UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200
ATLANTA, GEORGIA 30303

January 31, 2014

Mr. Joseph W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3D-C
Chattanooga, TN 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2 – NRC LICENSE RENEWAL INSPECTION, INSPECTION REPORT 05000327/2013012 AND 05000328/2013012

Dear Mr. Shea:

On December 17, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed a License Renewal Inspection at your Sequoyah Nuclear Plant, Units 1 and 2 in accordance with NRC Inspection Procedure 71002. The enclosed report documents the inspection results, which were discussed on December 17, 2013, with Mr. John Carlin, Site Vice-President, and other members of the Sequoyah Nuclear Plant management staff in an exit meeting open to public observation at the Sequoyah Training Center Auditorium. Additionally, on January 27, 2014, the NRC held a conference call with a member of your corporate licensing staff to discuss the final inspection results as presented in this report.

The objective of this inspection was to verify that your license renewal activities were consistent with the requirements of Title 10 of the Code of Federal Regulation (10 CFR), Part 54, "Requirements for the Renewal of Operating Licenses for Nuclear Power Plants," and your license renewal application dated January 15, 2013. The inspection consisted of the review of representative records, interviews with plant personnel, and plant walk-downs.

This inspection resulted in no findings. On the basis of the sample selected for review, the inspectors determined that the license renewal activities met the regulatory requirements in 10 CFR 54. The inspectors also determined that the proposed aging management programs would provide reasonable assurance that aging effects of in-scope structures, systems, and components will be managed to maintain their intended functions during the period of extended operation. The inspectors also found that documentation used to support the application was retrievable, auditable, and consistent with the records requirements in 10 CFR 54.

The inspectors identified various observations associated with the aging management review of one system within the scope of license renewal and the program elements of certain aging management programs described in the application.

J. Shea

In accordance with Title 10 of the Code of Federal Regulations 2.390, “Public Inspections, Exemptions, Requests for Withholding,” 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’s Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management 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

Terrence Reis, Director
Division of Reactor Safety

Docket Nos.: 50-327, 50-328
License Nos.: DPR-77, DPR-79

Enclosure:
Inspection Report 05000327/2013012, 05000328/2013012
w/Attachment: Supplementary Information

cc w/encl: Distribution via Listserv

J. Shea

In accordance with Title 10 of the Code of Federal Regulations 2.390, “Public Inspections, Exemptions, Requests for Withholding,” 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’s Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management 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

Terrence Reis, Director
Division of Reactor Safety

Docket Nos.: 50-327, 50-328
License Nos.: DPR-77, DPR-79

Enclosure:
Inspection Report 05000327/2013012, 05000328/2013012
w/Attachment: Supplementary Information

cc w/encl: Distribution via Listserv

☒ PUBLICLY AVAILABLE ☐ NON-PUBLICLY AVAILABLE ☐ SENSITIVE ☒ NON-SENSITIVE
ADAMS: ☒ Yes ACCESSION NUMBER: _____ ☒ SUNSI REVIEW COMPLETE

OFFICE	RII:DRS	RII:DFFI	RII:DRS	RII:DRS	RII:DRS	NRR:DLR	RII:DRS	RII:DRP
SIGNATURE	**/RA/**	**/RA/**	**/RA/** J. Rivera for	**/RA/**	**/RA/**	**/RA/**	**/RA/**	**/RA/**
NAME	J. Rivera-Ortiz	M. Crespo	L. Lake	B. Collins	P. Copper	B. Fu	O. Lopez-Santiago	J. Bartley
DATE	1/28/14	1/28/2014	1/28/14	1/28/2014	1/28/2014	1/28/2014	1/29/14	1/27/14
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY
DOCUMENT NAME: S:\DRS\Eng Branch 3\INSPECTIONS\Working Documents\INPUTS\Inputs 2013\SEQ License Renewal IP71002 2013012-FINAL.Docx

Letter to Mr. Joseph Shea from Terrence Reis dated January 31, 2014.

SUBJECT: SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2 – NRC LICENSE RENEWAL INSPECTION, INSPECTION REPORT 05000327/2013012 AND 05000328/2013012

Distribution w/encl:
C. Evans, RII
L. Douglas, RII
OE Mail
RIDSNRRDIRS
PUBLIC
RidsNrrPMSequoyah Resource

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No(s)	05000327, 05000328
License No:	DPR-77, DPR-79
Report No:	05000327/2013012, 05000328/2013012
Licensee:	Tennessee Valley Authority (TVA)
Facility:	Sequoyah Nuclear Plant, Units 1 and 2
Location:	Sequoyah Access Road Soddy-Daisy, TN 37379
Dates:	October 21 – December 17, 2013
Inspection Team:	J. Rivera-Ortiz, Senior Reactor Inspector, Team Lead L. Lake, Senior Reactor Inspector M. Crespo, Senior Fuel Facility Inspector B. Collins, Reactor Inspector P. Cooper, Reactor Inspector B. Fu, Materials Engineer, Office of Nuclear Reactors Regulation
Approved by:	Terrence Reis, Director Division of Reactor Safety

Enclosure

SUMMARY

IR 05000327/2013012, 05000328/2013012; 10/21/2013 – 12/17/2013; Sequoyah Nuclear Plant Units 1 and 2; License Renewal Inspection

The report covers a team inspection conducted by five Region II inspectors and a materials engineer from the Office of Nuclear Reactor Regulation, Division of License Renewal, in accordance with Nuclear Regulatory Commission (NRC) Inspector Manual Chapter 2516, "Policy and Guidance for the License Renewal Inspection Program," dated August 13, 2013 and NRC Inspection Procedure 71002, "License Renewal Inspection," dated November 23, 2011.

This inspection resulted in no findings. On the basis of the sample selected for review, the inspectors determined that the license renewal activities met the regulatory requirements in Title 10 of the Code of Federal Regulations, Part 54 (10 CFR 54). The inspectors also determined that the proposed aging management programs would provide reasonable assurance that aging effects of in-scope structures, systems, and components will be managed to maintain their intended functions during the period of extended operation, provided the programs are implemented in accordance with the application, the applicant's response to NRC requests for additional information, regulatory commitments, and applicable quality assurance measures. The inspectors also found that documentation used to support the application was retrievable, auditable, and consistent with the records requirements in 10 CFR 54.

The inspectors identified various observations associated with the aging management review of components in the essential raw cooling water system and the program elements of certain aging management programs described in the application.

REPORT DETAILS

4OA5 Other Activities: License Renewal Inspection – Inspection Procedure 71002

On January 15, 2013, Tennessee Valley Authority submitted a license renewal application (hereinafter referred to as "the application," ADAMS Accession Number ML13024A011) to extend the operating license for Sequoyah Nuclear Plant, Units 1 and 2, in accordance with 10 CFR 54. The current operating licenses for Unit 1 and 2 expire at midnight on September 7, 2020 and September 15, 2021, respectively. The provisions in 10 CFR 54 allow renewal of a current operating license for a period of 20 years. The inspectors conducted inspection activities in the areas of scoping and screening, aging management programs, annual updates to the application, and open items as directed by NRC Inspection Procedure 71002, "License Renewal Inspection."

.1 Scoping and Screening Inspection

a. Inspection Scope

The inspectors selected the essential raw cooling water (ERCW) system to verify, on a sampling basis, that scoping and screening activities were performed in accordance with the provisions in 10 CFR 54.4(a). The inspectors selected this system because of its safety-related function, risk significance, and interactions with other systems and components in the plant. The scoping and screening inspection of the ERCW system verified that non-safety-related structures, systems, and components whose failure could prevent the system from accomplishing its safety-related function were correctly included within the scope of license renewal. The scoping and screening inspection also considered structures, systems, and components that were excluded from the scope of license renewal to verify that the applicant provided adequate technical justification for their exclusion from license renewal.

The inspectors reviewed scoping and screening evaluations in conjunction with license renewal boundary drawings to identify the system's interactions, especially the boundaries between safety-related and non-safety-related components. The inspectors also reviewed aging management evaluations for the ERCW system to obtain reasonable assurance that the applicant had adequately documented all the identified passive and long-lived structures, system, and components requiring an aging management review and verify that the applicant accounted for all possible environmental aging effects. The inspectors also interviewed plant personnel about the scoping and screening methodology used for the system's components and surrounding structures.

The inspectors selected the following ERCW system components in-scope of license renewal to verify that the applicant had adequately documented their aging management review in the application and supporting technical evaluations.

- SQN-0-FCV-067-0365-A (Valve Body), ERCW Header B Return-Discharge Canal Shutoff Valve
- SQN-0-FCV-067-0014-B (Valve Body), ERCW Header B Return-Discharge Canal Shutoff Valve

- SQN-1-FCV-067-0066-A (Valve Body), Emergency Diesel Heat Exchangers A1 & A2 Supply Valve from Header A
- SQN-1-FCV-067-0067-B (Valve Body), Emergency Diesel Heat Exchangers B1 & B2 Supply Valve from Header B

The inspectors also conducted a walk-down of accessible portions of the system and surrounding structures to verify that the scoping and screening results in the application and supporting technical evaluations were consistent with the existing plant configuration, including non-safety-related structures, systems, and components whose failure could prevent the ERCW system from accomplishing its safety-related function. The inspectors also verified that there was reasonable assurance that the applicable environmental aging effects were accounted for in the application. The specific sample of components and structures directly observed during the walk-down are listed below.

- ERCS pump house structure
- turbine building structure
- diesel generator buildings
- auxiliary building
- ERCW strainers A1A-A, B1B-B, and B2B-B
- diesel generator cooler 1A-A D/G
- containment spray heat exchanger 1A-A and 1B-B
- room cooler and oil cooler for safety injection pump 1 A-A
- component cooling system heat exchangers 0B1, 0B2, 1A1, 2A1, and 2A2
- shutdown board room chiller
- motor driven auxiliary feedwater pump cooler 1A
- piping connection to upper containment coolers 2B and 2D
- supply lines to station air compressors at 1A header
- penetration room 1B-B at elevation 690
- charging pump room 1B-B
- penetration room 2B-B at elevation 714

The walk-down also included portions of the system that were determined to be out of scope of license renewal, in order to verify that the applicant applied the license renewal scoping criteria in accordance with 10 CFR 54.4. The inspectors selected the following out-of-scope portions of the system for review.

- piping downstream of the ERCW discharge header box
- piping in the additional diesel generator building
- capped/out-of-service piping in the old ERCW pump station

b. Findings and Observations

No findings were identified. Based on the inspection samples selected for review, the inspectors determined that the ERCW system, its surrounding structures, and adjacent systems, were adequately scoped in accordance with the criteria established in 10 CFR 54.4(a) for non-safety-related structures, systems, and components whose failure could prevent the function of safety-related equipment. The inspectors also determined that

the selected piping sections determined to be outside the scope of license renewal did not meet the scoping criteria in 10 CFR 54 and were adequately excluded from the scope of license renewal.

The inspectors identified the following two observations related to the screening and aging management review of certain components in the ERCW system.

1) ERCW Buried Piping at Old Pump Station – As a result of a walk-down of the ERCW system, the inspectors determined that there were two locations of the ERCW system containing normally inaccessible piping components that were not fully described in the aging management review contained in Section 3 of the application.

   The first location consisted of four carbon steel valves located immediately upstream of the ERCW discharge structure (valves 0-FCV-067-0012, 0-FCV-067-0014, 0-FCV-067-0364, and 0-FCV-067-0365). These flow control valves were connected to the main 36-inch diameter discharge lines (buried piping) and therefore were exposed soil environment on the external surface of the valve body. The valves were maintained in the open position without control power and covered with concrete missile shields. The inspectors determined that the application, Table 3.3.2-11, "Essential Raw Cooling Water Systems," did not include valve bodies in a soil environment as part of the applicable combinations of component, material and environment requiring aging management review.

   The second location consisted of eight covered openings in the old ERCW pumping station deck which provided access to interfaces between in-service and removed piping from the previous ERCW pump configuration. These openings contained capped underground piping (20-inch diameter carbon steel) that was previously used to connect each ERCW pump discharge line with their respective common header. When the ERCW pumps were relocated, the in-service discharge piping ends were capped with welded plates of 1-1/4 inch thickness. Each welded plate included a carbon steel plug in the center. The eight capped piping ends were then covered with steel missile shields. Since the missile shields did not include a leak tight sealing surface, rain water or moisture could get in contact with the steel plates and plugs. The inspectors determined that Table 3.3.2-11 of the application did not include this particular configuration of capped piping (i.e. carbon steel piping exposed to air-outdoor environment but not readily accessible without removing the missile shields) as part of the applicable combinations of component, material and environment requiring aging management review.

   This observation did not represent any concerns with the current ability of the system to perform its intended function since the inspectors did not identify any evidence of pressure boundary degradation during the walk-down. The applicant entered the issue in the corrective action program as Problem Evaluation Report (PER) 817802 in order to evaluate the aging management review for the underground piping components discussed above and revise the application as needed. On December 16, 2013, the applicant submitted a letter to the NRC addressing the changes to the application as a result of this observation (ADAMS Accession Number ML13357A722). The applicant concluded that these two locations containing underground components needed to be added to the scope of the Buried and Underground Piping and Tanks Program.

2) ERCW Suction Pipe Strainers – Table 3.3.2-11 of the application stated that the housings of the ERCW system strainers were made of carbon steel and exposed to the air-indoor and raw water environments. The air-indoor environment applied to the external surface of the housing while the raw water environment applied to the internal surface. However, the inspectors identified during a walk-down of the ERCW pump house that the external surface of the ERCW strainers were regularly exposed to raw water as a result of normal strainer leak-off, as demonstrated by general surface corrosion on the external surface of the strainer. The inspectors determined that the application did not include raw water as an applicable environment to the external surface of the ERCW strainers housing.

   This observation did not represent any concerns with the current ability of the system to perform its intended function based on the material condition of the strainers and the applicant's response to NRC request for additional information RAI B.1.17-1a documented in TVA letter to the NRC dated September 20, 2013 (ADAMS Accession Number ML13267A159). The applicant entered the issue in the corrective action program as PER 817802 in order to evaluate the aging management review for the ERCW strainers and revise the application as needed. On December 16, 2013, the applicant submitted a letter to the NRC addressing the changes to the application as a result of this observation (ADAMS Accession Number ML13357A722). The applicant updated Table 3.3.2-11 of the application to incorporate raw water as an applicable environment for the external surface of the ERCW strainers.

.2 Aging Management Programs Inspection

a. Inspection Scope

   The inspectors conducted a review of all aging management programs credited in the application for managing the aging effects of structures, systems, and components in scope of license renewal. The inspectors conducted plant walk-downs; reviewed technical evaluations, implementing procedures, and program results; and interviewed plant personnel to verify that existing or planned aging management programs conformed with descriptions contained in the application and could reasonably manage the effects of aging. For aging management programs with associated regulatory commitments for license renewal, the inspectors reviewed commitment tracking forms and problem evaluation reports to obtain reasonable assurance that administrative controls were in-place for tracking the completion of license renewal action items (e.g. program enhancements, procedure changes, and inspection activities) prior to the period of extended operation.

   The aging management programs selected for review are summarized in the following paragraphs based on the information included in Appendix B of the application and the most recent list of regulatory commitments submitted by the applicant to the NRC at the time of the inspection (Enclosure 2 of Letter from TVA to the NRC dated December 16, 2013, ADAMS Accession Number ML13357A722). The applicant's regulatory commitments for license renewal are subject to change as a result of further NRC review of the application. The specific inspection activities conducted for each aging management program are also included with each program description. Specific documents reviewed for each program are listed in the report attachment.

Aboveground Metallic Tanks Program (Appendix B, Section B.1.1): The application stated that the Aboveground Metallic Tanks Program is a new aging management program that will manage loss of material and cracking for the outer surfaces, including the bottom surfaces, of aboveground metallic tanks. The tanks within the scope of the program would be the condensate storage tanks (CSTs) and the refueling water storage tanks (RWSTs). For in-scope painted tanks (i.e. CSTs) the program would monitor the surface condition for blistering, flaking, cracking, peeling, discoloration, underlying rust, and physical damage. For in-scope stainless steel tanks (i.e. RWSTs) the program would monitor surface condition to assure a clean, shiny surface with no visible leaks. The applicant claimed consistency of the program with the program elements in NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," Revision 2, Section XI.M29, "Aboveground Metallic Tanks," without exceptions or enhancements.

The program would direct the inspection of visible exterior portions of the tanks at least once every refueling cycle. This program would also manage the bottom surface of aboveground metallic tanks, which are constructed on a ring of concrete and oil-filled sand. The program would require ultrasonic testing of the tank bottoms to assess the thickness against the thickness specified in the design specification. The ultrasonic testing of the tank bottoms would be performed at least once within the five years prior to the period of extended operation and whenever the tanks are drained during the period of extended operation.

The inspectors reviewed the aging management program evaluation report, corrective action documents, tank technical specifications, drawings, and procedures to determine whether the applicant considered site-specific operating experience in the preparation of the application and whether the proposed program would reasonably manage the applicable aging effects. The inspectors also performed a walk-down of the RWSTs and CSTs, and reviewed visual examination reports for previous tank inspections to assess the material condition of the tanks and verify consistency with the application. Specifically, the inspectors reviewed work orders for the visual inspection of the Unit 1 RWST in November 2001, Unit 2 RWST in April 2002, CST-A in April 2003, and CST-B in May 2005 to verify that inspection results and corrective actions were consistent with the application. The implementation of this new aging management program was identified as Commitment 1 in the regulatory commitments list dated December 16, 2013.

The inspectors also interviewed plant personnel about the current implementation of tank inspections and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors verified through interviews that the applicant had plans to perform volumetric examination (ultrasonic testing) of the CSTs and RWSTs to determine thickness measurements of tank bottoms as described in the application.

Bolting Integrity Program (Appendix B, Section B.1.2): The application stated that the Bolting Integrity Program is an existing aging management program that manages loss of preload, cracking, and loss of material for closure bolting in safety-related and non-safety-related pressure-retaining components through preventive and inspection activities. This program did not include the reactor head closure studs or structural bolting. As stated in the application, preventive measures include material and lubricant selection, applying the appropriate preload, and checking for uniformity of gasket compression where appropriate to preclude loss of preload, loss of material, and

cracking. The applicant described that inspection activities include those required by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC), Section XI, for Class 1, 2 and 3 pressure-retaining components. For non-ASME Code class bolts, periodic system walk-downs and inspections would ensure identification of the applicable aging effects before leakage becomes excessive. With the exception of one reactor vessel closure stud, which is managed by the Reactor Head Closure Studs Program, the applicant stated that no high-strength bolting has been identified at Sequoyah Nuclear Plant. The program would rely on the corrective action process to monitor identified leaking bolted connections at an increased frequency. The applicant would use applicable industry standards and guidance documents, including NUREG-1339 and Electric Power Research Institute (EPRI) documents NP-5769 and TR-104213, to delineate the program.

