halon Cylinders Weight and Pressure Test	13
GM-ST-FP-0004	Semi-annual Control Room Halon Cylinder Weight and Pressure Test	13
GM-ST-FP-0005	Semi-annual Switchgear Rooms Halon Cylinders Weight and Pressure Test	21
GM-ST-FP-0006	Fire Damper Eighteen Month Inspection	6
MM-ST-FP-0001	Inspection of Diesel Fire Pump Engine	17
MM-ST-FP-0002	Inspection of Fire Pump Strainer FP-6A	16
MM-ST-FP-0003	Inspection of Fire Pump Strainer FP-6B	4
OP-PM-FP-1000	Quarterly Fire Protection Drain Valve Flush and Alarm Test	32
OP-PM-FP-1001A	Monthly Fire Protection System Inspection (Week 1)	29
OP-PM-FP-1001B	Monthly Fire Protection System Inspection (Week 2)	33
OP-PM-FP-1001C	Monthly Fire Protection System Inspection (Week 3)	13
OP-ST-FP-0001A	Fire Protection System Inspection and Test	18
OP-ST-FP-0001D	Fire Protection System Inspection and Test	30

PROCEDURES

NUMBER	TITLE	REVISION
OP-ST-FP-0002	Fire Protection Water Suppression System Valve Cycling Test	23 & 33
OP-ST-FP-0003	Fire Protection System Diesel Generator Rooms Sprinkler Functional Test	15
OP-ST-FP-0008	Fire Protection System Auxiliary Building Sprinkler Functional Test	13
OP-ST-FP-0009	Fire Protection System Fire Hose Inspection	10
OP-ST-FP-0010	Fire Protection System Sprinkler Air Flow Test	8
OP-ST-FP-0011	Fire Protection System Hose Station Operability Test	8
PE-RR-FP-0400	Resetting of Dry Pipe Deluge Valve, FP-513	10
PE-ST-FP-0001	Fire Protection System Halon System Air Flow Test	11
PE-ST-FP-0002	Exterior Fire Hose Annual Hydrostatic Test	5
SE-ST-FP-0005	Fire Barrier and Penetration Seals Eighteen Month Inspection	15
SE-ST-FP-0008	Fire Protection Water Suppression System Flow Test	21
SE-ST-FP-0011	Fire Barrier and Penetration Seals Outage Inspection	2
SO-G-102	Fire Protection Program Plan	11
SO-G-103	Fire Protection Operability and Surveillance Requirements	26

WORK INSTRUCTIONS

NUMBER	TITLE	REVISION
16451	Testing of Sprinkler Heads in the Turbine Building Basement	0
1453-49	Perform UT Checks of Fire Protection Piping	0

WORK ORDERS

00350919-1	00360701-1	00396911-1	00399044-1	00403608-1
00405899-1	00409092-1	00409093-1	00409905-1	00411019-1
00411443-1	00414376-1	00418041-1	00419360-1	00420796-1
00423873-1	00425322-1	00426428-1	00428983-1	00429009-1
00433236-1	00436789-1	00437777-1	00438858-1	00444753-1
00445483-1	00446174-1	00446654-1	00451936-1	00452397-1

B.2.6 Overhead Load Handling System Inspection Program and Commitment 28

CONDITION REPORTS

2012-05389* 2012-17252

DRAWINGS

NUMBER	TITLE	REVISION
11405-S-31, Sht 1	Reactor Plant Pool and Pit Liner	3
11405-S-71	Auxiliary Building Spent Fuel Pit Liner	12
	Operator Lesson Plan Cross-section Drawing	

LICENSE RENEWAL

NUMBER	TITLE	REVISION
PBD-40	Overhead Loads and Handling Equipment	1
EA-FC- 00-069	Fuel Handling Equipment and Heavy Load Cranes Scoping, Screening, and Aging Management Review for License Renewal	1
EA-FC-00-143	Overhead Load Handling Systems Inspection Program Evaluation for License Renewal	0

PROCEDURES

NUMBER	TITLE	REVISION
IC-PM-IX-1350	Internals Vibration Monitoring Core Support Barrel/Thermal Shield Motion	6
MM-PM-MX-0551	Inspection of Reactor Vessel Closure Head Lift Rig	6
MM-RI-HE-0550	Polar Crane Inspection	32
MM-RI-HE-0551	Annual Inspection of Auxiliary Building Crane	19
MM-RI-FH-0700	Refueling Machine Preoperational Inspection and Maintenance	31
MM-RI-FH-0703	Visual Inspection Spent Fuel Machine Preoperational Inspection and Maintenance	22

QUALITY CONTROL REPORTS

20110058	20110062	20110070	20120157

WORK INSTRUCTIONS

NUMBER	TITLE
2655	HE-10 – Deborating Demineralizing Area Crane: Lube, Inspect and Perform NDE Inspection of the Hook
2657	HE-14 – Concrete Slab Removal Crane: Lube, Inspect and Perform NDE Inspection of the Hook
2658	HE-15 – Concrete Slab Removal Crane: Lube, Inspect and NDE the Hook
2659	HE-16 – Waste Evaporator Equipment Handling Crane: Lube, Inspect and NDE the Hook
4315	HE-30 – Containment Equipment Hatch Jib Crane: Inspect Jib Crane, Lubricate as Necessary

WORK ORDERS

00356287-1	00361124-1	00361293-1	00383831-1	00383834-1	00384106-1
00397176-1	00397177-1	00397178-1	00398227-1	00447807-1	

B.2.7 Periodic Surveillance and Preventive Maintenance (PSPM) Program and Commitments 36 and 37

MISCELLANEOUS

NUMBER	TITLE	REVISION/DATE
Drawing 11405-H-40, SH 3	Auxiliary Coolant Component Cooling System Flow Diagram P & ID	
Letter LIC-03-0036	Transmittal of Boundary Drawings Referenced in Response to Potential Open Items for the Review of the License Renewal Application for Fort Calhoun Station, Unit 1	March 14, 2003
PBD-13	Preventative Maintenance	11

PROCEDURES

NUMBER	TITLE	REVISION/DATE
EM-PM-RC-1000	General Inspection of General Electric reactor Coolant Pump Motors	20
EM-PM-RC-1001	Changing Reactor Coolant Pump Motor Oil	12
IC-ST-AE-3833	Type C Local Leakage Rate Test of Penetration M-HCV-383-3	January 3, 2013
IC-ST-AE-3834	Type C Local Leakage Rate Test of Penetration M-HCV-383-4	January 3, 2013
MM-PM-AE-0500	Periodic Inspection and Maintenance of Personnel Air Lock AE-2	9
MM-PM-AFW-0004	Preventative Maintenance Fuel Oil Transfer Pump (FO-37) Maintenance	April 22, 2008

PROCEDURES

NUMBER	TITLE	REVISION/DATE
MM-PM-DG-0001	Preventative Maintenance Diesel Generator DG-1 Inspection	March 14, 2013
MM-PM-DG-0002	Preventative Maintenance Diesel Generator DG-2 Inspection	March 18, 2013
MM-ST-FP-0001	Inspection of Diesel Fire Pump Engine	18
OP-ST-SHIFT-0001	Operations Technical Specification Required Shift Surveillance	111
PED-SEI-11	Trend Monitoring Analysis	5
PE-PM-VX-0413	Hills-McCanna Diaphragm Valve Maintenance	20a
PE-PM-VX-0429	CQE Relief Valve Setpoint and Leakage Test	11
PE-RR-VA-0221	Inspection of Nuclear Detector Well Cooling Units VA-13 Including Inspection and/or Replacement of HEPA Filters VA-11	0
RE-ST-RX-0004	Surveillance Test Boral Sample Coupon Retrieval and Testing	9
SO-G-23	Surveillance Test Program	61
SO-M-2	Standing Order Preventative Maintenance Program	45a

WORK INSTRUCTIONS

NUMBER	TITLE
PMID 824	Minor Work Instructions W/O Task #424805-01
PMID 869-1	VA-4A Inspect & Replace Demister Pads
PMID 870-1	VA-4B Inspect & Replace Demister Pads
PMID 1012	VA-67: Periodic Inspection
PMID 1013-2	VA-80A Disassemble and Inspect Impeller