The application stated that two program enhancements will be implemented prior to the period of extended operation. The applicant stated that the Bolting Integrity Program, with the planned enhancements, will be consistent with the program described in NUREG-1801, Section XI.M18, “Bolting Integrity.” Two additional program enhancements were added since the application was submitted as a result of NRC’s request for additional information. The implementation of all program enhancements was identified as Commitment 2 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant’s aging management reviews. The inspectors also reviewed a sample of recent examination results for bolting in the Unit 1 safety injection system and reactor coolant pumps. These examination results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of structures, systems, and components within the scope of the program during the period of extended operation.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Furthermore, the inspectors conducted a walk-down of the Unit 1 containment building during the Fall 2013 Refueling Outage to assess whether the program was effective at managing the applicable aging effects based on the condition of bolted connections. The inspectors’ walk-down included accessible areas in the lower containment (containment shell, containment race way, accumulator rooms, reactor coolant pumps, pressurizer, fan rooms, steam generators, and seal table); upper containment (containment shell and top of the pressurizer); and containment annulus (external surface of the containment shell from elevation 790 to 781, from 90° to 0° azimuth). During the plant walk-down, the inspectors also looked for any observable aging effects that were not already identified in the application.

Boric Acid Corrosion Control Program (Appendix B, Section B.1.3): The application stated that the Boric Acid Corrosion Control Program is an existing program that manages loss of material and increase in connection resistance for components on which borated reactor water may leak. The application described that program activities consists of (a) visual inspection of external surfaces that are potentially exposed to borated water leakage, including mechanical, electrical and structural components; (b) timely discovery of leak path and removal of boric acid residues; (c) assessment of the damage; and (d) follow-up inspection for adequacy. This program was implemented in response to NRC Generic Letter 88-05 and industry operating experience.

The application also stated that the program provides reasonable assurance that the reactor coolant pressure boundary will have an extremely low probability of abnormal leakage, rapidly propagating failure, or gross rupture. The applicant stated that corrective actions as a result of the program activities may include modifications to existing design or operating procedures to reduce the probability of boric acid leakage at locations where such leaks may cause corrosion damage.

The application claimed consistency of the Boric Acid Corrosion Control Program with the program elements in NUREG-1801, Revision 2, Section XI.M10, "Boric Acid Corrosion," without exceptions or enhancements. At the time of this inspection the applicant had not submitted any specific regulatory commitments for license renewal associated with the implementation of this program.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspectors also reviewed a sample of examination results and corrective actions for a recent Unit 1 reactor building post-shutdown leakage walk-down and the Unit 1 reactor vessel canopy seal welds. These examination results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of structures, systems, and components within the scope of the program during the period of extended operation. The inspectors conducted a walk-down of the Unit 1 auxiliary building, specifically the Unit 1 safety injection pump 1A-A and charging pump 1B-B rooms, to assess whether the program was effective at managing the applicable aging effects based on the visible condition of the materials.

Furthermore, the inspectors conducted a walk-down of the Unit 1 containment building during the Fall 2013 Refueling Outage to assess whether the program was effective at managing the applicable aging effects based on the condition of components on which borated reactor water may leak. The inspectors' walk-down included accessible areas in the lower containment (containment shell, containment race way, accumulator rooms, reactor coolant pumps, pressurizer, fan rooms, steam generators, and seal table); upper containment (containment shell and top of the pressurizer); and containment annulus (external surface of the containment shell from elevation 790 to 781, from 90° to 0° azimuth). During the plant walk-downs, the inspectors also looked for any observable aging effects that were not already identified in the application.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program self-assessments to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

Buried and Underground Piping and Tanks Inspection Program (Appendix B, Section B.1.4): The application stated that the Buried and Underground Piping and Tanks Inspection Program is a new program that manages loss of material and cracking for the external surfaces of buried and underground piping fabricated from carbon steel and stainless steel through preventive measures, mitigating measures, and periodic inspection activities during opportunistic or directed excavations. This program would be implemented prior to the period of extended operation.

The application stated that there are no underground or buried tanks for which aging effects are managed by the Buried and Underground Piping and Tanks Inspection Program. The applicant claimed consistency of the program with the program elements in NUREG-1801, Revision 2, Section XI.M41, "Buried and Underground Piping and Tanks," without exceptions or enhancements.

Additionally, the application stated that cathodic protection is not currently installed at Sequoyah. If cathodic protection is not provided for buried piping within the scope of the program prior to the period of extended operation, the program would include documented justification that cathodic protection is not warranted. The justification would include the results of soil testing (including tests for soil resistivity, corrosion-accelerating bacteria, pH, moisture, chlorides and redox potential) to demonstrate that the soil environment is not corrosive to applicable buried components. The results of a review of at least ten years of operating experience must support the conclusion that cathodic protection is not warranted. The review of ten years of operating experience would include review of operating experience with components not in the scope of license renewal if they are fabricated from the same materials and exposed to the same environments as in-scope buried and underground components.

However, the most recent list of commitments submitted to the NRC at the time of this inspection (letter from TVA dated December 16, 2013) stated that cathodic protection will be provided based on the guidance of NUREG-1801, Section XI.M41, as modified by NRC License Renewal Interim Staff Guidance LR-ISG-2011-03, "Changes to the Generic Aging Lessons Learned (GALL) Report, Revision 2, Aging Management Program XI.M41, Buried and Underground Piping and Tanks," dated August 2, 2012 (ADAMS Accession Number ML12138A296). The implementation of the program with the cathodic protection enhancement was identified as Commitment 3 in the regulatory commitments list dated December 16, 2013.

As described in the application, if a reduction in the number of inspections recommended in Table 4a of NUREG-1801, Section XI.M41, is claimed based on a lack of soil corrosivity as determined by soil testing, then soil testing should be conducted once in each ten-year period starting ten years prior to the period of extended operation.

The applicant had not implemented this new aging management program for license renewal as described in the application because it would be effective during the period of extended operation. However, the applicant was implementing an "Underground Piping and Tanks Integrity Program" which addressed some of the attributes described in the application. The inspectors reviewed program procedures to assess the implementation of ongoing aging management activities under the existing program. The inspectors reviewed the scope of the program as described in the implementing procedures and the site-specific inspection plan to obtain reasonable assurance that the existing program addressed the identified passive and long-lived structures, systems, and components credited under the new program in the applicant's aging management reviews. The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Compressed Air Monitoring Program (Appendix B, Section B.1.5): The application stated that the Compressed Air Monitoring Program is an existing program that manages loss of material in compressed air systems by periodically monitoring air samples for moisture and contaminants and by opportunistically inspecting internal surfaces within compressed air systems. The applicant stated that the program incorporates the guidance in Electric Power Research Institute (EPRI) document EPRI NP-7079, ASME Code OM-S/G-1998 (Part 17), and standard ISA-S7.0.1-1996 for preventive measures, inspection of components, and testing and monitoring of air quality.

The application also described several program enhancements that will be implemented prior to the period of extended operation. The applicant stated that the Compressed Air Monitoring Program, with the planned enhancements, will be consistent with the program described in NUREG-1801, Section XI.M24, "Compressed Air Monitoring," without exceptions. The implementation of all program enhancements was identified as Commitment 4 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program self-assessments results to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

Containment In-service Inspection IWE Program (Appendix B, Section B.1.6): The application stated that the Containment In-service Inspection IWE Program is an existing program that implements the requirements of the ASME BPVC, Section XI, Subsection IWE, for steel containments (Class MC) and steel liners for concrete containments (Class CC) in accordance with 10 CFR 50.55a. The scope of the program included the free-standing steel containment vessel and its integral attachments, containment hatches, airlocks, moisture barriers, and pressure-retaining bolting. As stated in the application, the program performs visual examinations, including examination of bellows as described in NRC Information Notice 92-20, "Inadequate Local Leak Rate Testing," to assess the general condition of the containment and to detect evidence of degradation that may affect structural integrity or leak tightness. The program also specified acceptance criteria, corrective actions, and provisions for expansion of the inspection scope when identified degradation exceeds the acceptance criteria. The program would be augmented by plant procedures that use the guidance of NUREG-1339, and EPRI documents TR-104213 and NP-5769, to ensure proper specification of bolting material, lubricant and sealants, and installation torque.

The application stated that the Containment In-service Inspection IWE Program was consistent with the program described in NUREG-1801, Section XI.S1, "ASME Section XI, Subsection IWE," without exceptions or enhancements. However, the applicant later submitted a regulatory commitment associated with this aging management program consisting of three program enhancements. The specific commitment actions included: (a) modifying the configuration of the Unit 1 test connection access boxes to prevent moisture intrusion to the leak test channels and performing remote visual examinations inside the leak test channels prior to installing the modification, (b) perform visual examinations of all accessible surfaces of the access boxes on each unit every other refueling outage, and (c) performing volumetric examinations where the steel containment vessel domes were cut at the frequency of once every five years until the coatings are reinstalled at these locations. The implementation of these program enhancements was identified as Commitment 35 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program self-assessments results to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

Furthermore, the inspectors conducted a walk-down of the Unit 1 containment building during the Fall 2013 Refueling Outage to assess whether the program was effective at managing the applicable aging effects based on the condition of accessible containment surfaces. The inspectors' walk-down included accessible areas in the lower containment (containment shell, containment race way, accumulator rooms, reactor coolant pumps, pressurizer, fan rooms, steam generators, and seal table); upper containment (containment shell and top of the pressurizer); and containment annulus (external surface of the containment shell from elevation 790 to 781, from 90° to 0° azimuth). During the plant walk-down, the inspectors also looked for any observable aging effects that were not already identified in the application.

Containment Leak Rate Program (Appendix B, Section B.1.7): The application stated that the Containment Leak Rate Program is an existing program that consists of tests performed in accordance with the regulations and guidance provided in 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," Option B; Regulatory Guide 1.163, "Performance-Based Containment Leak-Testing Program;" Nuclear Energy Institute (NEI) document 94-01, "Industry Guideline for Implementing Performance-Based Options of 10 CFR Part 50, Appendix J"; and standard ANSI/ANS 56.8, "Containment System Leakage Testing Requirements." The applicant stated that the Containment Leak Rate Program provides measures for condition monitoring to detect degradation prior to loss of intended function. The program would rely on pressure tests, leakage rate tests, and the implementation of the Containment In-service Inspection IWE Program for managing the applicable aging effects.

The application also stated that the Containment Leak Rate Program was consistent with the program described in NUREG-1801, Section XI.S4, "10 CFR Part 50, Appendix J," without exceptions or enhancements. However, the applicant subsequently submitted a regulatory commitment to revise the program procedures to require venting the steel containment vessel bottom liner plate weld leak test channels to the containment atmosphere prior to the containment integrated leak rate test and resealing the vent path after the containment integrated leak rate test to prevent moisture intrusion during plant operation. The commitment was identified as Commitment 34 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program self-assessments results to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

Diesel Fuel Monitoring Program (Appendix B, Section B.1.8): The application stated that the Diesel Fuel Monitoring Program is an existing program credited for managing loss of material in piping, tanks, and other components exposed to an environment of diesel fuel oil by verifying quality of the fuel oil source. The program's activities, as described in the application, include receipt inspections before allowing the fuel oil to enter the fuel oil storage tanks. Parameters monitored included water, sediment, total particulate, and levels of microbiological activity. Where possible, the program required multi-level sampling of fuel oil storage tanks or a representative sample from the lowest part of the tank when multi-level sampling cannot be performed due to design limitations. The program included adding biocides to prevent biological activity when water is identified.

The applicant described several program enhancements that will be implemented prior to the period of extended operation. The enhancements would include: (a) monitoring and trending of quality factors for the emergency diesel generator day tanks and the seven day storage tanks, (b) periodic cleaning and inspection of the standby diesel fuel oil storage tanks and high pressure fire protection fuel oil storage tank, and (c) volumetric examination of affected areas of the diesel fuel oil tanks. The applicant stated that the Diesel Fuel Monitoring Program, with the proposed enhancements, will be consistent with the program described in NUREG-1801, Section XI.M30, "Fuel Oil Chemistry." The implementation of program enhancements was identified as Commitment 5 in the regulatory commitments list dated December 16, 2013.

The application also stated that the One-Time Inspection Program described in Appendix B, Section B.1.29 of the application would verify that the Diesel Fuel Monitoring Program has been effective at managing the effects of aging.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspectors reviewed recent trending data on diesel fuel characteristics to assess the implementation and effectiveness of the program. The inspectors also reviewed PER 213080 to verify how the applicant would manage the use of biodiesel fuel on-site.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. In addition, the inspectors conducted walk-downs of the high pressure fire pump fuel oil storage tank and the emergency diesel generator day tanks to assess whether the program was effective at managing the applicable aging effects based on the visible condition of the materials.

Environmental Qualification Program (Appendix B, Section B.1.9): The application stated that the Environmental Qualification (EQ) of Electric Components Program is an existing program that manages the effects of thermal, radiation, and cyclic aging through the use of aging evaluations based on 10 CFR 50.49(f) qualification methods. The applicant also stated that reanalysis of aging evaluations is normally performed to

extend the qualification by reducing excess conservatism incorporated in the prior evaluation parameters. Reanalysis of an aging evaluation to extend the qualification of a component were performed on a routine basis pursuant to 10 CFR 50.49(e) as part of the EQ Program. The reanalysis of an aging evaluation was documented according to the station's quality assurance program requirements that require the verification of assumptions and conclusions. As stated in the application, the key program attributes for reanalysis include analytical methods, data collection and reduction methods, underlying assumptions, acceptance criteria, and corrective actions.
The application claimed consistency of the Environmental Qualification Program with the program elements in NUREG-1801, Revision 2, Section X.E1, "Environmental Qualification (EQ) of Electric Components," without exceptions or enhancements. At the time of this inspection the applicant had not submitted any specific regulatory commitments for license renewal associated with the implementation of this program.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified structures, systems, and components credited under this program in the application. The inspectors also reviewed an example of an EQ documentation package for a particular solenoid valve design and an example of a reanalysis for EQ extension of a level transmitter to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of structures, systems, and components within the scope of the program as described in the application. The inspectors conducted a walk-down of the auxiliary building emergency gas treatment system room (elevation 734) and Unit 2 pipe chase (elevation 690), which contained components within the scope of the program, to assess whether the program was effective at managing the applicable aging effects based on the visible condition of the materials. During the plant walk-down, the inspectors also looked for any observable aging effects that were not already identified in the application or could impact the environmental qualification of components.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program self-assessments to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

External Surfaces Monitoring Program (Appendix B, Section B.1.10): The application stated that the External Surfaces Monitoring Program is an existing program that manages aging effects of components fabricated from metallic and polymeric materials through periodic visual inspection of external surfaces during system inspections and walk-downs for evidence of leakage, loss of material (including loss of material due to wear), cracking, and change in material properties. The program utilized visual inspection to monitor for loss of material cracking, and change in material properties and the program confirms the integrity of coated surfaces as a mean to effectively manage the effects of corrosion on metallic surfaces.

The application also stated that inspections are performed by personnel qualified through plant-specific programs and at frequency not to exceed a refueling cycle. Surfaces that are not readily visible during plant operations and refueling outages, including insulated surfaces, were inspected when they were made accessible and at such intervals that ensured the components' intended functions are maintained. Additionally, the applicant credited the program for situations where the material and environment combinations are the same for the internal and external surfaces such that the external surfaces are representative of the internal surfaces.

The applicant described several program enhancements that will be implemented prior to the period of extended operation. The enhancements would include procedure revisions to clarify that periodic inspections will be performed for systems in-scope of license renewal, and procedure revisions to address metallic, flexible polymeric, and insulated components. The applicant stated that the External Surfaces Monitoring Program, with the proposed enhancements, will be consistent with the program described in NUREG-1801, Section XI.M36, “External Surfaces Monitoring of Mechanical Components.” The implementation of program enhancements was identified as Commitment 6 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant’s aging management reviews. The inspectors also reviewed a sample of examination results and corrective actions for a recent service water intake structure walk-down. These examination results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of structures, systems, and components within the scope of the program during the period of extended operation. The inspectors conducted a walk-down of the service water intake structure, Unit 1 cable spreading room, and Unit 1 auxiliary building to assess whether the program was effective at managing the applicable aging effects based on the visible condition of the materials.

Furthermore, the inspectors conducted a walk-down of the Unit 1 containment building during the Fall 2013 Refueling Outage to assess whether the program was effective at managing the applicable aging effects based on the condition of external surfaces. The inspectors’ walk-down included accessible areas in the lower containment (containment shell, containment race way, accumulator rooms, reactor coolant pumps, pressurizer, fan rooms, steam generators, and seal table); upper containment (containment shell and top of the pressurizer); and containment annulus (external surface of the containment shell from elevation 790 to 781, from 90° to 0° azimuth). During the plant walk-downs, the inspectors also looked for any observable aging effects that were not already identified in the application.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Fatigue Monitoring Program (Appendix B, Section B.1.11): The application stated that the existing Fatigue Monitoring Program ensures that fatigue usage remains within allowable limits by (a) tracking the number of critical thermal and pressure transients for selected components, (b) verifying that the severity of monitored transients are bounded by the design transient definitions for which they are classified, (c) assessing the impact of the reactor coolant environment on a set of sample critical components, and (d) addressing applicable fatigue exemptions.

The program description in the application stated that tracking the number of critical thermal and pressure transients for the selected components ensures a Code design usage factor of less than or equal to 1, including environment effects where applicable. The program provided for updates of fatigue usage calculations on an as-needed basis if an allowable cycle limit is approached. The application also stated that the program ensures that fatigue usage remains within allowable limits for components identified to have a Time-Limited Aging Analysis.

The applicant described several program enhancements that will be implemented prior to the period of extended operation. The enhancements would include: (a) procedure revisions to monitor and track critical transients for components with a fatigue time-limited aging analysis, (b) development of fatigue usage calculations for a set of reactor coolant system components that consider the effect of the reactor water environment, (c) determination of fatigue usage factors for the reactor coolant system limiting components to address the cold overpressure mitigation systems event and the effects of structural weld overlays, and (d) procedure revisions to provide updates of the fatigue usage calculations on an as-needed basis if an allowable cycle limit is approached, or in a case where a transient definition has been changed, unanticipated new thermal events are discovered, or the geometry of components has been modified. The applicant stated that the Fatigue Monitoring Program, with the proposed enhancements, will be consistent with the program described in NUREG-1801, Section X.M1, “Fatigue Monitoring.” The implementation of program enhancements was identified as Commitment 7 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed the site procedure that monitors components cycle or transient limits to verify it provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to verify that the component list included all applicable components that required cycle counting and monitoring. The inspectors also reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

The inspectors interviewed the program owners to determine if the responsible individuals were knowledgeable about the procedure that provides specific instructions for cycle counting, and the monitored components. The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities.