WORK INSTRUCTIONS

NUMBER	TITLE
PMID 1085-2	VA-80B: Disassemble and Inspect Impeller
PMID 1835-1	Detailed Work Instructions
PMID 1837-1	Detailed Work Instructions
PMID 1837-4	VA-46B: Monthly Control Room Air Conditioner Checks
PMID 3867	YCV-871E: Inspect Exhaust Damper and Roll Pin Replacement
PMID 3868	YCV-871F: Inspect Exhaust Damper and Roll Pin Replacement
PMID 12573-3	Inspection of MH-5 and MH-31 (Duct Bank Inspection)
PMID 14883-02	CA-555: Ultrasonic Testing of Containment Penetration Piping
PMID 15163-02	HCV-1749: Ultrasonic Testing of Containment Penetration Piping
PMID 16796-01	HCV-545: Perform Radiographic Valve Examination
PMID 16805-1	Standard Work Step Template

WORK ORDERS

00262107-1	00311994-1	00381872-1	00394200-1	00394483-1	00418041-1
00421664-1	00429272-1	00431508-1	00431969-1	00435985-1	00441567-1
00441801-1	00442271-1	00450311-1	00450538-1	00450541-1	00451069-1
00451070-1	00451071-1	00451072-1	00451073-1	00451079-1	00451080-1
00451081-1	00451082-1	00451083-1			

B.2.8 Reactor Vessel Internal Inspection Program and Commitments 16 and 18

CONDITION REPORT

2013-07706

LETTERS

NUMBER	TITLE	DATE
LIC-12-0144	Submittal of Reactor Vessel Internal (RVI) Component Aging Management Program (AMP) for Fort Calhoun Station (FCS), Unit No. 1	September 27, 2012
LIC-13-0059	Change to License Renewal Commitments Pertaining to Inspection of Reactor Vessel Internals	May 10, 2013

MISCELLANEOUS

DESCRIPTION

Final Safety Evaluation of EPRI Report, Materials Reliability Program Report 1016569 (MRP-227), Revision 0, "Pressurized Water Reactor (PWR) Internals Inspection and Evaluation Guidelines, dated June 22, 2011
PBD-44, "Reactor Vessel Internals Inspection," Revision 1

Procedure IC-PM-IX-1350, "Internals Vibration Monitoring Core Support Barrel/Thermal Shield Motion," Revision 6

Regulatory Issue Summary 2011-07, "License Renewal Submittal Information for Pressurized Water Reactor Internals Aging Management," dated July 21, 2011

Report WCAP-17437-NP, "PWR Vessel Internals Program Plan for Aging Management of Reactor Internals at Fort Calhoun Station," dated August 2012

WORK ORDERS

00316354-1 00382488-1 00391448-1

B.2.10 Structures Monitoring Program and Commitments 29, 30, 31 and 32

CONDITION REPORTS

2003-01965	2008-06516	2009-04619	2009-04620	2009-04623	2009-04625
2009-04626	2009-04649	2009-04653	2012-05044	2012-05070	2013-09273
2013-10697*	2013-10701*	2013-10706*	2013-10715*	2013-10804*	2013-11830*
2013-11985*					

DRAWINGS

NUMBER	TITLE	REVISION
L24065	Electrical Penetration Assemblies E6, E7, E8, & E9	2
D-596	Dome Tendon Blockout Details	4
L24055	Lug Details Commpon Part Items CP28 to CP46 Inclusive	3
L24055A	Common Parts CP19 to CP71 Incl., Common Assemblies CA1 to CA16 Incl., Backup Bars P21 to P29 & E8 to E14 Incl	7
11405-S-31	Reactor Plant Pool and Pit Liner Sheet 1	3
11405-S-32	Reactor Plant Pool and Pit Liner Sheet 2	7

GUIDANCE

NUMBER	TITLE	REVISION/DATE
ACI 201.1R-92	Guide for Making a Condition Survey of Concrete in Service	1992
ACI 201.2R-92	Guide to Durable Concrete	1992
ACI 224R-80	Control of Cracking in Concrete Structures	1980
ACI 349.3R-96	Evaluation of Existing Nuclear Safety Related Concrete Structures	1996
IE Bulletin 80-11	Masonry Wall Design	May 8, 1980
Information Notice 87-67	Lessons Learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11	December 31, 1987
NUMARC 93-01	Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants	2
Regulatory Guide 1.160	Monitoring the Effectiveness of Maintenance at Nuclear Power Plants	2
ISG-02	Staff Guidance on Scoping of Equipment Relied on to Meet the Requirements of the Station Blackout (SBO) Rule (10 CFR 50.63) for License Renewal (10 CFR 54.4(a)(3))	0

GUIDANCE

NUMBER	TITLE	REVISION/DATE

LICENSE RENEWAL

NUMBER	TITLE	REVISION
EA-FC-00-083	Aging Management Program for General Corrosion of External Surfaces Evaluation for License Renewal	0
EA-FC-00-084	Structures Monitoring Program Evaluation for License Renewal	0
PBD-42	Structures Monitoring Program	2

MISCELLANEOUS

DESCRIPTION

Discharge Tunnel Inspection Report performed by Underwater Construction Corporation for the examination conducted June 6, 2012

PROCEDURES

NUMBER	TITLE	REVISION
CH-AD-0060	Groundwater Sampling and Analysis Process	3
PED-SEI-2	Duties and Responsibilities of System Engineering Personnel	21
SE-PM-AE-1001	Preventive Maintenance Auxiliary Building Structural Inspection	11
SE-PM-AE-1002	Intake Building and Miscellaneous Structures Inspection	9
SE-PM-AE-1003	Turbine Building Structural Inspection	7
SE-PM-AE-1004	Containment Building Structural Inspection	11
SO-G-118	Site Groundwater Protection Program	5
SO-M-100	Conduct of Maintenance	57

WORK ORDERS

00128727-1	00128731-1	00128732-1	00259063-1	00259063-1	00310128-1
00320329-1	00321564-1	00350972-1	00451426-1	00465960-1	

B.3.2 Buried Piping and Components Program and Commitment 19

CONDITION REPORTS

2005-01600	2005-04867	2009-01122	2010-04776	2011-05403	2011-08571
2012-03111					

DRAWINGS

NUMBER	TITLE	REVISION
13229	12’ DIM. X 23’ O.A.L. Diesel Fuel Oil Tank FO-1	9
16047	12’ X 23’ O.A.L. Auxiliary Boiler Fuel Oil Tank FO-1	6
45470	Anode Cathodic Protection System for FO-10	0
11405-M-312	Yard Piping Designations from Buried Pipe Program	21
A-6338	500 Gallon Convault Standard Drawing	0
D-4612, Sh 1	Piping Isometric for Fuel Oil Piping Between Fuel Tanks FO-10 and FO-38 Sections from Buried Pipe Program	2
E-4182	Underground Fire Loop Sections from Buried Pipe Program	12
ISO CA-9001	Instrument and Compressed Air Sections from Buried Pipe Program	5
ISO FO-9005, Sh 1	Auxiliary Steam Fuel Oil Sections from Buried Pipe Program	5
ISO RW-9003, Sh 1	Raw Water Sections from Buried Pipe Program	6
ISO RW-9003, Sh 2	Raw Water Sections from Buried Pipe Program	6
ISO VD-9000, Sh 1	Vents and Drains Sections from Buried Pipe Program	5
ISO WD-10002, Sh 1	Waste Disposal Sections from Buried Pipe Program	7

MISCELLANEOUS

NUMBER	TITLE	REVISION/DATE
	Non-Significant Configuration Change for Repair of FO-10 Fill Line	
1016456	Recommendations for an Effective Program to Control the Degradation of Buried Pipe	December 2008
Engineering Change 36896	Replacement Valve for FP-767 and FP-768	
Engineering Change 37583	Line the Interior of Diesel Fuel Oil Storage Tank FO-1	0
NEI 09-14	Guideline for the Management of Underground Piping and Tank Integrity	1
PBD-28	Buried Piping and Components Program	8

PROCEDURES

NUMBER	TITLE	REVISION
GM-PM-MX-0300	Defuel, Clean, Inspect, and Refuel Diesel Fuel Oil Storage Tanks (FO-1 and FO-10)	9
GM-PM-MX-0300A	Defuel, Clean, Inspect, and Refuel Diesel Fuel Oil Storage Tank FO-1	2
GM-PM-MX-0300B	Defuel, Clean, Inspect, and Refuel Diesel Fuel Oil Storage Tank FO-10	1
SO-M-100	Conduct of Maintenance	57