Fire Protection Program (Appendix B, Section B.1.12): The application stated that the Fire Protection Program is an existing program that manages cracking, loss of material, delamination, separation, and change in material properties through periodic visual inspection of components and structures with a fire barrier intended function. The

program also performed periodic visual and functional testing of fire doors to ensure their operability and periodic visual inspections and testing of the carbon dioxide (CO2) fire suppression system.

The application stated that two program enhancements will be implemented prior to the period of extended operation. The program enhancements would include: (a) procedure revisions to include an inspection of fire barrier walls, ceilings, and floors for any signs of degradation such as cracking, spalling, or loss of material caused by freeze thaw, chemical attack, or reaction with aggregates, and (b) procedure revisions to provide acceptance criteria of no significant indications of concrete cracking, spalling, and loss of material of fire barrier walls, ceilings, and floors and in other fire barrier materials. The applicant stated that the Fire Protection Program, with planned enhancements, will be consistent with the program described in NUREG-1801, Section XI.M26, "Fire Protection." These program enhancements were identified as Commitment 8 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed a sample of existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspectors also reviewed a sample of examination results and corrective actions for recent inspections of the auxiliary building fire walls (elevation 690 and below). These examination results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of passive and long-lived structures, systems, and components within the scope of the program during the period of extended operation. The inspectors conducted a walk-down of the Unit 1 auxiliary building instrument room (elevation 685), auxiliary building cable spreading room (elevation 706), Unit 1 penetration room (elevation 690), and Unit 2 pipe chase (elevation 690) to assess whether the program was effective at managing the applicable aging effects of fire barriers based on the visible condition of the materials. During the plant walk-down, the inspectors also looked for any observable aging effects that were not already identified in the application.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program self-assessments to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

Fire Water System Program (Appendix B, Section B.1.13): The application stated that the Fire Water System Program is an existing program that manages loss of material and fouling for fire protection components that are tested in accordance with the Fire Protection Report. The program activities described in the application included system performance testing, trending of inspection results, and periodic flushing in accordance with the Fire Protection Report and consistent with the National Fire Protection Code (NFPA)-25.

The application stated that several program enhancements will be implemented prior to the period of extended operation. The program enhancements have been revised several times since the application was submitted as a result, in part, of NRC's requests for additional information. The program enhancements would include: (a) visual inspection and acceptance criteria of fire water system internals, (b) sprinkler head testing, (c) full flow testing per NFPA-25, (d) inspection method for piping wall thickness, (e) fire water tank inspections, (f) feasibility study for NFPA-25 main drain tests, and (g) spray head discharge pattern tests. The applicant stated that the Fire Protection Program, with the planned enhancements, will be consistent with the program described in NUREG-1801, Section XI.M27, Fire Water System. The implementation of program enhancements was identified as Commitment 9 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed a sample of existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews.

The inspectors also reviewed a sample of recent examination and testing results for the auxiliary building sprinkler system, auxiliary and diesel generator buildings fire water system flow test, fire water tank A internal inspection, and internal inspection of fire water piping. These examination results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of passive and long-lived structures, systems, and components within the scope of the program during the period of extended operation. The inspectors conducted a walk-down of fire water tanks A and B, fire water pump rooms A and B; and fire water piping in the auxiliary instrumentation room (elevation 685), auxiliary building cable spreading room (elevation 706), Unit 1 auxiliary penetration room (elevation 690), and Unit 2 auxiliary building pipe chase (elevation 690) to assess whether the program was effective at managing the applicable aging effects of fire water system components based on the visible condition of the materials. During the plant walk-down, the inspectors also looked for any observable aging effects that were not already identified in the application.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program self-assessments to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

Flow Accelerated Corrosion Program (Appendix B, Section B.1.14): The application stated that the Flow Accelerated Corrosion Program is an existing program that manages loss of material due to wall thinning for carbon steel piping and components by (a) performing an analysis to determine systems subject to flow accelerated corrosion and internal and external erosion, (b) conducting appropriate analysis to predict wall thinning, (c) performing wall thickness measurements based on wall thinning predictions,

and (d) evaluating measurement results to determine remaining service life and the need for replacement or repair of components. This program was implemented as a result of industry operating experience.

As stated in the application, the program relies on implementation of guidelines published by EPRI in document NSAC-202L, "Recommendations for an Effective Flow-Accelerated Corrosion Program," Revision 3, and internal and external operating experience. The applicant stated that the program uses a combination of computer modeling, component inspections, and follow-on evaluations to ensure that components do not reach minimum allowed wall thickness prior to the next scheduled outage without appropriate actions being taken. The process would be adjusted as a result of any power up-rates to account for changes in system conditions.

The application also described that the existing program will be enhanced prior to the period of extended operation. The program enhancements would include: (a) revising the implementing procedures to more accurately reflect guidelines from EPRI document NSAC-202L, "Recommendations for an Effective Flow Accelerated Corrosion Program," and (b) revising the implementing procedures to incorporate the guidance in NRC License Renewal Interim Staff Guidance LR-ISG-2012-01, "Wall Thinning Due to Erosion Mechanisms." The applicant stated that the Flow Accelerated Corrosion Program, with the planned enhancements, will be consistent with the program described in NUREG-1801, Section XI.M17, "Flow-Accelerated Corrosion." The implementation of program enhancements was identified as Commitment 10 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews.

The inspectors interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program self-assessments to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

Flux Thimble Tube Inspection Program (Appendix B, Section B.1.15): The application stated that the Flux Thimble Tube Inspection Program is an existing program that manages loss of material due to wear of the flux thimble tube walls in the path from the reactor vessel instrument nozzles to the fuel assembly instrument guide tubes. The application also stated that non-destructive examination methodology such as eddy current testing or other NRC-accepted inspection methods are used to measure wall thickness and will be used during the period of extended operation. This program implemented the recommendations of NRC Bulletin 88-09, "Thimble Tube Thinning in

Westinghouse Reactors," in regards to non-destructive examination such as eddy current testing or other justified and NRC-approved method used to monitor flux thimble tube wear.

As stated in the application, the flux thimble tubes are subject to loss of material where flow-induced fretting causes wear at discontinuities in the path from the reactor vessel instrument nozzle to the fuel assembly guide tube. The program would manage the aging effect of loss of material using a combination of NRC accepted non-destructive examination methodology and monitoring for wear of the thimble tubes to ensure the intended function of the components.

The application also described that the existing program procedures will be enhanced prior to the period of extended operation to include a requirement for initiating a “Service Request” when the predictive trending projects that a tube will exceed 80 percent wall wear prior to the next planned inspection. Additionally, a requirement to initiate a “Service Request” would be added if any tube is found with wear greater than 80 percent through wall in order to evaluate the predictive methodology. The applicant stated that the Flux Thimble Tube Inspection Program, with planned enhancements, will be consistent with the program described in NUREG-1801, Section XI.M37, “Flux Thimble Tube Inspection.” The implementation of program enhancements was identified as Commitment 11 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provide guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant’s aging management reviews. The inspectors also reviewed thimble tube examination results for the last two refueling outages as documented in the plant’s in-service inspection reports. The inspectors reviewed these examination results to assess the implementation of the program and determine if loss of material due to wear was being detected and monitored prior to exceeding the acceptance criteria.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

In-service Inspection Program (Appendix B, Section B.1.16): The application stated that the In-service Inspection Program is an existing program that manages loss of material, cracking, and flaw growth for ASME Class 1, 2, and 3 pressure-retaining components, including welds, pump casings, valve bodies, integral attachments, and pressure-retaining bolting using volumetric, surface, and/or visual examination; leakage testing; and repair and replacement activities as specified in ASME BPVC, Section XI, 2001 Edition through 2003 Addenda. The program also included additional limitations, modifications, and augmentations described in 10 CFR 50.55a. The applicant stated that every ten years this program is updated to the latest ASME BPVC, Section XI edition and addenda approved by the NRC in 10 CFR 50.55a.

The application claimed consistency of the program with the program elements in NUREG-1801, Revision 2, Section XI.M1, "ASME Section XI In-service Inspection, Subsections IWB, IWC, and IWD," without exceptions or enhancements. However, the applicant subsequently submitted a commitment item to implement various program enhancements as a result of NRC's request for additional information. The enhancements included, in part: (a) revising program procedures to include a supplemental inspection of Class 1 cast austenitic stainless steel piping components, (b) revising program procedures to perform an augmented visual inspection of the Unit 1 and Unit 2 control rod drive mechanism thermal sleeves and a wall thickness measurement of the six thermal sleeves exhibiting the greatest amount of wear, (c) evaluating industry operating experience related to control rod drive mechanism housing penetration wear and initiatives to measure control rod drive mechanism housing penetration wear, (d) revising program procedures to perform an examination of the accessible control rod drive mechanism housing penetrations, (e) revising program procedures to estimate the control rod drive mechanism housing penetration wear at the end of the next reactor vessel head inspection interval and compare the projected wall thickness to the thickness used in Sequoyah design basis analyses, and (f) revising program procedures to monitor the wear of the accessible control rod drive mechanism housing penetrations. The implementation of program enhancements was identified as Commitment 36 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program self-assessments results to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

In-service Inspection IWF Program (Appendix B, Section B.1.17): The application stated that the In-service Inspection IWF Program is an existing program that fulfills the requirements of ASME BPVC, Section XI, as mandated by 10 CFR 50.55a. As described in the application, the program is credited for managing the effects of aging of ASME Class 1, 2, and 3 piping and component supports for license renewal. According to the applicant, Class MC supports category is not applicable to Sequoyah Nuclear Plant since it utilizes a free-standing steel containment vessel design. The program scope was based on sampling of piping supports and 100 percent of component supports other than piping, as specified in Table IWF-2500-1.

As stated in the application, the program provides for visual examinations and acceptance criteria to determine the general mechanical and structural condition or degradation of component supports such as verification of clearances, settings, physical

displacements, loose or missing parts, debris, corrosion, wear, erosion, or the loss of integrity at welded or bolted connections. The applicant stated that discovery of support deficiencies during regularly scheduled inspections are entered in the corrective action program for resolution, which includes examination scope expansion and re-examination. The program description in the application stated that the program is augmented by plant procedures to ensure that the selection of bolting material, installation torque or tension, and the use of lubricants and sealants are appropriate for the intended purpose.

The applicant described that the existing program procedures will be enhanced prior to the period of extended operation to include corrective action guidance and clarify that detection of aging effects will include monitoring anchor bolts for loss of material, loose or missing nuts, and cracking of concrete around the anchor bolts. The applicant stated that the In-service Inspection IWF program, with planned enhancements, will be consistent with the program described in NUREG-1801, Section XI.S3, "ASME Section XI, Subsection IWF." The implementation of program enhancements was identified as Commitment 12 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspectors also reviewed a sample of examination results and corrective actions for recent in-service inspection results of the Unit 1 reactor coolant system flange bolting. These examination results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of structures, systems, and components within the scope of the program during the period of extended operation. Additionally, the inspectors conducted a Unit 1 containment walk-down during the most recent refueling outage in November 2013, to assess whether the program was effective at managing the applicable aging effects based on the material condition of piping and components supports in containment. During the plant walk-down, the inspectors also looked for any observable aging effects that were not already identified in the application.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Inspection of Overhead Heavy Loads and Light Load (Related to Refueling) Handling Systems Program (Appendix B, Section B.1.18): The application stated that the cranes and hoists in the scope of license renewal are monitored in accordance with the existing Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program. The existing activities, as described in the application, consist of periodic inspections and preventive maintenance that are relied upon to manage loss of material due to corrosion, loose bolting or rivets, and crane rail wear of cranes and hoists in the scope of 10 CFR 54.4. The program relied on visual examinations and

functional testing on active components to ensure that cranes and hoists are capable of sustaining their rated loads, thus ensuring their intended function is maintained during the period of extended operation.

The application also stated that the scope of the program includes structural components, including structural bolting, that make up the bridge, the trolley, lifting devices, and rails in the rail system and includes cranes and hoists that meet the provisions of 10 CFR 54.4(a)(1) and (a)(2) as well as NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants."

The application described that the existing program procedures will be enhanced prior to the period of extended operation to: (a) specify the inspection scope will include monitoring of rails in the rail system for wear; monitoring structural components of the bridge, trolley and hoists for the aging effect of deformation, cracking, and loss of material due to corrosion; and monitoring structural connections/bolting for loose or missing bolts, nuts, pins or rivets and any other conditions indicative of loss of bolting integrity, (b) include the inspection requirements of ASME Safety Standard B30.2, "Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)," and (c) clarify that the acceptance criteria will include requirements for evaluation in accordance with ASME B30.2 of significant loss of material for structural components and structural bolts and significant wear of rail in the rail system; and that the acceptance criteria and maintenance and repair activities will use the guidance provided in ASME B30.2. The applicant stated that the program, with planned enhancements, will be consistent with the program described in NUREG-1801, Section XI.M23, "Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems." The implementation of program enhancements was identified as Commitment 13 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspectors also reviewed a sample of examination results and corrective actions for a recent manipulator crane inspection in Unit 2. These examination results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of structures, systems, and components within the scope of the program during the period of extended operation. The inspectors conducted a walk-down of the turbine building, specifically the turbine building crane, to assess whether the program was effective at managing the applicable aging effects based on the visible condition of the materials. During the plant walk-down, the inspectors also looked for any observable aging effects that were not already identified in the application.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Internal Surfaces in Miscellaneous Piping and Ducting Components Program (Appendix B, Section B.1.19): The application stated that the Internal Surfaces in Miscellaneous Piping and Ducting Components Program is a new program that will manage fouling, cracking, loss of material, and change in material properties for piping and components. The program would consist of: (a) opportunistic visual inspections of the internal surfaces of piping and components during periodic surveillances or maintenance activities when the surfaces are accessible for visual inspection, and (b) opportunistic visual inspection and physical manipulation of elastomeric components. The program would evaluate inspection results using design standards, procedural requirements, current licensing basis codes and standards.

The application stated that this new program will be established prior to the period of extended operation. The applicant stated that the Internal Surfaces in Miscellaneous Piping and Ducting Components Program will be consistent with the program described in NUREG-1801, Section XI.M38, “Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components.” The implementation of this program was identified as Commitment 14 in the regulatory commitments list dated December 16, 2013.

At the time of the inspection, the implementing procedures had not yet been developed for this program. The inspectors discussed the programmatic attributes and scope of the program with plant personnel to obtain reasonable assurance that the program would address the identified passive and long-lived structures, systems, and components credited under this program in the applicant’s aging management reviews. The inspectors also interviewed plant personnel about the future implementation plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Masonry Wall Program (Appendix B, Section B.1.20): The application stated that the Masonry Wall Program is an existing program that is implemented as part of the Structures Monitoring Program. The program was based on guidance provided in NRC Bulletin 80-11, "Masonry Wall Design," and NRC Information Notice 87-67, "Lessons Learned from Regional Inspections of Licensee Actions in Response to NRC Bulletin 80-11." As stated in the application, the program manages the aging effects of masonry walls within the scope of license renewal as delineated in 10 CFR 54.4 so that the evaluation basis established for each masonry wall remains valid through the period of extended operation.

The application also stated that the program included visual inspections of masonry walls within the scope of license renewal, which included masonry walls required to meet 10 CFR 50.48 requirements, radiation shielding masonry walls, and masonry walls with the potential to affect safety-related components. According to the application, masonry walls were inspected at least every five years, with provisions for more frequent inspections, to ensure there is no loss of intended function between inspections.

The application included program enhancements that will be implemented prior to the period of extended operation as part of the planned enhancements for the Structures Monitoring Program, described in Appendix B of the application, Section B.1.40. The applicant stated that the Masonry Wall Program, with the proposed enhancements, will

be consistent with the program described in NUREG-1801, Section XI.S5, “Masonry Wall Program.” The implementation of program enhancements was identified as Commitment 31 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant’s aging management reviews. The inspectors also reviewed a sample of examination results and corrective actions for a recent Maintenance Rule Structures Inspection. These examination results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of structures, systems, and components within the scope of the program during the period of extended operation. The inspectors conducted a walk-down of the turbine building and the ERCW pump house to assess whether the program was effective at managing the applicable aging effects based on the visible condition of the materials. During the plant walk-down, the inspectors also looked for any observable aging effects that were not already identified in the application.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Metal Enclosed Bus Inspection Program (Appendix B, Section B.1.21): The application stated that the Metal Enclosed Bus Inspection Program is a new program that provides for the inspection of the internal and external portions of metal enclosed bus to identify age-related degradation of the bus and bus connections, the bus enclosure assemblies, and the bus insulation and insulators. The program would include the inspection of bus ducts required for recovery of offsite power. This program would not manage the aging effects on external bus structural supports, which would be managed under the Structures Monitoring Program. The program would consist of (a) visual inspections of the internal and external portions of metal enclosed buses and (b) on a sampling basis, resistance measurements of various electrical connections. The applicant stated that the Metal Enclosed Bus Inspection Program will be consistent with the program described in NUREG-1801, Section XI.E4, “Metal Enclosed Bus Program.” The implementation of this program was identified as Commitment 15 in the regulatory commitments list dated December 16, 2013.

At the time of the inspection, the implementing procedures had not yet been developed for this program. The inspectors discussed the programmatic attributes and scope of the program with plant personnel to obtain reasonable assurance that the program would address the identified passive and long-lived structures, systems, and components credited under this program in the applicant’s aging management reviews. The inspectors also interviewed plant personnel about the future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Neutron Absorbing Material Monitoring (Appendix B, Section B.1.22): The application stated that the Neutron-Absorbing Material Monitoring Program is an existing program which provides reasonable assurance that degradation of the neutron-absorbing material (Boral) used in spent fuel racks that could compromise the criticality analysis (which requires a sub-critical margin of 5 percent) will be detected. The program relied on periodic inspection, testing, and other monitoring activities to assure that the required five percent sub-criticality margin is maintained during the period of extended operation. The program was established to monitor loss of material and changes in dimension such as gaps, blisters, pits, and bulges that could result in a loss of neutron-absorbing capability. The parameters monitored included physical measurements and geometric changes in test coupons. The frequency of testing would be based on the results of initial inspections prior to the period of extended operation and will not exceed every ten years. The approach to relating measurement results of the coupons considered the exposure the coupons have received versus the exposure the spent fuel racks have received. In the event that a loss of neutron-absorbing capacity is anticipated based on coupon testing, additional testing would be performed to ensure the sub-criticality requirements.