QUALITY CONTROL INSPECTION REPORTS

2009-0236 2005-0626

WORK ORDERS

00126127-1 00143567-1 00175860-1 00202273-1 00320329-1 00323653-6
00406858-1 00418123-2

B.3.3 General Corrosion of External Surface Program and Commitment 20

PROCEDURES

NUMBER	TITLE	REVISION
PBD-13	Preventive Maintenance	11
PED-SEI-20	Duties and Responsibilities of System Engineering Personnel	21
SO-O-1	Conduct of Operations	100

B.3.4 Cable and Connections Program and Commitments 35 and 41

GUIDANCE

NUMBER	TITLE	REVISION/DATE
EPRI TR-109619	Guidelines for the Management of Adverse Localized Equipment Environments	June 1999
EPRI TR-107514	Age-Related Degradation Inspection Method and Demonstration: In Behalf of Calvert Cliffs Nuclear Power Plant License Renewal Application	0
IEEE P1205-2000	IEEE Guide for Assessing, Monitoring and Mitigating Aging Effects on Class 1E Equipment used in Nuclear Power Generating Stations	
ISG-02	Staff Guidance on Scoping of Equipment Relied on to Meet The Requirements of the Station Blackout (SBO) Rule (10 CFR 50.63) For License Renewal (10 CFR 54.4(a)(3))	0
NUREG/CR-5643	Insights Gained from Aging Research	March 1992
SAND 96-0344	Aging Management Guidelines for Commercial Nuclear Power Plants-Electrical Cable and Terminations	September 1996

PROCEDURE

NUMBER	TITLE	REVISION
EM-PM-EX-1001	4160 Volt Motor Inspection	26

CONDITION REPORT

2013-03198

MISCELLANEOUS

	TITLE	REVISION
	Program Basis Document PBD-30, Cables and Connections	1

WORK INSTRUCTIONS

NUMBER	TITLE
PMID 953-03	T1A-3, Inspect and Meggar Test Non-segregated Bus
PMID 1592-03	Minor Work Instructions
PMID 1594-03	Inspection of T1A-2 Bus
PMID 10433-03	Inspection of T1A-1 Bus

WORK ORDERS

00370527-1 00370528-1 00393278-1 00393279-1 00411186-1 00410992-1

B.3.5 One-time Inspection Program and Commitments 7, 8, 9, 10, and 11

CONDITION REPORTS

2009-05849 2011-04620 2012-00574

EXAMINATION REPORTS

NUMBER	TITLE	DATE
7033-3475	Flow Serve NDE Inspection Report, Pump RC-3B Cover/Heat Exchanger, Purchase Order 00061189	December 17, 2004

EXAMINATION REPORTS

NUMBER	TITLE	DATE
RLLA-01239	Flow Serve Inspection Report, Pump RC-3D Cover/Heat Exchanger, Part Number 7007264	June 27, 2003

OTHER DOCUMENTS

NUMBER	TITLE	DATE
AR 29952	One Time Inspection Program for License Renewal	May 15, 2001
EC56786	NOD-QP-16.1, USAR Change Form for Commitment 8	July 26, 2012
LIC-12-0064	Deletion of License Renewal Commitments Due to Replacement of Components	May 30, 2012
OE 2011-2097	Draft License Renewal Interim Staff Guidance LR-ISG-2011-01	November 8, 2011

PROCEDURES

NUMBER	TITLE	REVISION
QCP-400	Visual Inspection	17
PBD-29	One-Time Inspection	7

WORK INSTRUCTIONS

NUMBER	TITLE	DATE
1756-01	Spent Fuel Pool Heat Exchanger (AC-8) Remove Channel Cover, Inspect, ECT, Reinstall Cover	June 17, 2000
1757-01	Letdown Heat Exchanger (CH-7) Remove Channel Cover, Inspect, ECT, Reinstall Cover	June 17, 2000
1762-01	Shutdown Cooling Heat Exchanger (AC-4A) Remove Channel Cover, Inspect, ECT, Reinstall Cover	June 18, 2009
1762-02	Shutdown Cooling Heat Exchanger (AC-4A) Performance Monitoring Test	June 18, 2009

WORK INSTRUCTIONS

NUMBER	TITLE	DATE
1763-01	Shutdown Cooling Heat Exchanger (AC-4B) Remove Channel Cover, Inspect, ECT, Reinstall Cover	June 18, 2009
1763-02	Shutdown Cooling Heat Exchanger (AC-4B) Performance Monitoring Test	June 18, 2009

WORK ORDERS

00216255-1	00317262-1	00317580-1	00320338-1	00320341-1	00320359-1
00320366-1	00325848-1	00325873-1	00325908-1	00325910-2	00325916-1
00363053-1	00363055-1	00363056-1	00363058-1	00432384-1	

B.3.6 Selective Leaching Program and Commitment 33

CONDITION REPORTS

2011-08076 2013-04339

LICENSE RENEWAL

NUMBER	TITLE	REVISION
EA-FC-00-142	Selective Leaching Program Evaluation for License Renewal	0
PBD-29	One-Time Inspection	7
PBD-41	Selective Leaching	4a

QUALITY CONTROL INSPECTION REPORTS

20130043 20130096

WORK ORDERS

00454124-1	00454130-1	00454133-1	00454136-1	00454138-1	00454172-1
00454327-1	00454332-1	00454337-1	00454424-1	00454426-1	00454427-1
00454429-1	00454431-1				

B.3.7 Thermal Aging Embrittlement of Cast Austenitic Stainless Steel and Commitments 34 and 39

LICENSE RENEWAL

NUMBER	TITLE	REVISION/DATE
AR 30487	Thermal Aging Embrittlement of CASS Program for License Renewal	October 23, 2001
Calculation EA-FC-00-146	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program Evaluation for License Renewal	0
Calculation LTR-PAFM-11-119	Flaw Tolerance Evaluation for Susceptible CASS Reactor Coolant Piping Components in Fort Calhoun	November 2011
PBD-39	Thermal Aging Embrittlement of CASS (Cast Austenitic Stainless Steel)	1
WCAP-17262-NP	Technical Basis for Eliminating Large Primary Loop Pipe Rupture as the Structural Design Basis for Fort Calhoun Unit 1	0

Aging Management Programs without Associated Commitments

B.1.1 Bolting Integrity Program

CONDITION REPORTS

2011-02761 2012-05393

LICENSE RENEWAL

NUMBER	TITLE	DATE
NUREG-1339	Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants	June 1990
EPRI NP-5769	Degradation and Failure of Bolting in Nuclear Power Plants	April 1988
EPRI TR-104213	Bolted Joint Maintenance and Application Guide	December 1995

PROCEDURES

NUMBER	TITLE	REVISION
MD-AD-0007	Administrative Procedure Bolting	8
MM-RR-RC-1000	Cleaning of Reactor Vessel Studs, Nuts and Washers	15
PED-SEI-20	Duties and Responsibilities of System Engineering Personnel	21
PE-RR-X-1000	Cleaning and Inspecting Safety Related Studs and Nuts	13
QC-ST-MX-3001	VT-2 Examination of Normally Insulated Class 1 Pressure Retaining Bolted Connections in Systems Borated for Reactivity Control	3
SE-EQT-X-0002	Carbon Steel and Low Alloy Steel Fasteners Inservice Testing Inspections	14
SO-M-100	Standing Order Conduct of Maintenance	57
SO-O-1	Standing Order Conduct of Operations	101

WORK ORDERS

00316176-1	00361157-1	00361178-1	00365289-1	00383498-1

B.1.2 Chemistry Program

MISCELLANEOUS

NUMBER	TITLE	REVISION
1014986	PWR Primary Water Chemistry Guidelines	6
1008224	PWR Secondary Water Chemistry Guideline	6
1007820	Closed Cooling Water Chemistry Guideline	1
EA-FC-00-082	Chemistry Program Evaluation for License Renewal	0
	Work Order 00388485-1	

PROCEDURES

NUMBER	TITLE	REVISION
CH-AD-0001	Chemistry Program Plan	25
CH-AD-0003	Plant Systems Chemical Limits and Corrective Actions	90
MM-PM-DG-0002	Diesel Generator DG-2 Inspection	3

B.1.3 Containment Inservice Inspection Program

MISCELLANEOUS

NUMBER	TITLE	REVISION/DATE
Letter LIC-08-0102	Fort Calhoun Station, Unit 1, 2008 Refueling Outage Inservice Inspection Results and NIS-1 and NIS-2 Forms	September 15, 2008
Letter LIC-10-0018	Fort Calhoun Station, Unit 1, 2009 Refueling Outage Inservice Inspection Results	March 18, 2010
PBD-2	Inservice Inspection Program	13