The applicant also described three program enhancements that will be implemented prior to the period of extended operation. The enhancements would include revising program procedures to: (a) perform blackness testing of the Boral coupons within the ten years prior to the period of extended operation and at least every ten years thereafter based on initial testing to determine possible changes in boron-10 areal density, (b) relate physical measurements of Boral coupons to the need to perform additional testing, and (c) perform trending of coupon testing results to determine the rate of degradation and to take action as needed to maintain the intended function of the Boral. The applicant stated that the Neutron Absorbing Material Monitoring Program, with the proposed enhancements, will be consistent with the program described in NUREG-1801, Section XI.M40, “Monitoring of Neutron-Absorbing Materials Other than Boraflex.” The implementation of program enhancements was identified as Commitment 16 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided adequate guidance to ensure that the effects of aging for the spent fuel pool racks will be managed to ensure their function will be maintained for the period of extended operation. The inspectors interviewed the plant personnel responsible for the establishment of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors also reviewed the placement strategy for the coupons in the spent fuel pool for the last several years with a senior reactor engineer to ensure the coupons were exposed to the greatest neutron flux of any component in the pool. The inspectors also reviewed the acceptance criteria provided by the spent fuel pool rack manufacturer and the applicable criticality analysis, including the assumptions for minimum Boral depletion and values associated with Boral concentration, to assess the applicant’s establishment of action levels in procedures and to ensure the analysis assumptions were consistent with actually storage racks. The inspectors reviewed the technical documents that defined the specification of the Boral coupons versus the Boral plating of the spent fuel rack to ensure consistency between the materials.

In addition, the inspectors conducted walk downs of the spent fuel pool to assess whether the program was effective at managing the applicable aging effects based on the visible condition of the materials. The inspectors noted that the program had yet to perform an inspection of the coupons; however, the applicant was in the process of selecting a vendor to implement the recently established program procedures.

Nickel Alloy Inspection Program (Appendix B, Section B.1.23): The application stated that the Nickel Alloy Inspection Program is an existing program that manages cracking due to primary water stress corrosion cracking (PWSCC) for nickel-alloy components and loss of material due to boric acid-induced corrosion in susceptible safety-related components in the vicinity of nickel-alloy reactor coolant pressure boundary components as required by 10 CFR 50.55a. The program consisted of (a) inspections of the PWR vessel, pressurizer components, and piping that contain PWSCC-susceptible dissimilar metals (Alloys 600/82/182) and (b) inspections of other reactor coolant pressure boundary components. This program was originally implemented in accordance with the EPRI Materials Reliability Program (MRP)-139, "Primary System Piping Butt Welds Inspection and Evaluation Guidelines."

The application also stated that the program monitors for reactor coolant pressure boundary cracking and leakage using various methods, including non-destructive examination techniques, radiation monitoring, and visual inspections for boric acid deposits, leakage, or the presence of moisture to identify cracking in the reactor coolant pressure boundary or loss of material. Inspection methods, schedules and frequencies for susceptible components were implemented in accordance with 10 CFR 50.55a and industry guidelines (e.g., MRP-139).

The application claimed consistency of the Nickel Alloy Inspection Program with the program elements in NUREG-1801, Revision 2, Section XI.M11B, "Cracking of Nickel-Alloy Components and Loss of Material due to Boric Acid-Induced Corrosion in Reactor Coolant Pressure Boundary Components," without exceptions or enhancements. At the time of this inspection the applicant had not submitted any specific regulatory commitments for license renewal associated with the implementation of this program. However, the applicant submitted a revision to the program description in a docketed correspondence to the NRC (Enclosure 1 of Letter from TVA to NRC dated December 16, 2013, ADAMS Accession Number ML13357A722). The revision to the program description consisted of deleting the reference to MRP-139 as a result of the incorporation of ASME Code Case N-770-1 into 10 CFR 50.55a.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed

recent program self-assessments to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

Non-EQ Cable Connections Program (Appendix B, Section B.1.24): The application stated that the Non-EQ Cable Connections Program is a new, one-time inspection program that provides reasonable assurance that the intended functions of the metallic parts of electrical cable connections are maintained consistent with the current licensing basis through the period of extended operation. Cable connections included would be those connections in the scope of license renewal susceptible to age-related degradation resulting in increased resistance of connection due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, or oxidation that are not subject to the environmental qualification requirements of 10 CFR 50.49.

The application also stated that the program provides for one-time inspections that will be completed prior to the period of extended operation on a sample of connections. The factors considered for sample selection would be application (medium and low voltage, defined as less than 35 kilo-volts), circuit loading (high loading), connection type, and location (high temperature, high humidity, vibration, etc.). The representative sample size would be based on twenty percent of the connection population with a maximum sample of 25. The inspections would be performed prior to the period of extended operation.

The application claimed consistency of the Non-EQ Cable Connections Program with the program elements in NUREG-1801, Section XI.E6, “Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements,” without exceptions or enhancements. The implementation of this new program was identified as Commitment 17 in the regulatory commitments list dated December 16, 2013.

At the time of the inspection, the implementing procedures had not yet been developed for this program. The inspectors discussed the programmatic attributes and scope of the program with plant personnel to obtain reasonable assurance that the program would address the identified passive and long-lived structures, systems, and components credited under this program in the applicant’s aging management reviews. The inspectors also interviewed plant personnel about the future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Non-EQ Inaccessible Power Cable Program (Appendix B, Section B.1.25): The application stated that the Non-EQ Inaccessible Power Cables Program is a new condition monitoring program that will manage the aging effect of reduced insulation resistance on inaccessible power cables (400 V to 35 kV) that have a license renewal intended function. The cables to be included in this program are routed underground and are connected to the 6.9 kV yard area common board, the 6.9 kV shutdown boards, the 6.9 kV start buses (1B and 2B only), and the 480 V shutdown boards.

As stated in the application, the program will include periodic actions to prevent inaccessible cables from being exposed to significant moisture. Inaccessible power cables within the scope of the program and exposed to significant moisture would be tested at least once every six years to provide an indication of the condition of the cable insulation properties. Test frequencies would be adjusted based on test results and operating experience. The specific type of test performed would be a proven test for detecting deterioration of the cable insulation. The program would include periodic inspections for water accumulation in manholes at least once every year (annually). In addition to the periodic manhole inspections, manhole inspections for water after event-driven occurrences, such as flooding, would be performed. Inspection frequency would be increased as necessary based on evaluation of inspection results.

The application claimed consistency of the Non-EQ Cable Connections Program with the program elements in NUREG-1801, Section XI.E3, "Inaccessible Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements." The implementation of this new program was identified as Commitment 18 in the regulatory commitments list dated December 16, 2013. This regulatory commitment also included actions in response to NRC request for additional information RAI B.1.25.1a (Letter from TVA to the NRC dated 10/21/2013, ADAMS Accession Number ML13296A017) related to water accumulation in manholes and diagnostic testing in all inaccessible power cables within the scope of the program.

At the time of the inspection, the implementing procedures had not yet been developed for this program. The inspectors discussed the programmatic attributes and scope of the program with plant personnel to obtain reasonable assurance that the program would address the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspectors also interviewed plant personnel about the future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

The inspectors conducted a walk-down of in-scope structures called "handholes" and observed a standing water check performed by the applicant on Handholes Group #52, which provided access to in-scope buried cable running to the ERCW building. The inspectors reviewed existing work orders issued to routinely pump standing water in the handholes and discussed with plant staff the extent of standing water routinely found in these handholes and corrective actions performed to pump the water to an acceptable level below the level of the cables. The inspectors also discussed potential engineering changes to install exterior sump pumps and/or remote level detection to manholes which contain in-scope license renewal cables. The inspectors performed these inspection activities to determine if the proposed program, with enhancements, would provide reasonable assurance that the applicable aging effects will be managed during the period of extended operation.

Non-EQ Instrument Circuits Test Review Program (Appendix B, Section B.1.26): The application stated that the Non-EQ Instrumentation Circuits Test Review Program is a new performance monitoring program that will manage the aging effects of the applicable cables in the neutron monitoring system (excore power range) and process radiation monitoring (containment building purge exhaust monitors, fuel pool air space

monitors, and main control room air intake monitors). The program would provide reasonable assurance that the intended functions of sensitive, high-voltage, low-signal cables exposed to adverse localized equipment environments caused by heat, radiation and moisture (i.e., neutron flux monitoring instrumentation and process radiation monitoring) can be maintained consistent with the current licensing basis through the period of extended operation.

The application also stated that the program includes sensitive instrumentation circuit cables and connections. These cables and connections would be included in the instrumentation loop calibration at the normal calibration frequency. This testing would provide (a) an indication of the existence of aging effects based on acceptance criteria related to instrumentation circuit performance and (b) sufficient indication of the need for corrective actions based on acceptance criteria related to instrumentation loop performance. The review of calibration results or findings of surveillance testing programs would be performed at least once every ten years, with the first review occurring before the period of extended operation. Additionally, a proven cable system test for detecting deterioration of the insulation system would be performed at a frequency based on engineering evaluation, but at least once every 10 years. The first test would be completed prior to the period of extended operation.

The application claimed consistency of the Non-EQ Instrument Circuits Test Review Program with the program elements in NUREG-1801, Section XI.E2, “Insulation Material for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits,” without exceptions or enhancements. The implementation of this new program was identified as Commitment 19 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify the program scope included the identified passive and long-lived structures, systems, and components credited under this program. The inspectors verified that the proposed inspections and tests provided for detecting deterioration of the insulation system, and provided reasonable assurance that the effects of aging will be managed such that applicable components will continue to perform their intended functions through the period of extended operation. The inspectors also interviewed plant personnel about the implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience.

Non-EQ Insulated Cables and Connections Program (Appendix B, Section B.1.27): The application stated that the Non-EQ Insulated Cables and Connections Program is a new one-time inspection program that provides reasonable assurance that the intended functions of the metallic parts of electrical cable connections are maintained consistent with the current licensing basis through the period of extended operation. Cable connections included would be those connections in the scope of license renewal susceptible to age-related degradation resulting in increased resistance of connection due to thermal cycling, ohm heating, electrical transients, vibration, chemical contamination, corrosion, or oxidation that are not subject to the environmental qualification requirements of 10 CFR 50.49.

The application also stated that this program provides for one-time inspections that will be completed prior to the period of extended operation on a sample of connections. The factors considered for sample selection would be application (medium and low voltage, defined as < 35 kV), circuit loading (high loading), connection type, and location (high temperature, high humidity, vibration, etc.). The representative sample size would be based on 20 percent of the connection population with a maximum sample of 25.

The application claimed consistency of the Non-EQ Instrument Circuits Test Review Program with the program elements in NUREG-1801, Section XI.E1, "Insulated Cables and Connections Program," without exceptions or enhancements. The implementation of this new program was identified as Commitment 20 in the regulatory commitments list dated December 16, 2013.

At the time of the inspection, the implementing procedures had not yet been developed for this program. The inspectors discussed the programmatic attributes and scope of the program with plant personnel to obtain reasonable assurance that the program would address the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspectors also interviewed plant personnel about the future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Oil Analysis Program (Appendix B, Section B.1.28): The application stated that the Oil Analysis Program is an existing program credited for ensuring that loss of material, cracking, and fouling are not occurring by maintaining the quality of the lubricating oil. According to the application, the program ensured that contaminants (primarily water and particulates) are within acceptable limits through testing activities and corrective actions.

The applicant described a program enhancement that will be implemented prior to the period of extended operation. The enhancement was to include procedures to monitor and maintain contaminants in the 161 kV oil filled cable system within acceptable limits through periodic sampling in accordance with industry standards, manufacturer's recommendations and plant-specific operating experience. The program procedures would also be revised to trend oil contaminant levels and initiate a PER if contaminants exceed alert levels or limits in the 161 kV oil-filled cable system. The applicant stated that the Oil Analysis Program, with the proposed enhancements, will be consistent with the program described in NUREG-1801, Section XI.M39, Lubricating Oil Analysis. The application also stated that the One-Time Inspection Program described in Section B.1.29 of the application will verify that the Oil Analysis Program has been effective at managing the effects of aging. The implementation of program enhancements was identified as Commitment 21 in the regulatory commitments list dated December 16, 2013.

The inspectors interviewed the personnel responsible for establishing and implementing the Oil Monitoring Program to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed oil sampling procedures, criteria, and specifications for a sample of equipment to determine if they provided adequate guidance to meet the programmatic attributes described in the application. The

inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspectors reviewed the trending data for the oil in the diesel generator 1A1, which charted the properties and level of contaminates in the oil, conducted walk downs of various oil sampling stations, and observed the system engineer pull a sample as part of a minor work order for a main feed water pump to assess the implementation of the program. The inspectors also observed the oil staging room where the various oils are loaded into holding tanks for topping off various oil reservoirs to assess the current controls in place for the program.

One-Time Inspection Program (Appendix B, Section B.1.29): The application stated that the One-Time Inspection Program is a new aging management program that consists of a one-time inspection of selected components to verify the effectiveness of the Diesel Fuel Monitoring, Oil Analysis, and Water Chemistry Control Programs; the reactor vessel flange leak-off lines, internal surfaces of the containment spray piping water seal area at water line region, and external surfaces of the residual heat removal heat exchanger tubes. The aging effects evaluated would be loss of material, cracking, and fouling. The program would also confirm the insignificance of an aging effect for situations in which additional confirmation is appropriate using inspections that verify unacceptable degradation is not occurring, and to trigger additional actions if necessary to ensure the intended functions of affected components are maintained during the period of extended operation.

The application also stated that the planned visual and volumetric inspections are to provide direct evidence of the presence and extent of loss of material resulting from all types of corrosion in treated liquid environments, if it has occurred. Once implemented, the program would include: (a) determining the sample size based on 20 percent of the components in each material-environment-aging effect group up to a maximum of 25 components for each Unit, (b) identifying inspection locations in each material environment group based on the potential for the aging effect to occur, (c) identifying the most effective examination technique, including acceptance criteria, to be used, and (d) evaluating the aging effects and the need for follow-up examinations using the corrective action program.

The application claimed consistency of the One-Time Inspection Program with the program elements in NUREG-1801, Section XI.M32, "One-Time Inspection," without exceptions or enhancements. The implementation of this new program was identified as Commitment 22 in the regulatory commitments list dated December 16, 2013.

The inspectors interviewed plant personnel about current implementation status of the program and planned activities for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed a preliminary sampling plan to verify it met the objectives of the sampling plan specified in NUREG-1801, Section XI.M32, Revision 2. The inspectors further reviewed the current procedures for non-destructive examinations to evaluate personnel qualification requirements.

The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed a recent program self-assessment to evaluate the effectiveness of the program and verify that programmatic issues related to the 7-day fuel oil supply tanks and day tank fuel oil transfer pumps were identified and entered in the corrective action program for resolution.

One-Time Inspection Small-Bore Piping Program (Appendix B, Section B.1.30): The application stated that the One-Time Inspection Program for small-bore piping is a new program that augments ASME BPVC, Section XI requirements and is applicable to small-bore ASME Code Class 1 piping and components with a nominal pipe size diameter less than 4 inches (NPS < 4) and greater than or equal to NPS 1 in systems that have not experienced cracking of ASME Code Class 1 small-bore piping. The program could also be used for systems that have experienced cracking but have implemented design changes to effectively mitigate cracking. However, the applicant stated that Sequoyah Nuclear Plant has not experienced cracking of ASME Code Class 1 small-bore piping due to stress corrosion, cyclical (including thermal, mechanical, and vibration fatigue) loading, or thermal stratification and thermal turbulence. The program would include measures to verify that degradation is not occurring, thereby either confirming that there is no need to manage age-related degradation or validating the effectiveness of any existing program for the period of extended operation.

The application also stated that the program provides a one-time volumetric or opportunistic destructive inspection of a three percent sample or maximum of ten ASME Class 1 piping butt weld locations and a three percent sample or a maximum of ten ASME Class 1 socket weld locations that are susceptible to cracking. The program would include pipes, fittings, branch connections, and full and partial penetration welds. The sample selection would be based on susceptibility to stress corrosion, cyclic loading, thermal stratification, thermal turbulence, dose considerations, operating experience, and limiting locations of total population of ASME Class 1 small-bore piping locations. The inspections would be performed within the six-year period prior to the period of extended operation.

The application claimed consistency of the program with the elements in NUREG-1801, Section XI.M35, “One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program,” without exceptions or enhancements. The implementation of this new program was identified as Commitment 23 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing non-destructive examination procedures to verify that they provided guidance consistent with the programmatic attributes in the application, including personnel qualification requirements. The inspectors reviewed previous in-service inspection summary reports and verified that procedures used for volumetric examinations of small-bore butt welds were generally effective at identifying aging effects. The inspectors also reviewed plans to develop volumetric techniques to examine small-bore socket welds. As an assurance, the applicant stated that if such techniques are not successfully developed by the time of the program implementation, destructive examinations will be performed. The inspectors also interviewed plant personnel about the current implementation status of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities.

Periodic Surveillance and Preventive Maintenance Program (Appendix B, Section B.1.31): The application stated that the Periodic Surveillance and Preventive Maintenance Program is an existing program that manages aging effects of components not managed by other aging management programs. The program incorporated preventive maintenance activities and periodic surveillances to provide for periodic inspections of components to detect aging effects. Inspection intervals were established such that they provide timely detection of degradation prior to loss of intended functions. Additionally, inspection intervals, sample sizes, and data collection methods were dependent on component material and environment and take into consideration industry- and plant-specific operating experience and manufacturers' recommendations. The applicant stated that the selection of components to be inspected will focus on locations which are most susceptible to aging, where practical. Established inspection methods to detect aging effects were performed by qualified personnel and included (a) visual inspections and manual flexing of elastomeric components and (b) visual inspections or other non-destructive examination techniques for metallic components.

The applicant also stated that the Periodic Surveillance and Preventive Maintenance Program has no corresponding program in NUREG-1801, Revision 2. The applicant would revise the existing program procedures as necessary to include all activities described in the program description contained in Appendix B of the application. The implementation of this existing program was identified as Commitment 24 in the regulatory commitments list dated December 16, 2013. This commitment item also included actions in response to NRC's requests for additional information concerning inspections of coatings, micro-biology induced corrosion, and buried piping internal surfaces for in-scope components.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews.
The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program self-assessments to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

Protective Coatings Monitoring and Maintenance Program (Appendix B, Section B.1.32): The application stated that the Protective Coatings Monitoring and Maintenance Program is an existing program that monitors and maintains Service Level I coatings applied to carbon steel and concrete surfaces inside containment (e.g., steel containment vessel shell, structural steel, supports, penetrations, and concrete walls and floors). The program served to prevent or minimize loss of material due to corrosion of carbon steel components and aided in decontamination. The program addressed accessible coated surfaces inside containment. The program was developed based on the guidance contained in NRC Regulatory Guide 1.54, Revision 0; however, the

program would be enhanced to meet the technical basis of Regulatory Position C4 in NRC Regulatory Guide 1.54, “Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants,” Revision 2, and American Society of Testing and Materials (ASTM) document ASTM D 5163-08. With these enhancements, the applicant stated that the program provides an effective method to assess coating condition through visual inspections by identifying degraded or damaged coatings and providing a means for repair of identified problem areas.

The applicant relied on proper monitoring and maintenance of protective coatings inside containment to ensure operability of post-accident safety systems that rely on water recycled through the containment. Specifically, proper monitoring and maintenance of Service Level I coatings would ensure that there is no coating degradation that would impact safety functions, for example, by clogging emergency core cooling systems suction strainers, reducing flow through the system and possibly causing unacceptable head loss for the pumps.

The application stated that several program enhancements will be implemented prior to the period of extended operation. The program enhancements would include program procedures revision to clarify that: (a) detection of aging effects will include inspection of coatings near sumps or screens associated with the emergency core cooling system; (b) instruments and equipment needed for inspection may include, but not be limited to, flashlights, spotlights, marker pen, mirror, measuring tape, magnifier, binoculars, camera with or without wide-angle lens, and self-sealing polyethylene sample bags; and (c) the last two performance monitoring reports pertaining to the coating systems will be reviewed prior to the inspection or monitoring process. The applicant stated that the Protective Coatings Monitoring and Maintenance, with the planned enhancements, will be consistent with the program described in NUREG-1801, Section XI.S8, “Protective Coating Monitoring and Maintenance Program.” The implementation of program enhancements was identified as Commitment 25 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant’s aging management reviews. The inspectors also reviewed the examination results for Unit 1 Cycle 18 and Cycle 19 Coatings inspections. These examination results included the coatings associated with the upper containment, inner crane wall, and the dome liner. These examination results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of structures, systems, and components within the scope of the program during the period of extended operation.

Furthermore, the inspectors conducted a walk-down of the Unit 1 containment building during the Fall 2013 Refueling Outage to assess whether the program was effective at managing the applicable aging effects based on the condition of coatings. The inspectors’ walk-down included accessible areas in the lower containment (containment shell, containment race way, accumulator rooms, reactor coolant pumps, pressurizer, fan rooms, steam generators, and seal table); upper containment (containment shell and top of the pressurizer); and containment annulus (external surface of the containment

shell from elevation 790 to 781, from 90° to 0° azimuths). During the plant walk-down, the inspectors also looked for any observable aging effects that were not already identified in the application.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Reactor Head Closure Studs Program (Appendix B, Section B.1.33): The application stated that the Reactor Head Closure Studs Program is an existing program that manages cracking and loss of material due to wear or corrosion for reactor head closure stud bolting (studs, washers, nuts and threads in flange) using in-service inspection (ASME BPVC, Section XI, 2001 Edition through 2003 Addenda, Table IWB-2500-1) and preventive measures to mitigate cracking. Preventive actions included avoiding the use of metal plated stud bolting, use of an acceptable surface treatment, use of stable lubricants, and use of bolting material that has actual yield strength of less than 150 kilo-pounds per square inch (ksi) for all studs except one, which has yield strength of 150.7 ksi. According to the application, the program detects cracks, loss of material and leakage using visual, surface and volumetric examinations as required by ASME BPVC, Section XI. The program also relied on recommendations to address reactor head closure studs degradation listed in NUREG-1339, "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants," and NRC Regulatory Guide 1.65, "Materials and Inspections for Reactor Vessel Closure Studs."

The application described two program enhancements that will be implemented prior to the period of extended operation. The first enhancement was to revise the program procedures to ensure that replacement studs are fabricated from bolting material with actual measured yield strength less than 150 ksi. The second enhancement was to revise the program procedures to exclude the use of molybdenum disulfide (MoS_2) on the reactor vessel closure studs. The applicant stated that the Reactor Head Closure Studs Program, with the proposed enhancements, will be consistent with the program described in NUREG-1801, Section XI.M3, "Reactor Head Closure Stud Bolting." The implementation of program enhancements was identified as Commitment 26 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspector reviewed inspection results for the recent Unit 1 refueling outage to assess the implementation of the program and determine if the program would reasonable manage the aging effects applicable to the reactor closure head studs. The inspector also reviewed corrective action records for the 1997 reactor stud replacement to assess the program's implementation of corrective actions.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Reactor Vessel Internals Program (Appendix B, Section B.1.34): The application stated that the Reactor Vessel Internals Program is an existing program that includes reactor vessel internal components for Unit 1 and Unit 2, which are of a Westinghouse nuclear steam supply system design, with the exception of fuel assemblies, reactivity control assemblies, nuclear instrumentation, and welded attachments to the reactor vessel. As described in the application, the program manages cracking, loss of material, reduction of fracture toughness, change in dimension, and loss of preload for reactor vessel internal components intended to provide core support and implements the guidance of EPRI documents 1022863 (MRP-227-A) and 1016609 (MRP-228). Furthermore, the program used a four-step ranking process (i.e., primary, expansion, existing, and no additional measures components) that was based on appropriate component functionality criteria, age-related degradation susceptibility criteria, and failure consequences criteria to identify the components that will be inspected under the program.

The application stated that two program enhancements will be implemented prior to the period of extended operation. The program enhancements would include revising program procedures to take physical measurements of the Type 304 stainless steel holddown spring in Unit 1 at each refueling outage to ensure preload is adequate for continued operation and include preload acceptance criteria. The applicant stated that the Reactor Vessel Internals Program, with the planned enhancements, will be consistent with the program described in NUREG-1801, Section XI.M16A, “PWR Vessels Internals Program” as revised by draft NRC License Renewal Interim Staff Guidance LR ISG-2011-04. The implementation of program enhancements was identified as Commitment 27 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify that they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant’s aging management reviews. Specifically, the inspectors reviewed Technical Instruction 0-TI-RVI-000-301.0, “PWR Rector Vessel Internals Inspection Program,” and site-specific inspection plans to verify they identified the applicable components for both Unit 1 and Unit 2 in accordance with the industry guidelines referenced in the application.

The inspectors also reviewed a sample of examination results from previous inspections of reactor vessel internal components to assess the implementation of the program and the disposition of indications. The examination results were included in report number 0108, “Visual Examination of PWR Interior and Core Structure Components for SQN Unit 1 Cycle 16,” April 2009, and report number 0128, “Visual Examination of PWR Interior and Core Structure Components for SQN Unit 2 Cycle 16,” November 2009. The inspectors reviewed these examination results to verify that the program

implementation was consistent with the program elements described in the application and that aging effects were being managed to maintain the function of the in-scope reactor vessel internal components.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Reactor Vessel Surveillance Program (Appendix B, Section B.1.35): The application stated that the Reactor Vessel Surveillance Program is an existing program that manages reduction of fracture toughness and long-term operating conditions for reactor vessel beltline materials using material data and dosimetry. The program managed the applicable aging effects using a combination of neutron embrittlement analyses, limiting the pressure and temperature below an analyzed limit, and monitoring neutron fluence. The application also stated that the program includes all reactor vessel beltline materials as defined by 10 CFR 50 Appendix G, Section II.F, and complies with 10 CFR 50, Appendix H for vessel material surveillance.

The objective of the Reactor Vessel Surveillance Program, as stated in the application, is to provide sufficient material data and dosimetry to (a) monitor irradiation embrittlement at the end of the period of extended operation and (b) determine the need for operating restrictions on the inlet temperature, neutron spectrum, and neutron flux. As described in the application, eight surveillance capsules were initially installed in each of the Sequoyah Nuclear Plant Units 1 and 2 reactors. The capsules were attached radially to the inside surface of the reactor pressure vessel, going outward from the core region, at the 30, 120, and 300 degree azimuths. Capsules removed from the reactor vessel were tested and reported in accordance with standard ASTM E 185-82 to the extent practicable for the configuration of the specimens in the capsule. If surveillance capsules are not withdrawn during the period of extended operation, the applicant stated that operating restrictions are specified to ensure that the plant is operated under the conditions to which the surveillance capsules were exposed.

The application stated that three program enhancements will be implemented prior to the period of extended operation. The program enhancements would include revising program procedures to: (a) consider the area outside the beltline such as nozzles, penetrations and discontinuities to determine if more restrictive pressure temperature limits are required than would be determined by just considering the reactor vessel beltline materials, (b) incorporate an NRC-approved schedule for capsule withdrawals to meet ASTM-E1 185-82 requirements, including the possibility of operation beyond 60 years, and (c) withdraw and test a standby capsule to cover the peak fluence expected at the end of the period of extended operation. The applicant stated that the Reactor Vessel Surveillance Program, with the planned enhancements, will be consistent with the program described in NUREG-1801, Section XI.M31, “Reactor Vessel Surveillance.” The implementation of program enhancements was identified as Commitment 28 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedure SI-225, “Surveillance Program for Reactor Irradiation Specimen,” Revision 9, to verify it provided guidance consistent with the programmatic attributes described in the application. The inspectors also

reviewed documentation for vessel surveillance capsules that were removed previously to assess the implementation of the program; specifically for the fourth capsules removed from Unit 1 in 1998 and Unit 2 in 1999. The inspectors reviewed examination results from these capsules, which indicated that all reactor vessel beltline materials had an upper shelf energy level in excess of 50 ft-lb for exposures projected to the end of the original plant license term (32 Effective Full Power Years).

The inspectors reviewed documentation and interviewed applicant's personnel to verify that the current pressure-temperature curves, calculated in accordance with 10 CFR Part 50, Appendix H, were updated to reflect the new fluence projections for the period of extended operation. The inspectors also verified that the revised pressure-temperature curves met the requirements of Regulatory Guide 1.99, "Radiation Embrittlement of Reactor Vessel Materials," Revision 2 and the applicant revised the schedule of reactor pressure vessel surveillance capsule withdrawal to cover the period of extended operation.

Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program (Appendix B, Section B.1.36): The application stated that the Inspection of Water-Control Structures Associated with Nuclear Power Program is an existing program developed based on guidance provided in NRC Regulatory Guide 1.127, Revision 1, "Inspection of Water-Control Structures Associated with Nuclear Power Plants," and provides an in-service inspection and surveillance program for the Sequoyah Nuclear Plant slopes, channels and raw water-control structures associated with emergency cooling water systems or flood protection. The scope of the program, as described in the application, includes water-control structures within the scope of license renewal as delineated in 10 CFR 54.4. The program addressed age-related deterioration, degradation due to extreme environmental conditions, and the effects of natural phenomena that may affect water-control structures.

As stated in the application, the program requires periodic monitoring and maintenance of water-control structures so that the consequences of age-related deterioration and degradation can be prevented or mitigated in a timely manner. According to the applicant, inspections of water control structures were conducted in a systematic manner by or under the direction of qualified engineers, and technical evaluations were performed if observed degradations have the potential for impacting the intended function of the water-control structures.

The application also stated that the program and proposed enhancements will be implemented as part of the enhancements for the Structures Monitoring Program for the period of extended operation. The applicant stated that the Inspection of Water-Control Structures Associated with Nuclear Power Plants Program, with the proposed enhancements, will be consistent with the program described in NUREG-1801, Section XI.S7, "RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants." The implementation of program enhancements was identified as Commitment 31 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program

in the applicant's aging management reviews. The inspectors also reviewed a sample of examination results and corrective actions for a recent visual inspection of ponds, channels, and dikes. These examination results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of structures, systems, and components within the scope of the program during the period of extended operation. The inspectors conducted a walk-down of the component cooling water intake channel, dredge pond, and the ERCW intake channel and dike, to assess whether the program was effective at managing the applicable aging effects based on the visible condition of the water-control structures. During the plant walk-down, the inspectors also looked for any observable aging effects that were not already identified in the application.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Selective Leaching Program (Appendix B, Section B.1.37): The application stated that the Selective Leaching Program is a new program that demonstrates the absence of selective leaching in a selected sample of components fabricated from gray cast iron and copper alloys that contain greater than 15 percent zinc or greater than 8 percent aluminum exposed to raw water, waste water, treated water, or ground water. The program would incorporate one-time visual inspections of selected components coupled with hardness measurement or other mechanical examination techniques such as destructive testing, scraping or chipping to determine whether loss of material is occurring due to selective leaching that may affect the ability of a component to perform its intended function during the period of extended operation.

The application also stated that this new program will be established prior to the period of extended operation. The applicant stated that the Selective Leaching Program will be consistent with the program described in NUREG-1801, Section XI.M33, "Selective Leaching of Materials." The implementation of this program was identified as Commitment 29 in the regulatory commitments list dated December 16, 2013.

At the time of the inspection, the implementing procedures had not yet been developed for this program. The inspectors discussed the programmatic attributes and scope of the program with plant personnel to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspectors also interviewed plant personnel about the future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Service Water Integrity Program (Appendix B, Section B.1.38): The application stated that the Service Water Integrity Program is an existing program that manages loss of material and fouling for components fabricated from carbon steel, carbon steel clad with stainless steel, cast iron, copper alloy, nickel alloy, and stainless steel exposed to ERCW as described in the applicant's response to NRC Generic Letter 89-13, "Service

Water System Problems Affecting Safety-Related Equipment." The program, as described in the application, includes (a) surveillance and control techniques to manage effects of biofouling, corrosion, erosion, coating failures, and silting; (b) tests to verify heat transfer capability of heat exchangers important to safety; (c) system walk-downs to ensure compliance with the licensing basis; and (d) routine inspections and maintenance.

The application claimed consistency of the Service Water Integrity Program with the program elements in NUREG-1801, Revision 2, Section XI.M20, "Open-Cycle Cooling Water System," without exceptions or enhancements for the period of extended operation. However, on November 4, 2013, the applicant responded to an NRC's request for additional information in which three program changes were added to enhance the program. The program enhancements would consist of revising the program procedures to: (a) perform periodic visual inspections to manage loss of coating integrity in heat exchangers credited in the NRC Generic Letter 89-13 response and include specific coating integrity acceptance criteria, (b) ensure coating inspections are performed by individuals certified to ANSI N45.2.6, "Qualifications of Inspection, Examination, and Testing Personnel for Nuclear Power Plants," and that subsequent evaluation of inspection findings is conducted by a nuclear coatings subject matter expert qualified in accordance with ASTM D 7108-05, "Standard Guide for Establishing Qualifications for a Nuclear Coatings Specialist," and (c) ensure an individual knowledgeable and experienced in nuclear coatings work will prepare a coating report that includes a list of locations identified with coating deterioration. The implementation of these program enhancements was identified as Commitment 38 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed a sample of existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspectors also reviewed a sample of recent inspection/testing results and corrective actions for the diesel generator water cooler 2B-1, component cooling system heat exchangers 2A1 and 2A2, and safety injection pump cooler 1A-A. The review included temperature trending data for the diesel generator water coolers 1A-A, 1B-B, 2A-A, and 2B-B. These inspection and testing results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of passive and long-lived structures, systems, and components within the scope of the program during the period of extended operation. The inspectors conducted a walk-down of accessible portions of the system to assess whether the program was effective at managing the applicable aging effects based on the visible condition of the materials. During the plant walk-down, the inspectors also looked for any observable aging effects that were not already identified in the application. The following ERCW components were inspected during the walk-down.

- ERCW strainers A1A-A, B1B-B, and B2B-B
- diesel generator cooler 1A-A
- blind flange piping connection for component cooling system flood mode
- containment spray heat exchangers 1A-A and 1B-B

- room cooler and oil cooler for safety injection pump 1 A-A
- component cooling system heat exchangers 0B1, 0B2, 1A1, 2A1, and 2A2
- shutdown board room chiller
- motor driven auxiliary feedwater pump cooler 1A
- piping connecting to upper containment coolers 2B and 2D
- ERCW supply lines to station air compressors at 1A header
- penetration rooms 1B-B (elevation 690) and 2B-B (elevation 714)
- charging pump room 1B-B

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program health reports and self-assessments to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

Steam Generator Integrity Program (Appendix B, Section B.1.39): The application stated that the Steam Generator Integrity Program is an existing program that manages aging effects for the steam generator tubes, plugs, sleeves, and secondary side components contained within the steam generator in accordance with the plant technical specifications and commitments to NEI 97-06, “Steam Generator Program Guidelines.” The application also described that the program incorporates several actions on both the primary and secondary portions of the steam generators, including non-destructive examination techniques (visual, eddy current, ultrasonic examination), mechanical cleaning, and rigorous chemistry controls. The applicant stated that tube degradation is trended and evaluated, and should a tube exceed acceptance criteria, the tube is plugged using approved techniques. Other actions – such as predictive assessment of tube degradation and monitoring of primary-to-secondary leakage – were utilized to ensure the tubes will continue to perform their function through the subsequent operating cycle.

The application claimed consistency of the Steam Generator Integrity Program with the program elements in NUREG-1801, Revision 2, Section XI.M19, “Steam Generators” with one enhancement. The enhancement would revise the implementing procedures to ensure that corrosion-resistant materials are used for replacement steam generator tube plugs. This enhancement was identified as Commitment 30 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant’s aging management reviews.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage

the applicable aging effects. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. Additionally, the inspectors reviewed recent program self-assessments to evaluate the effectiveness of the program and verify that programmatic issues were identified and entered in the corrective action program for resolution.

Structures Monitoring Program (Appendix B, Section B.1.40): The application stated that the Structures Monitoring Program is an existing program that provides for aging management of structures and structural components, including structural bolting, within the scope of license renewal. The program was developed based on guidance in Regulatory Guide 1.160, Revision 2, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," and NEI document NUMARC 93-01, Revision 2, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," to satisfy the requirement of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." The application also described that the scope of the Structures Monitoring Program includes structures within the scope of license renewal as delineated in 10 CFR 54.4 and the condition monitoring of masonry walls and water-control structures as described in the Masonry Wall Program and in the Inspection of Water-Control Structures Associated with Nuclear Power Plants Program.