PROCEDURES

NUMBER	TITLE	REVISION/DATE
	10 year Containment (IWE &IWL) Inservice Inspection Program Plan and Basis for Fort Calhoun Station Unit 1	January 18,2001
SE-PM-AE-1004	Preventive Maintenance Containment Building Structural Inspection	7
SE-ST-CONT-3002	Conduct of Containment Concrete Inspection	0

B.1.4 Containment Leak Rate Program

CONDITION REPORTS

2003-05727 2009-02628 2011-02199

GUIDANCE

NUMBER	TITLE	REVISION/DATE
ANSI/ANS-56.8	Containment System Leakage Testing Requirements	2002
NEI 94-01	Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J	2A
Regulatory Guide 1.163	Performance Based Containment Leak-Test Program	1
ANSI/ANS 56.8	Containment System Leakage Testing Requirements	1994
BN-TOP-1	Testing Criteria of Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear Power Plants, Bechtel Power Corporation	1

LICENSE RENEWAL

NUMBER	TITLE	REVISION
EA-FC-00-111	Containment Leak Rate Program Evaluation for License Renewal	0
PBD-5	Containment Leak Rate	18

PROCEDURES

NUMBER	TITLE	REVISION
IC-ST-AE-0001	Containment Personnel Air Lock Type B Leak Rate Test	13
IC-ST-AE-0002	Containment Equipment Hatch O-ring Type B Leak Rate Test	11
IC-ST-AE-0003	Fuel Transfer Tube Flange O-ring Type B Leak Rate Test	10
IC-ST-AE-0004	Containment Electrical Penetration Type B Leak Rate Test	13
IC-ST-AE-0005	Containment Mechanical Penetration Type B Leak Rate Test	10
SE-ST-CONT-0003	Compilation and Evaluation of Type B and Type C Local Leakage Rate Test Results	3
SE-ST-ILRT-0001	Containment Integrated Leak Rate Test (CILRT)	8

WORK ORDERS

00133796-1	00162504-1	00164669-1	00297260-1	00315678-1	00316192-2
00316354-1	00332821-1	00373528-1	00414191-1		

B.1.5 Flow Accelerated Corrosion Program

CONDITION REPORTS

2009-05604 2009-06077 2013-09273

PROCEDURES

NUMBER	TITLE	REVISION
PBD-3	Flow Accelerated Corrosion	10a
PED SEI 38	Evaluation and disposition of FAC Inspection Data	5
PED SEI 41	Gridding Instructions for UT Examinations of Piping Components	2
QCP-200	Personnel Certification	38
QCP-331	Ultrasonic Thickness Measurement Procedure for Flow Accelerated Corrosion Program	15

MISCELLANEOUS

TITLE

EA-FC-00-89, Flow Accelerated Corrosion (FAC) Program Evaluation For License Renewal, Revision 0

NSAC-202L-R3, “Recommendations for an Effective Flow-Accelerated Corrosion Program, Final Report,” dated May 2006

TR-106611 Flow-Accelerated Corrosion in Power Plants

Work Order 00465960-1

B.2.9 Steam Generator Program

PROCEDURES

NUMBER	TITLE	REVISION/DATE
ARP-CB-1.2.3/A6	Annunciator Response Procedure A6 Control Room Annunciator A6	December 11, 2012
PED-SEI-34	Maintenance Rule Program	9
PED-SEI-42	Steam Generator Program	12
SE-PM-MS-0100	Visual Inspection of Steam Generator Secondary Side	October 16, 2006
SE-PM-MS-0101	Steam Generator Tube Sheet Annulus Inspection and Sludge Removal	June 26, 2012
SE-ST-RC-003	Inservice Testing of Steam Generator Tubes	November 22, 2006
SO-M-10	Standing Order Foreign Material Exclusion Control	November 2, 2010