The application stated that qualified personnel inspect the structures and structural components, and that program activities included the inspection of concrete structures, masonry walls, elastomers, earthen structures, component supports, exposed surfaces of bolting, and surfaces provided with protective coatings. In addition, the application stated that the inspection frequency is at least once every five years. However, the program contained provisions for increased inspection frequency and trending of structures and components in accordance with10 CFR 50.65(a)(1), if the extent of degradation is such that the structure or component may not meet its design basis or, if allowed to continue uncorrected until the next normally scheduled assessment, may not meet its design basis.

Additionally, the applicant described several program enhancements that will be implemented prior to the period of extended operation. The program enhancements have been revised several times since the application was submitted as a result, in part, of NRC's requests for additional information. The program enhancements would consist of procedure revisions to: (a) include an itemized list of in-scope structures; those structures included in the Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program; in-scope structural components and commodities; and specify in-scope structures that are in the scope of the Masonry Wall Program; (b) include periodic sampling and chemical analysis of ground water chemistry for pH, chlorides, and sulfates on a frequency of at least every five years, (c) revise the parameters to be monitored or inspected, (d) include specific guidance for detection of aging effects; (e) include acceptance criteria based on industry and plant-specific operating experience, including the information provided in industry codes, standards, and guidelines including NEI 96-03, ACI 201.1R-92, ANSI/ASCE 11-99, and ACI 349.3R-02; and (d) include specific preventive actions. The program enhancements also included specific actions in response to NRC's request for additional information RAI B.1.40-4a related to a crack indication identified in the turbine building condenser pit north wall (ADAMS Accession Number ML13296A017). The applicant stated that the Structures Monitoring Program, with the planned enhancements, will be

consistent with the program described in NUREG-1801, Section XI.S6, "Structures Monitoring Program." The implementation of program enhancements was identified as Commitment 31 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided guidance consistent with the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspectors also reviewed a sample of examination results and corrective actions for a recent Maintenance Rule Structures Inspection. These examination results were inspected to verify, on a sampling basis, that the program would reasonably manage the identified aging effects of structures, systems, and components within the scope of the program during the period of extended operation.

The inspectors also conducted a walk-down of the turbine building and the ERCW building to assess whether the program was effective at managing the applicable aging effects based on the visible condition of the materials. Particularly, the inspectors observed the condition of the condenser pit north wall located in the turbine building, which was discussed in NRC request for additional information B.1.40-4a. The inspectors interviewed plant personnel about the corrective actions implemented at the time to address the crack indication in this wall and reviewed program procedures to verify that the program elements, with the proposed enhancements discussed in the commitment list, would reasonably manage the aging effects associated with the crack indication in order to maintain the intended function of the wall during the period of extended operation.

Furthermore, the inspectors conducted a walk-down of the Unit 1 containment building during the Fall 2013 Refueling Outage to assess whether the program was effective at managing the applicable aging effects based on the condition of in-scope structures. The inspectors' walk-down included accessible areas in the lower containment (containment shell, containment race way, accumulator rooms, reactor coolant pumps, pressurizer, fan rooms, steam generators, and seal table); upper containment (containment shell and top of the pressurizer); and containment annulus (external surface of the containment shell from elevation 790 to 781, from 90° to 0° azimuth). During the plant walk-downs, the inspectors also looked for any observable aging effects that were not already identified in the application.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application

Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program (Appendix B, Section B.1.41): The application stated that the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel Program is a new program that manages the aging effects of cracking and reduction in fracture toughness in CASS components. The program would consist of a susceptibility determination of CASS piping, piping components, piping elements, the pressurizer spray head, and

regenerative heat exchanger shell to thermal aging embrittlement based on casting method, molybdenum content, and percent ferrite. For potentially susceptible components, aging management would be accomplished through qualified visual inspections, such as enhanced volumetric examination, qualified ultrasonic testing methodology, or component-specific flaw tolerance evaluation in accordance with ASME BPVC, Section XI Code, 2001 Edition through 2003 Addenda. This program would be implemented prior to the period of extended operation.

The application claimed consistency of the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel Program with the program elements in NUREG-1801, Revision 2, Section XI.M12, "Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)," without exceptions or enhancements for the period of extended operation. However, the applicant's response to NRC's request for additional information B.1.41-4a (ADAMS Accession Number ML13357A722, dated December 16, 2013) included two program changes to enhance the program. The program enhancements would consist of: (a) additional analysis will be performed using plant-specific materials data and best available fracture toughness curves for CASS components with delta ferrite content greater that 25 percent and (b) if required for susceptible CASS materials with estimated delta ferrite greater than 20 percent, a site-specific flaw tolerance analysis will be performed and submitted to the NRC for review and approval at least two years prior to the period of extended operation; unless ASME has approved the flaw tolerance analysis methodology that the applicant will use. The implementation of these program enhancements was identified as Commitment 32 in the regulatory commitments list dated December 16, 2013.

The inspectors interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities, and determine if the program would reasonably manage the applicable aging effects. The inspectors also reviewed existing non-destructive examination procedures to verify they provided guidance consistent with the programmatic attributes described in the application, including personnel qualification requirements.

The inspectors also reviewed the current applicant's plan to implement the new program. Specifically, the inspectors verified that all applicable components in the scope of the program were identified and that calculations were performed to identify the susceptibility of each component. The inspectors further verified that, for potentially susceptible components, inspection plans were being developed in order to manage the aging effects through qualified visual inspections, qualified ultrasonic inspections, or component-specific flaw tolerance evaluations in accordance with the ASME Code.

Water Chemistry Control – Closed Treatment Water Systems Program (Appendix B, Section B.1.42): The application stated that the Water Chemistry Control – Closed Treated Water Systems Program is an existing program credited for managing loss of material, cracking, and fouling in components exposed to a treated water environment through monitoring and control of water chemistry, including the use of corrosion inhibitors, chemical testing, and visual inspections of internal surface condition, to determine the presence of corrosion and/or cracking. The application also stated that the latest revision of the EPRI Closed Cycle Cooling Guidelines is used to delineate the program.

The applicant described several program enhancements that will be implemented prior to the period of extended operation. The enhancements would include revising procedures to: (a) provide a corrosion inhibitor for the auxiliary building cooling, incore chiller 1A, 1B, 2A, and 2B, and 6.9 kV shutdown board room A and B in accordance with industry guidelines and vendor recommendations, (b) conduct inspections whenever a boundary is opened for the standby diesel generator jacket water subsystem, component cooling system, glycol cooling loop system, high pressure fire protection diesel jacket water system, and chilled water portion of miscellaneous heating, ventilation, and air conditioning (HVAC) systems, (c) state that the inspections in (b) will be conducted in accordance with the applicable ASME Code requirements, industry standards, or other plant-specific and personnel qualification procedures that are capable of detecting corrosion or cracking, (d) perform sampling and analysis of the glycol cooling system per industry standards and in no case greater than quarterly unless justified with an additional analysis, and (e) inspect a representative sample of piping and components with the highest likelihood of corrosion or cracking at a frequency of once every ten years. The applicant stated that the Water Chemistry Control – Closed Treated Water Systems Program, with the proposed enhancements, will be consistent with the program described in NUREG-1801, Section XI.M21A, Closed Treated Water Systems. The implementation of program enhancements was identified as Commitment 33 in the regulatory commitments list dated December 16, 2013.

The inspectors reviewed existing implementing procedures to verify they provided adequate guidance to meet the programmatic attributes described in the application. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews. The inspector reviewed the 2009 program self-assessment to assess the implementation and verify that programmatic issues were identified and entered in the corrective action program for resolution.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application.

Water Chemistry Control – Primary and Secondary Program (Appendix B, Section B.1.43): The application stated that the Water Chemistry Control – Primary and Secondary Program is an existing program credited for managing loss of material, cracking, and fouling in components exposed to a treated water environment through periodic monitoring and control of water chemistry. The program description in the application stated that the program monitors and control water chemistry parameters using the guidance in EPRI reports 1014986 (Revision 6, for primary water chemistry) and 1016555 (Revision 7, for secondary water chemistry).

The applicant stated that the Water Chemistry Control – Primary and Secondary Program was consistent with the program described in NUREG-1801, Section XI.M2, "Water Chemistry," with no additional enhancements. The application also stated that the One-Time Inspection Program described in Section B.1.29 of the application would verify that the Water Chemistry Control – Primary and Secondary Program has been effective at managing the effects of aging.

The inspectors reviewed existing implementing procedures and abnormal operating procedures to verify they provided adequate guidance to meet the programmatic attributes described in the application, including out of limit actions. The inspectors reviewed the scope of the program as described in the implementing procedures to obtain reasonable assurance that the program addressed the identified passive and long-lived structures, systems, and components credited under this program in the applicant's aging management reviews.

The inspectors also interviewed plant personnel about the current implementation of the program and future plans for license renewal to assess their knowledge and involvement in the license renewal activities. The inspectors reviewed aging management program evaluation reports to verify that the applicant considered site-specific operating experience in the preparation of the application. In addition, the inspectors observed the applicant obtain a sample for the reactor cooling system per the existing program procedure and discussed the program implementation with lab personnel in the chemistry department to assess whether the program was effective in monitoring and controlling water chemistry parameters.

b. Findings and Observations

No findings were identified. On the basis of the samples selected for review and the inspection activities conducted, the inspectors determined that the proposed aging management programs; when implemented in accordance with the application, the applicant's response to NRC's requests for additional information, regulatory commitments, and the applicable quality assurance measures; will provide reasonable assurance that the applicable aging effects of those structures, systems, and components within the scope of license renewal will be managed during the period of extended operation in order to maintain their intended functions consistent with the current licensing basis. For the existing aging management programs, the inspectors determined that these programs were generally effective at managing the applicable aging effects of in-scope structures, systems, and components. Based on the assessment of plant conditions during walk-downs and the review of program activities and results, the inspectors determined that aging effects were being identified and managed to maintain the ability of structures, systems, and components to perform their design functions.

Additionally, the applicant committed to implement several enhancements to existing programs as well as developing new aging management programs. The inspectors noted that the implementation of program enhancements and development of new programs were in a planning stage at the time of this inspection. Based on interviews with the applicant's personnel and the review of commitment tracking documents, the inspectors determined that the applicant had plans to implement program enhancements and new programs in accordance with the application and subsequent docketed correspondence with the NRC.

The inspectors identified the following observations associated with aging management programs. These observations did not represent operability concerns with existing plant equipment and were entered into the corrective action program as a "Service Request" or "Problem Evaluation Report" for resolution.

1) Aboveground Metallic Tanks Program – The inspectors performed walk-downs of CST-A and CST-B and noted that there was evidence of minor damage to the top edge of the tanks. Condensate storage tank A showed a dent and general corrosion at the interface between the side wall and the dome. Condensate storage tank B also showed various dents and general corrosion at the interface between the side wall and the dome. The inspectors noted that this condition was previously identified in the applicant's corrective action program for evaluation and resolution. The tanks' degradation did not represent any immediate concerns with the ability of the tank to perform its intended function since the degradation did not affect the ability of the tank to maintain the required volume.

   Additionally, the inspectors performed a walk-down of the RWSTs and observed that the Unit 2 RWST had indications of cracking in the insulation. These cracks were approximately a few feet in length and half an inch in width. The inspectors interviewed plant personnel and determined that no periodic inspections were being performed for the top of the tanks. However, a search of plant records of historical work orders revealed that the insulation on top of the tank was degraded and subsequently repaired in 1996. The degradation of the Unit 2 RWST insulation did not represent any immediate concerns with the ability of the tank to perform its intended function since the degradation did not affect the ability of the tank to maintain the required volume.

   The applicant initiated PERs for each tank indication and PER 700282 to evaluate the condition of the condensate and refueling water storage tanks relative to the program descriptions and conclusions described in the application. The applicant generated work orders to address the indications in each tank. The inspectors determined that the program elements of the new Aboveground Metallic Tanks Programs, as described in the application, will provide reasonable assurance that the aging effects identified during the walk-downs will be managed during the period of extended operation in order to maintain the design function of the tanks.

2) Structures Monitoring Program – The inspectors identified two examples of existing aging effects in structures within the scope of the Structures Monitoring Program for which the proposed enhancements would provide effective aging management to maintain their function during the period of extended operation. First, during the containment walk-down performed in the Unit 1 Fall 2013 Refueling Outage, the inspectors noted hairline cracking indications in the concrete which forms the under-side of the reactor cavity and the fuel transfer canal. These hairline cracks also exhibited minor water leakage at times when water is in the fuel transfer canal. The cracks were previously identified by the applicant's engineering staff and were being monitored by the existing Structures Monitoring Program, which provided reasonable assurance that the current program was effective at identifying and managing aging effects. The applicant also had evaluated the concrete cracking indications to demonstrate that the intended function of the structure was maintained in accordance with the current licensing basis. The applicant initiated PER 798078 to further evaluate the condition and determine if additional actions were needed under the Structures Monitoring Program.

   Additionally, during a walk-down of the Unit 1 auxiliary building, emergency gas treatment system room (elevation 734), the inspectors noted surface corrosion on shield building mechanical penetrations X-114 and X-115. The piping running through these penetrations were part of the ice condenser glycol piping. The inspectors noted that the penetration sleeves showed indications of surface corrosion as a result of condensation from the piping. The inspectors questioned the applicant about the current aging

management activities as part of the current Structures Monitoring Program and how this type of penetration would be managed during the period of extended operation. The applicant stated that the penetration seals were inspected as part of the fire barrier inspections as part of the Fire Protection Program, but the penetration sleeve was not particularly covered by the current Structures Monitoring Program. However, the proposed program enhancements described in the commitment list dated December 26, 2013 specifically included penetration sleeves and seals as part of the Structures Monitoring Program, which provided reasonable assurance that the aging effects for the affected structure-to-component interface would be managed during the period of extended operation. The corrosion indications observed by the inspectors on the accessible portions of the penetration sleeves did not represent any immediate concerns with the ability of the concrete or the sleeve to perform its intended function since the indications consisted of general surface corrosion without evident and significant loss of material. The applicant initiated Service Request 817370 to evaluate the condition and determine if additional actions were needed under the Structures Monitoring Program.

3) Operating Experience – In Appendix B of the application, the applicant claimed consistency of the aging management programs with the program elements in NUREG-1801, Revision 2. NUREG-1801 states that operating experience involving an aging management program, including past corrective actions resulting in program enhancements or additional programs, should provide objective evidence to support a determination that the effects of aging will be adequately managed so that the structure and component intended functions will be maintained during the period of extended operation.

   The inspectors noted that the plant-specific operating experience referenced in Appendix B of the application to demonstrate the effectiveness of the existing programs was based on the review of plant documents and interviews with plant staff. The applicant documented the review of operating experience in two engineering reports: SQN-RPT-10-LRD09, “Operating Experience Review Results – Aging Management Program Effectiveness,” and SQN-RPT-10-LRD08, “Operating Experience Review Report – Aging Effects Requiring Management (AERM).” The inspectors noted that part of the process for identifying applicable site-specific operating experience consisted of searching the corrective action program (e.g. PER database) using key words related to the aging effect or the associated aging management program.

   The inspectors identified at least two examples of keyword searches in the PER database documented in engineering report SQN-RPT-10-LRD09 that were not fully representative of the aging issues potentially affecting the plant structures, systems, and components.

   The first example was related to the Environmental Qualification of Electric Components Program. Since the environmental qualification program is an existing program the applicant relied, in part, on the PER database to conclude that the program has been effective at maintaining the function of equipment within the scope of the program. The applicant used the keyword “equipment qualification” to search the PER database. The inspectors determined that this keyword search was not fully representative of potential past issues with environmental qualification of plant equipment. The inspectors determined that there were other relevant keywords; such as “environmental

qualification," "10 CFR 50.49," "harsh environment," and "EQ Program," that were not used to ensure all applicable plant-specific operating experience was adequately identified and reviewed.

Similarly, the applicant used the keywords "hose station," "deluge" and "sprinkler" to search the PER database for plant-specific operating applicable to the Fire Water System Program. The inspectors determined that this keyword search was not fully representative of potential past issues with the Fire Water System Program. The inspectors determined that there were other relevant keywords; such as "fire water system," "fire water system piping," "fire water system tubing," "fire water system strainer," and "fire water system leak," that were not used to ensure all applicable plant-specific operating experience was adequately identified and reviewed.

The applicant initiated Service Request 817499 to enter this observation in the corrective action program for evaluation and resolution. The applicant would determine if the operating experience reviewed for preparing the application was sufficient to support the conclusions about the effectiveness of existing programs to detect, monitor, and correct the applicable aging effects.

4) Administrative Controls – The inspectors noted that the applicant was using the corrective action program and commitment tracking system to track the implementation of commitment action items associated with enhancements to existing programs and the creation of new aging management programs. However, the inspectors identified that additional administrative controls for other key license renewal actions, besides the commitments, were not established to ensure that all aging management programs were reliably implemented prior to and during the period of extended operation, regardless if the programs are existing, enhanced, or new. The inspectors recognized that the applicant's staff was aware, to some extent, of the need for such administrative controls; however no specific strategy or plan was defined at the time of this inspection. The inspectors determined that the applicant had not established the following administrative controls:

- Administrative controls to ensure that existing implementing procedures credited for aging management activities were adequately identified prior to the period of extended operation in order to clearly communicate the complete or partial applicability of the procedures to license renewal. The inspectors identified that some implementing procedures were credited for license renewal in their entirely while certain activities under existing procedures were credited as "existing programs" in the application. The inspectors identified that the applicant did not have action items in place to ensure the procedure(s) or procedure step(s) applicable for license renewal were clearly identified.

- Administrative controls to ensure that aging management programs were governed by appropriate administrative procedures to ensure that all the program elements are maintained as described in the application. Particularly, the inspectors noted that some aging management programs were implemented through multiple organizations and numerous procedures. The inspectors determined that the applicant had not established action items to control all the key elements of the programs as described in the application.

- Administrative controls to ensure that program basis information was consolidated and easily available to facilitate effective knowledge transfer among program owners and ensure program sustainability during the period of extended operation. The inspectors noted that supporting information for each aging management program described in the application consisted of a large number of engineering reports, technical evaluations, plant drawings, procedures, and docketed correspondence with the NRC. While all the license renewal documentation was being maintained in a permanent record system, the inspectors determined that the applicant did not have action items to consolidate the information and facilitate the successful turnover of program ownership during the period of extended operation.

- Administrative controls to ensure that license renewal action items were adequately closed. For instance, the inspectors identified an example where the PER tracking the enhancements for the Reactor Head Closure Studs Program (PER 685211-001) was closed out without licensing approval and archived to an action item in the maintenance procedure revision tracking database. All regulatory commitments captured in the applicant's corrective action database were required to be reviewed and approved by the licensing department prior to closing the PER. The applicant initiated PER 685211 to ensure commitments for the Reactor Head Closure Stud Program were properly implemented and reviewed by licensing prior to closeout. The applicant also performed an extent of condition review to ensure no other license renewal PERs were improperly closed out.

The applicant initiated Service Request 811177 to enter this observation in the corrective action program for evaluation and resolution. The initial version of Service Request 811177 considered creating a single PER to track the overall implementation of license renewal activities due prior to the period of extended operation. The Service Request included action items to: (a) resolve NRC-identified observations during the license renewal inspections, (b) complete all the regulatory commitments for license renewal as defined in the final NRC safety evaluation report, (c) revise the license renewal aging management program implementing procedures to annotate that the procedures are required for license renewal and cannot be modified without approval from the licensing organization, (d) prepare administrative procedures to establish programmatic controls for aging management programs, (e) prepare aging management program and commitment completion notebooks for the aging management programs credited in the NRC staff final safety evaluation report defining the implementation of the program and commitments, and (f) track other key license renewal activities such as revising environmental qualification binders, update pressure-temperature limit curves, and complete specific reactor vessel surveillance activities.

Additionally, in January 2014 the applicant submitted a letter to the NRC responding to various Requests for Additional Information and revising the list of regulatory commitments for license renewal (TVA Letter CNL-14-010, dated January 16, 2014, Proprietary Information). The inspectors noted that the applicant added commitment items to incorporate the existing aging management programs that did not contain any enhancements or were not associated with a particular regulatory commitment. The inspectors determined that this approach would result in a consistent implementation of administrative controls for all aging management programs credited in the application.

.3 Annual Update/Open Item Inspection

a. Inspection Scope

The inspectors interviewed the applicant's personnel responsible for managing and tracking the implementation of the annual update of the application. The inspectors discussed plant modifications and potential or confirmed changes to the current licensing basis of the facility that materially affected the contents of the license renewal application, including the Updated Final Safety Analysis Report supplement, to verify that the applicant's staff was planning to revise the application in accordance with 10 CFR 54.21(b). The inspectors reviewed the methods in which the applicant's personnel screened modification work orders and design change notices for physical modifications to verify that applicable updates to the application would be identified. The inspector also reviewed a sample of modifications to independently verify that applicable plant changes materially affecting the contents of the application were properly identified and incorporated in the next annual update to the application.

The inspectors also contacted the NRC staff in the Office of Nuclear Reactor Regulation to identify any technical open items that needed additional review or direct inspection besides the issues captured in the request for additional information process.

Furthermore, the inspectors verified that official administrative controls were in-place to ensure that committed tasks were being tracked to be accomplished prior to and during the period of extended operation.

b. Findings and Observations

No findings were identified. The inspectors did not identify any issues of concern with the applicant's process and plans to update the application. Based on discussions with plant staff about the current plan to update the application, the inspectors concluded that the applicant was aware of the requirements in 10 CFR 54 to update the application on an annual basis and the types of material changes that needed to be included. The applicant used the same scoping and screening criteria for structures, systems, and components as for the original application (procedure EN-FAP-LR-003, "System and Structure Scoping for License Renewal," Revision 2) to identify changes that materially affected the contents of the application. The applicant had also established a procedure, EN-FAP-LR-011, "License Renewal Application Maintenance," Revision 2, to dictate how the annual license renewal application amendment will be performed. Since the final NRC safety evaluation report was scheduled to be completed in late 2014 and the original application was submitted in January 2013, the applicant was planning to issue the first update to the application in mid-2014 to meet the timeliness requirements in 10 CFR 54.21(b). The period of review for the annual update would start in May 2012, the original cutoff date of the original application, until present. The inspectors noted that the applicant identified four potential work order packages that materially affected the contents of the application: (a) Design Change Notice (DCN) 22524, Installation of Vent Covers on Diesel Generation Fuel Oil Atmospheric Vents, (b) DCN 22613, Fire Protection Valve Model Changed, and (c) DCNs 22664 and 22665, Reactor Coolant Pump Oil/Drain System Upgrade.

The inspectors also confirmed that there were no open license renewal technical issues identified by previous NRC reviews and audits that were not already addressed in docketed correspondence between TVA and the NRC, such as requests for additional information and associated responses.

Furthermore, the inspectors confirmed that regulatory commitments for license renewal were being tracked in an official plant work control system to ensure completion prior to the period of extended operation. Each regulatory commitment for license renewal identified in Enclosure 2 of TVA letter to the NRC dated December 16, 2013 (ADAMS Accession Number ML13357A722) were tracked in the commitment tracking system. Additionally, each commitment item had a separate PER in the applicant's corrective action program to track their completion prior to the period of extended operation.

4OA6 Meetings

a. Exit Meeting

On December 17, 2013, the NRC presented the preliminary results of this inspection to Mr. John Carlin, Site Vice-President, and other members of the Sequoyah Nuclear Plant management staff in an exit meeting open to public observation. The applicant acknowledged the inspection results presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the applicant. The public meeting summary is available in the NRC's ADAMS through Accession Number ML13361A155.

On January 27, 2014, the inspectors held a conference call with applicant's staff from the corporate licensing organization to discuss the final disposition of inspection issues as presented in this report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Applicant Personnel
R. Ahrable, Entergy
B. Bacon, Corporate Program Manager, NPG Heavy Equipment
W. Bichlmeir, Entercon/Entergy
K. Brune, Corporate Program Manager, Engineering Mechanics
J. Carlin, Site Vice-President, Sequoyah Nuclear Plant
I. Collins, Manager, NPG Site Program Engineering
R. Egli, Corporate Program Manager, NPG Fire Protection
M. Gowin, Corporate Program Manager, ASME BPV IST
G. Haliburton, Corporate Program Manager, NPG Material and Metallurgical Engineering
M. Henderson, Manager, NPG Site Program Engineering
C. Hunsaker, Corporate Program Manager, NPG ASME BPV ISI
R. Jansen, Entergy
R. Jennings, Corporate Projects
A. Keyser, Corporate Program Manager, NPG ASME BPV ISI
H. Lee, Corporate Licensing
L. Loyd, Entercon/Entergy
Z. Martin, Corporate Program Manager, NPG Spent Fuel
M. McBrearty, Site Licensing Manager, Sequoyah Nuclear Plant
D. Priestly, Program Manager, NDE UT
H. Rideout, Entergy
B. Roberts, Entergy
P. Simmons, Plant Manager, Sequoyah Nuclear Plant
J. Strange, Program Manager, NPG Maintenance

NRC Personnel
A. Erickson, Structural Engineer/NRR
R. Plasse, Project Manager/NRR

LIST OF ITEMS OPENED AND CLOSED

OPENED AND CLOSED

None

OPENED

None

CLOSED

None

LIST OF DOCUMENTS REVIEWED

Scoping and Screening Inspection

Drawing 1, 2-17W300-11, Yard Piping, Rev. 7
Drawing 1, 2-37W205-5, Mechanical Pumping Station Piping & Equipment, Rev. 10
Drawing LRA-1, 2-47W845-1, Mechanical Flow Diagram - Essential Raw Cooling Water System, Rev. 0
Drawing LRA-1, 2-47W845-2, Mechanical Flow Diagram - Essential Raw Cooling Water System, Rev. 0
Drawing LRA-1, 2-47W845-5, Mechanical Flow Diagram - Essential Raw Cooling Water System, Rev. 0
Drawing LRA-1-47W845-3, Mechanical Flow Diagram - Essential Raw Cooling Water System, Rev. 0
Drawing LRA-1-47W845-6, Mechanical Flow Diagram - Essential Raw Cooling Water System, Rev. 0
Drawing LRA-2-47W845-3, Mechanical Flow Diagram - Essential Raw Cooling Water System, Rev. 0
Drawing LRA-2-47W845-4, Mechanical Flow Diagram - Essential Raw Cooling Water System, Rev. 0
Problem Evaluation Report (PER) 21420, Piping Downstream 1-FCV-67-66 Below Minimum Wall Thickness, 8/8/03
PER 70344, Cavitation Damage on ERCW Pipe, 11/15/04
PER 70681, Cavitation Damage on 1B CSHX ERCW Discharge, 10/22/04
Report SQN-RPT-10-AMM19, Aging Management Review of the Essential Raw Cooling Water System, Rev. 2
Report SQN-RPT-10-AMM29, Aging Management Review of Non-Safety-Related Systems and Components Affecting Safety-Related Systems, Rev. 2
Report SQN-RPT-10-LRD01, Engineering Report System and Structure Scoping Results, Rev. 2

Aboveground Metallic Tanks Program

Commitment Tracking Document NCO114396370, Unit 1 Aboveground Metallic Tanks Program/LRA Section B.1.1
Commitment Tracking Document NCO114434891, Unit 2 Aboveground Metallic Tanks Program/LRA Section B.1.1
PER 684458, License Renewal NRC Commitment # 1
Work Order (WO) 01-003151-000, Visual Inspection of Unit 1 RWST, November 2001
WO 01-003459-000, Visual Inspection of Unit 2 RWST, April 2002
WO 02-003718-000, Visual Inspection of CST-A, April 2003
WO 02-002210-000, Visual Inspection of CST-B, May 2005

Bolting Integrity Program

Commitment Tracking Document NCO114435303, Unit 1 Unit 1 Bolting Integrity Program/LRA Section B.1.2
Commitment Tracking Document NCO114436450, Unit 2 Unit 1 Bolting Integrity Program/LRA Section B.1.2
PER 684459, License Renewal NRC Commitment # 2
Procedure 0-MI-MXX-000-009.2, Routine Maintenance Involving Unistrut Clamps, Anchored Connections, Instrument Bolting, and Miscellaneous Bolting, Rev. 4
Procedure 0-PI-DXX-000-105, Boric Acid Leak Monitoring Program, Rev. 0

Procedure 0-TI-SPT-000-301.0, ASME Section XI Pressure Testing Program Basis Document, Rev. 2
Procedure MMTP-104, Guidelines and Methodology for Assembling and Tensioning Threaded Connections, Rev. 5
Procedure NPG-SPP-09.7, Corrosion Control Program, Rev. 2
Procedure N-PT-7, Liquid Penetrant Examination of Threaded Fasteners (Studs or Bolts), Two Inches and Smaller in Diameter and Other Components as Applicable using the Fluorescent Water-Washable Method, Rev. 13
Procedure N-UT-67, Generic Procedure for Straight Beam Ultrasonic Examination of Bolts and Studs, Rev. 4
Procedure N-VT-4, System Pressure Test Visual Examination Procedure, Rev. 25
Procedure N-VT-9, Visual Examination of ASME III Bolts, Studs, and Nuts, Rev. 2
PS 4.M.1.1 (R25), Material Fabrication and Handling Requirements for Austenitic Stainless Steel, Dated: 6/10/11
R-0058, Examination Summary and Resolution Sheet, Date: 4/13/09
R-7195, Examination Summary and Resolution Sheet, Date: 9/24/98

Boric Acid Corrosion Control Program

Procedure 0-PI-DXX-000-105, Boric Acid Leak Monitoring Program, Rev. 0
Procedure 0-TI-DXX-000-097.1, Boric Acid Corrosion Control Program, Rev. 8
Boric Acid Leak Monitoring Program, Rev. 0
CRP-ENG-F-13-031, Fleet Assessment of the Boric Acid Corrosion Control Program (BACCP) at Sequoyah and Watts Bar Nuclear Plants, 08/23/13
Procedure NPG-SPP-09.7, Corrosion Control Program, Rev. 2
SQN-ENG-S-12-039, -109, Snapshot Self-Assessment Report for Boric Acid Corrosion Control Program, 07/16/12
SQN-RPT-10-AME01, Aging Management Review of Electrical Systems, Rev. 0
SQN-RPT-10-AMM07, Aging Management Review of the Safety Injection System, Rev. 2
SQN-RPT-10-LRD03, Aging Management Program Evaluation Report Non-Class 1 Mechanical, Rev. 3
SQN-RPT-10-LRD10, Aging Management Review Summary, Rev. 1
WO 111995551, 0-PI-SLT-068-200.0, Unit 1 Reactor Building Post Shutdown Leakage Examination, 02/22/12
WO 113577290, 0-PI-DXX-068-100 Unit 1 Reactor Head Canopy Seal Weld Monitoring, 09/20/13
WO 113805279, NPG-SPP-09.7, Borated Water Leak Assessment, Attachment 1, Rev. 5, 10/14/13
WO 113875176, 0-PI-DXX-000-105, Boric Acid Leak Monitoring Program, 04/09/13
WO 114586877, 0-PI-DXX-000-105, Boric Acid Leak Monitoring Program, 10/14/13

Buried and Underground Piping and Tanks Inspection Program

Commitment Tracking Document NCO114436660, Unit 1 Buried and Underground Piping and Tanks Inspection Program/SQN LRA Section B.1.4
Commitment Tracking Document NCO114437059, Unit 2 Buried and Underground Piping and Tanks Inspection Program/SQN LRA Section B.1.4
PER 684460, License Renewal NRC Commitment # 3, 02/19/2013
Procedure 0-TI-DXX-000-915.0, Sequoyah Nuclear Plant Technical Instruction, Underground Piping and Tanks Integrity Program, Rev. 6
Procedure NPG-SPP-09.15, Underground Piping and Tanks Integrity Program (UPTI), Rev. 06
Sequoyah Nuclear Plant, Underground Piping and Tanks Integrity Program Inspection Plan, Rev. 2, 01/29/13

Compressed Air Monitoring Program
1-AR-M15-B, Miscellaneous 1-XA-55-15B, Rev. 35
Commitment Tracking Document NCO114438021, Unit 1 Compressed Air Monitoring Program/LRA Section B.1.5
Commitment Tracking Document NCO114438288, Unit 2 Compressed Air Monitoring Program/LRA Section B.1.5
PER 144451, Oil-Like Substance found on 2-PCV-1-23
PER 684479, License Renewal NRC Commitment # 4
Procedure 0-PI-CEM-032-001.0, Turbine Building Control Air Quality Test, Rev. 9
Procedure, 0-PI-CEM-032-002.0, Auxiliary Building Control Air Quality Test, Rev. 8
SQN-ENG-S-10-54, SOER 88-01 Instrument Air System Failures, Rev. 04
SQN-ENG-S-12-35, Snapshot Self-Assessment: SOER 88-1 REC, 4 Air Quality in Instrument Air System, 09/29/2012

Containment In-service Inspection IWE Program
Commitment Tracking Document NCO11523180, Unit 1 Containment In-service Inspection IWE Program
Commitment Tracking Document NCO11523198, Unit 2 Containment In-service Inspection IWE Program
Commitment Tracking Document NCO115254501, Modify Configuration of Unit 1 Test Connection/LRA Section B.1.6
CRP-ENG-F-12-032, TVA Focused Compliance Self-Assessment Report Sequoyah Nuclear Plant for In-service Inspection, Rev. 1
PER 810759, License Renewal NRC Commitment # 35
Procedure 0-PI-DXI-000-116.2, ASME Section XI IWE/IWL Containment In-service Inspection (CISI) Program, Rev. 04
Procedure 1-SI-DXI-000-254.1, Containment Vessel Integrity Verification, Rev. 05
Procedure N-VT-15, Visual Examination of Class MC and Metallic Liners of Class CC Components of Light-Water Cooled Plants, Rev. 10
Procedure N-VT-16, General Visual Examination Containment Vessel Integrity, Rev. 04
SQN-ENG-F-10-12, ASME Section XI Program Self-Assessment, 1/25/2010

Containment Leak Rate Program
Commitment Tracking Document NCO115253116, Unit 2 Containment Leak Rate Program/LRA Section B.1.7
Commitment Tracking Document NCO115253150, Unit 1 Containment Leak Rate Program/LRA Section B.1.7
CRP-ENG-F-12-008, TVA Fleet-Wide Containment Leak Rate Program (Appendix J) Focused Self-Assessment Report, 1/31/12
PER 810758, License Renewal NRC Commitment # 34
Procedure 2-SI-SLT-088-156.0, Containment Integrated Leak Rate Test Unit 2, Rev. 04
Procedure l-SI-SLT-088-156.0, Containment Integrated Leak Rate Test Unit 1, Rev. 05

Diesel Fuel Monitoring Program
Commitment Tracking Document NCO114438429, Unit 1 Diesel Fuel Monitoring Program/LRA Section B.1.8
Commitment Tracking Document NCO114439064, Unit 2 Diesel Fuel Monitoring Program/LRA Section B.1.8
PER 213080
PER 682469, License Renewal NRC Commitment # 5

PM 063604799, Equipment Identifier 1-GENB-082-0001A-A, Preventive Maintenance Work Instructions
Procedure 0-TI-CEM-000-016.7, Sampling Methods – Miscellaneous Systems, Rev. 32, 9/20/13

Environmental Qualification Program
CRP-ENG-F-13-007, TVA Focused Self-Assessment Report, 03/22/2013
NPG-SPP-09.2, Equipment Environmental Qualification (EQ) Program, Rev. 1
S22 130920 001, 10CFR50.49 QMDS Change and Variance Evaluation Form, SQNEQ-IFT-001, 09/20/13
SQN-ENG-F-11-09, Periodic Focused Self-Assessment of Sequoyah EQ Program (10 CFR 50.49 Environmental Qualification of Electric Equipment), 05/29/11
SQNEQ-SOL-007, Environmental Qualification Documentation Package for ASCO Solenoid Valves 206-381 Series & NPEF8300 Series, 03/06/08

External Surfaces Monitoring Program
Commitment Tracking Document NCO114439508, Unit 1 External Surfaces Monitoring Program /LRA Section B.1.10
Commitment Tracking Document NCO114439822, Unit 2 External Surfaces Monitoring Program /LRA Section B.1.10
NPG-SPP-09.0, Conduct of Engineering, Rev. 04
NPG-SPP-09.0.1, Conduct of System Engineering, Rev. 01
NPG-SPP-09.7, Corrosion Control Program, Rev. 05
PER 684489, License Renewal NRC Commitment # 6
Procedure 0-PI-DXX-000-750, Sequoyah Nuclear Plant Unit 0 Periodic Instruction Piping Inspection in Tunnels and Infrequently Accessed Areas, Rev. 0
Procedure QEP 11.08, Performance of Plant Walkdowns, Rev. 3