WORK INSTRUCTIONS

PMID 1052-16 PMID 1965-14

WORK ORDERS

00171723-1 00313976-1

Time-Limited Aging Analyses

CALCULATIONS

NUMBER	TITLE	REVISION
EA-FC-00-140	Time-Limited Aging Analyses	1
FC06608	Flywheel Strength Analysis – Operating, Seismic and Fracture Conditions Vendor Calc No. HTAM622595 Rev C	0
FC07334	Replacement Steam Generator Feed Water Distribution System Design Plan	0

DRAWINGS

NUMBER	TITLE	REVISION/DATE
Peter Kiewit Sons Drawing 7400	Containment Structure Stressing Gallery Mats M-1, M-2, M-3 & M-4	September 6, 1968
Peter Kiewit Sons Drawing FC-1	Stressing Gallery	July 17, 1968
Peter Kiewit Sons Drawing FC-2	Stressing Gallery	September 30, 1968
GHDR 11405-A-13	Primary Plant Section A-A	13
GHDR 11405-A-14	Primary Plant Section B-B	14

MISCELLANEOUS

NUMBER	TITLE	REVISION
PBD-5	Containment Leak Rate	18
PBD-7	Containment Tendon Testing	7
Regulatory Guide 1.35	Inservice Inspection of Ungrouted Tendons in Prestressed Concrete Containments	1

PROCEDURES

NUMBER	TITLE	REVISION
SE-ST-CONT-3001	Surveillance of the Containment Prestressing System	8
SE-ST-RC-3003	RCP Flywheel Inspection	1

WORK ORDERS

00294493-1	00337773-1	00037916-1

Newly Identified Components

MISCELLANEOUS

NUMBER	TITLE	REVISION
LTR-PEUS-12-70	10 CFR 54.37(b) Evaluation for Fort Calhoun Station	
Procedure NL-02-1	Nuclear Licensing Department: Required Reports to Outside Agencies	
Procedure PED-GEI-83	10 CFR 54.37(b) Review Process	4

Administrative Controls

MISCELLANEOUS

NUMBER	TITLE	REVISION/DATE
LTR-PEUS-11-32, Volume 1	Fort Calhoun Station Generic Aging Lessons Learned (GALL) Gap Analysis	0
NEI 99-04	Guidelines for Managing NRC Commitment Changes	0
RIS 2000-17	Managing Regulatory Commitments Made By Power Reactor Licensees to the NRC Staff	September 21, 2000
RIS 2011-05	Information on Revision 2 to the Generic Aging Lessons Learned Report for License Renewal of Nuclear Power Plants	July 1, 2011

PROCEDURES

NUMBER	TITLE	REVISION
NOD-QP-3	10 CFR 50.59 and 10 CFR 72.48 Reviews	33
NOD-QP-16	Updated Safety Analysis Report (USAR)	23
NOD-QP-21	Operating Experience (OE) Program	37a
NOD-QP-34	Ongoing Commitment Program	16a

Closeout of Open Items

CONDITION REPORTS

2011-09788	2012-00116	2012-02096	2012-04997	2012-05067	2013-11857

MISCELLANEOUS

NUMBER	TITLE	REVISION/DATE
EC 56806	Wireless Remote Level Indication for Manholes	0
Letter LIC-12-0041	NRC Inspection Report 05000285/2011006, Reply to a Notice of Violation (NOV); EA-12-035	April 13, 2012
Regulatory Guide 1.218	Condition-Monitoring Techniques for Electric Cables Used in Nuclear Power Plants	April 2012
NUREG/CR-7000	Essential Elements of an Electric Cable Condition Monitoring Program	January 2010
WO 48476	Weld a Hotleg Sandbox Cover	
EC 61095	Weld a Hotleg Sandbox Cover Using a 1/2 " Solid Plate	

MISCELLANEOUS

TITLE
Cable Vault Operating Guide, Version 1 for manhole level transmitter system
Electrical Diagnostic Testing of Medium Voltage Cables – Fort Calhoun Nuclear Generating Station (K-503604-RA-0001-R00), dated February 7, 2012
Inspection Report 05000285/2011006
Licensed operator training related to system operation
Manhole 5A, 5B, and 31 level trends for March and April 2013
Preventive Maintenance Item to replace transmitter batteries every 3 years

PROCEDURES

NUMBER	TITLE	REVISION
ARRP-MLM-1	Wireless Remote Level Alarms for Manhole Level Monitors	0
EM-FLP-AE-0001	Inspection and Dewatering of Manholes	0