Fatigue Monitoring Program
Commitment Tracking Document NCO114440165, Unit 1 Fatigue Monitoring Program/LRA Section B.1.11
Commitment Tracking Document NCO114440283, Unit 2 Fatigue Monitoring Program/LRA Section B.1.11
PER 275297, Data errors in performance of 0-SI-NXX-000-009.0 R19 (QA Audit SSA1011), 10/28/2010
PER 534878, Inconsistencies between the RSG fatigue analysis, 4/11/2012
PER 685231, License Renewal NRC Commitment # 7
Procedure 0-SI-SXX-068-127.0, RCS and Pressurizer Temperature and Pressure Limits, Rev. 11
Procedure SI-225, Program for Reactor Irradiation Specimen, Rev. 0009
Report # 8382, Record of Reactor Vessel Examination (EVT-1 and VT-3), Rev. 9, May 2006
SQN Units 1 & 2 Surveillance Instruction, 0-SI-NXX-009.0, Monitoring Component Cyclic or Transient Limits, Rev. 22, 04/12/2013

Fire Protection Program
Commitment Tracking Document NCO114440391, Unit 1 Fire Protection Program/SQN LRA Section B.1.12
Commitment Tracking Document NCO114440624, Unit 2 Fire Protection Program/SQN LRA Section B.1.12
PER 682456, License Renewal NRC Commitment # 8, 02/14/2013
Procedure 0-PI-FPU-000-001.M, Fire Protection Engineer Monthly Inspection, Rev. 6

Procedure 0-PI-FPU-302-100.0, Visual Inspection of Electrical Cable Tray Splice Boxes – Fire Stops, Rev. 4
Procedure 0-PI-FPU-410-701.Q, Inspection of Fire Doors, Rev. 7
Procedure 0-SI-EFT-039-237.0, Diesel Generator Building CO2 Fire Protection System Test (System 39), Rev. 23
Procedure 0-SI-FPU-302-001.R, Fire Barrier Visual Inspection – Auxiliary Building and Control Building, Rev. 11
Procedure 0-SI-FPU-302-004.R, Fire Barrier Visual Inspection – Diesel Generator Building and ERCW Pumping Station, Rev. 5
Procedure 0-SI-FPU-302-005.R, Fire Barrier Visual Inspection – ERCW Manholes and Handholes ERCW Pumping Station, Rev. 4
Procedure FPDP-1, Conduct of Fire Protection, Rev. 2
SQN-ENG-F-10-14, Full Focused Programmatic Fire Protection/Appendix R Self-Assessment, 07/23/2010
SQN-ENG-F-13-09, Fire Protection and 10CFR50 Appendix R, Programmatic Self-Assessment, 08/26/2013
WO 111857664, 0-SI-FPU-302-001.R U2 Fire Barrier Inspection – Aux Bldg EL 690 and Below, 5/30/11
WO 112593061, 0-SI-FPU-302-001.R Fire Barrier Inspection – Aux Bldg EL 690 and Below, 5/11/12

Fire Water System Program
Commitment Tracking Document NCO114445855, Unit 1 Fire Water System Program/SQN LRA Section B.1.13
Commitment Tracking Document NCO114446046, Unit 2 Fire Water System Program/SQN LRA Section B.1.13
Drawing LRA-1,2-47W850-2, Flow Diagram Fire Protection, Rev. 0
PER 682458, License Renewal NRC Commitment # 9, 02/14/2013
PER 682466, License Renewal NRC Commitment # 9, 02/14/2013
Procedure 0-SI-FPU-026-002.Y, Auxiliary and Diesel Generator Building System 26 Flow Test, Rev. 10
Procedure 0-SI-FPU-026-241.R, Visual Inspection of the Fire Protection Sprinkler Systems in the Auxiliary Building, Rev. 4
SQN-ENG-F-10-14, Full Focused Programmatic Fire Protection/Appendix R Self-Assessment, 07/23/2010
SQN-ENG-F-13-09, Fire Protection and 10CFR50 Appendix R, Programmatic Self-Assessment, 08/26/2013
WO 110 789371, 0-PI-FPU-026-801.H Internal Inspection of Water Tank A, 8/1/11
WO 110789362, 0-SI-FPU-026-002.Y, Aux and DG Building System 26 Flow Test, 04/18/11
WO 112475679, 0-SI-FPU-026-241.R, U0 Inspect Aux Bldg Sprinkler System, 1/29/12
WO 114085515, Section of Fire Sprinkler Header Needs Removed to Allow Rigging of CCP Cooling Coil Assembly, 11/3/12

Flow-Accelerated Corrosion Program
Commitment Tracking Document NCO114446167, Unit 1 Flow-Accelerated Corrosion Program/LRA Section B.1.14
Commitment Tracking Document NCO114446284, Unit 2 Flow-Accelerated Corrosion Program/LRA Section B.1.14
CRP-ENG-F-12-001, Fleet-Wide Flow Accelerated Corrosion Program (FAC) Focused Self-Assessment Report, 03/03/12
PER 684461, License Renewal Commitment #10, Flow Accelerated Corrosion Program

Procedure 0-TI-DXX-000-001.0, Flow Accelerated Corrosion Program, Rev. 0007
Procedure 0-TI-DXX-000-016.0, Erosive Wear Degradation Monitoring Program, Rev. 0000
Procedure DS-M4.2.1, Flow Accelerated Corrosion Program Methods, Rev. 0007
Service Request (SR) 812469, License Renewal Application – Outdated Reference in Appendix A and B
SR 816149, LRA Appendix B, Section B.1.14, Flow Accelerated Corrosion Program

Flux Thimble Tube Inspection Program
Commitment Tracking Document NCO114446365, Unit 1 Flux Thimble Tube Inspection Program /SQN LRA Section B.1.15
Commitment Tracking Document NCO114446471, Unit 2 Flux Thimble Tube Inspection Program /SQN LRA Section B.1.15
In-service Inspection Report No. R-004, Examination Report, Incore Flux Thimble Tubes, SQN Unit 2 Cycle 18, October 2012
In-service Inspection Report No. R-0075, Examination Report, Incore Flux Thimble Tubes, SQN Unit 1 Cycle 19, October 2013
PER 684473, License Renewal NRC Commitment # 8, 02/14/2013

In-service Inspection Program
Commitment Tracking Document NCO114939963, Unit 1 In-service Inspection Program/SQN LRA Section B.1.16
Commitment Tracking Document NCO114940001, Unit 2 In-service Inspection Program/SQN LRA Section B.1.16
CRP-ENG-F-12-032, TVA Focused Compliance Self-Assessment Report Sequoyah Nuclear Plant for In-service Inspection, Rev. 1
PER 810760, License Renewal NRC Commitment # 36
Procedure 0-SI-DXI-000-114.3, ASME Section XI ISI/NDE Program Unit 1 and Unit 2, Rev. 18
Procedure 0-TI-DXI-000-115.0, ASME Section XI Repair and Replacement Program, Rev. 02
SQN-ENG-F-10-12, ASME Section XI Program Self-Assessment, 1/25/2010

In-service Inspection IWF Program
Commitment Tracking Document NCO114447282, Unit 1 In-service Inspection IWF Program/SQN LRA Section B.1.17
Commitment Tracking Document NCO114447374, Unit 2 In-service Inspection IWF Program/SQN LRA Section B.1.17
CRP-ENG-F-12-032, TVA Focused Compliance Self-Assessment Report Sequoyah Nuclear Plant for In-service Inspection, Rev. 1
PER 684463, License Renewal NRC Commitment # 12
Procedure 0-SI-DXI-000-114.3, ASME Section XI ISI/NDE Program Unit 1 and Unit 2, Rev. 18
Procedure N-VT-1, Visual Examination Procedure for ASME Section XI Pre-service and In-service, Rev. 44
PS 4.M.1.1 (R25), Material Fabrication and Handling Requirements for Austenitic Stainless Steel, Dated: 6/10/11
SQN-ENG-F-10-12, ASME Section XI Program Self-Assessment, 1/25/2010
WO 09-774792-000, Report No. U1R17-VT-053, RCP 4 Cartridge Seal Bolts 1 to 8, 10/22/10
WO 09-779311-000, Report No. U1R17-VT-052, Flange Bolting, 10/22/10

Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program
0-MI-MIN-000-014.0, TVA Sequoyah Nuclear Plant Maintenance Instruction – Rigging Equipment and Portable Hoist Control, Inspection and Testing, Rev. 7

Commitment Tracking Document NCO114447563, Unit 1 Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems/SQN LRA Section B.1.18
Commitment Tracking Document NCO114447669, Unit 2 Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems/SQN LRA Section B.1.18
PER 685213, License Renewal NRC Commitment # 13, 02/14/2013
Procedure 0-MI-ECR-079-095, Spent Fuel Pit Bridge Crane Periodic Inspection, Rev. 12
Procedure 0-MI-ECR-079-930.0, Manipulator Crane Checkout, Rev. 11
Procedure 0-MI-ECR-303-911.0, Reactor Building (Polar) Crane Periodic Inspection, Rev. 9
Procedure 0-MI-ECR-303-921.0, Auxiliary Building Crane Periodic Inspection, Rev. 14
TVA-NQA-PLN89-A, Nuclear Quality Assurance Plan (NQAP) (Quality Assurance Program Description), Rev. 27
WO112730457, U2 Manipulator Crane Preventative Maintenance

Internal Surfaces in Miscellaneous Piping and Ducting Components Program
Commitment Tracking Document NCO114448965, Unit 1 Internal Surfaces in Miscellaneous Piping and Ducting Components /SQN LRA Section B.1.19
Commitment Tracking Document NCO114449086, Unit 2 Internal Surfaces in Miscellaneous Piping and Ducting Components /SQN LRA Section B.1.19
PER 684464, License Renewal NRC Commitment # 14, 02/14/2013
SQN-RPT-10-LRD03, Aging Management Program Evaluation Report Non-Class 1 Mechanical, Rev. 3

Masonry Wall Program
Procedure TI-4, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting–10 CFR 50.65, Rev. 24
SQN-CI-96-02, Lead Civil Engineer Instruction Procedure for Walk-down of Structures for Maintenance Rule, Rev. 1
SQN-DC-V-1.1.1, Reinforced Concrete Block Walls, Rev. 5

Metal Enclosed Bus Inspection Program
DCN 22616A, Plant Modification, 500KV Switchyard Transformers (Unit 1)
DCN 22617A, Plant Modification, 500KV Switchyard Transformers (Unit 2)
PER 684475, License Renewal NRC Commitment #15, Metal Enclosed Bus Inspection Program
Procedure NLDP-5, FSAR Management, Rev. 0006
Commitment Tracking Document NCO114449310, Unit 1 Metal Enclosed Bus Inspection Program/SQN LRA Section B.1.21
Commitment Tracking Document NCO114449402, Unit 2 Metal Enclosed Bus Inspection Program/SQN LRA Section B.1.21
PER 684475, License Renewal NRC Commitment # 15

Neutron Absorbing Material Monitoring Program
Boral Coupon Tree Documentation – Project 10370 – Sequoyah, 1993
Commitment Tracking Document NCO114449494, Unit 1 Neutron Absorbing Material Monitoring Program/SQN LRA Section B.1.22
Commitment Tracking Document NCO114449623, Unit 2 Neutron Absorbing Material Monitoring Program/SQN LRA Section B.1.22
Holtec Report No. HI-992349, Criticality Safety Analysis of Sequoyah Spent Fuel Racks with Alternative Arrangements, Rev. 1, Dated 4/20/2000
Holtec Report No.: HI-992302, Boron Dilution Analysis Sequoyah Nuclear Plant Units 1 & 2, Rev. 1, Dated 4/20/2000
PER 688013, License Renewal NRC Commitment # 16

Procedure NPG -SPP-08.1, Nuclear Fuel Management, Appendix H, Rev. 7, 10/07/2013

Nickel Alloy Inspection Program
Procedure 0-SI-DXI-000-114.3, ASME Section XI ISI/NDE Program, Unit 1 and Unit 2, Rev. 18
SR 812469, License Renewal Application – Outdated Reference in Appendix A and B
PER 813531, License Renewal Application – Outdated Reference in Appendix A and B
NETP-113, PWR Alloy 600 Program and other Augmented Inspection Requirements, Rev. 1
CRP-ENG-08-002, Self-Assessment Report Sequoyah Nuclear Plant Alloy 600 Program, 4/24/08

Non-EQ Cable Connections Program
Commitment Tracking Document NCO114449753, Unit 1 Non-EQ Cable Connections /SQN LRA Section B.1.24
Commitment Tracking Document NCO114450238, Unit 2 Non-EQ Cable Connections /SQN LRA Section B.1.24
Letter from NEI Nuclear Energy Institute to the NRC, Subject: NEI White Paper on GALL AMP XI E6 (Electrical Cables), Dated: 09/05/2006
PER 685205, License Renewal NRC Commitment # 17
SQN-RPT-10-LRD04, Aging Management Program Evaluation Results – Electrical, Rev. 1

Non-EQ Inaccessible Power Cable Program
Commitment Tracking Document NCO114450375, Unit 1 Non-EQ Inaccessible Power Cable Program/SQN LRA Section B.1.25
Commitment Tracking Document NCO114451117, Unit 2 Non-EQ Inaccessible Power Cable Program/SQN LRA Section B.1.25
NRC Generic Letter 2007-01 - Inaccessible Underground Power Cable Failures That Disable Accident Mitigation Systems or Cause Plant Transients, Dated February 7, 2007
PER 685206, Implementation of NRC Commitment 18
PER 685206, License Renewal NRC Commitment # 18
PER 796809, License Renewal NRC Commitment # 18
PER 796810, License Renewal NRC Commitment # 18
SQN-13-030, Core Drill a Larger Access Port in 30 Manholes
SQN-13-081, Grading of Gravel Area around CCW Building
TVA General Specification for Installation G-38, Modification, and Maintenance of Insulated Cables Rated Up to 15,000 Volts, Rev. 20
WO 112717501, During Performance of WO 11984178 8 inches of Water was found in Manhole
WO 113972121, Check Standing Water in Manholes
WO 114198377, Check Standing Water in Manholes
WO 114580296, Check Standing Water in Manholes

Non-EQ Instrument Circuits Test Review Program
0-PI-NUC-092-036.0, Incore-Excore Detector Calibration, Rev. 12
0-SI-ICC-090-102.A, Channel Calibration of Fuel Pool Area Radiation Monitor (Train A), Rev. 24
Commitment Tracking Document NCO114451252, Unit 1 Non-EQ Instrument Circuits Test Review Program /SQN LRA Section B.1.26
Commitment Tracking Document NCO114451309, Unit 2 Non-EQ Instrument Circuits Test Review Program /SQN LRA Section B.1.26
PER 6684480, Implementation of the Non-EQ Instrumentation Circuits Test Review Program
PER 684480, License Renewal NRC Commitment # 19, 02/14/2013
Procedure 0-PI-IXX-092-N45.0, Calibration of Power Range Nuclear Instrumentation System Following Incore/Excore Detector Calibration, Rev. 28

Non-EQ Insulated Cables and Connections Program
Commitment Tracking Document NCO114451378, Unit 1 Non-EQ Insulated Cables and Connections Program /SQN LRA Section B.1.27
Commitment Tracking Document NCO114454007, Unit 2 Non-EQ Insulated Cables and Connections Program /SQN LRA Section B.1.27
PER 685207, Implementation of the Non-EQ Cables and Connections Program
PER 685207, License Renewal NRC Commitment # 20, 02/14/2013
SQN-RPT-10-LRD04, Aging Management Program Evaluation Results – Electrical, Rev. 1

Oil Analysis Program
Commitment Tracking Document NCO114454036, Unit 1 Oil Analysis Program/SQN LRA Section B.1.28
Commitment Tracking Document NCO114454168, Unit 2 Oil Analysis Program/SQN LRA Section B.1.28
PER 685209, License Renewal NRC Commitment # 21
PM 063601259, Equipment Identifier 1-GENB-082-0001A-A, Preventive Maintenance Work Instructions
Procedure 0-TI-PDM-000-002.0, Oil Sampling and Monitoring, Rev. 5, 6/07/2012

One-Time Inspection Program
Commitment Tracking Document NCO114454219, Unit 1 One-Time Inspection Program/SQN LRA Section B.1.29
Commitment Tracking Document NCO114454297, Unit 2 One-Time Inspection Program/SQN LRA Section B.1.29
Drawing 1, 2-47W813-1-ISI, Flow Diagram Reactor Coolant System, 03/11/91
PER 212875, EDG Minimum Required 7 Day Tank Volume, Feb. 2010
PER 213200, DC-V-11.8 Non-Conservative Fuel Oil Consumption Rate, Feb. 2010
PER 684465, License Renewal NRC Commitment # 22
Procedure 0-SI-DXI-000-114.3, ATT.10, SQN Unit 1 Augmented Examinations, 09/18/2013
Procedure 0-SI-DXI-000-114.3, ATT.11, SQN Unit 2 Augmented Examinations, 09/18/2013
Report SQN-RPT-10-AMM03, Attachment 1, Components Subjected to AMR, Revision 1
Self-Assessment ENG-F-10-010, CDBI Preparation Self-Assessment Report
SQN-M&M-08-005, Self Assessment Report Maintenance and Modifications, 07/21/2008
SQN-RPT-10-LRD03, Aging Management Program Evaluation Report Non-Class 1 Mechanical, Rev. 3

One-Time Inspection Small-Bore Piping Program
Commitment Tracking Document NCO114454348, Unit 1 One-Time Inspection Program – Small Bore Piping/SQN LRA Section B.1.30
Commitment Tracking Document NCO114454391, Unit 2 One-Time Inspection Program – Small Bore Piping/SQN LRA Section B.1.30
PER 167979, Loop 2 Safety Injection Socket Weld Indication, Unit1 Cycle 16, 04/07/2009
PER 684467, License Renewal NRC Commitment # 23
PER 950384, Pipe Fracture Upstream of Carbon Steel to Stainless Steel Socket Weld on 2-ULV-7-542, 05/11/1995
SQN-RPT-10-LRD02, Aging Management Program Evaluation Report – Class 1 Mechanical, Rev. 3
WO 09773437-000, Routine Work Order, ASME Section XI, Replacement of Class 1, 1-1/2 inch NPS Piping Downstream of Check Valve 1-63-587 Due to Indications Found During NDE Examination, 04/06/2009

Periodic Surveillance and Preventive Maintenance Program
Commitment Tracking Document NCO114454534, Unit 1 Periodic Surveillance and Preventive Maintenance/SQN LRA Section B.1.31
Commitment Tracking Document NCO114454565, Unit 2 Periodic Surveillance and Preventive Maintenance/SQN LRA Section B.1.31
PER 685212, License Renewal NRC Commitment # 24
Procedure NPG-SPP-06.2, Preventive Maintenance, Rev. 08
SQN-ENG-F-13-008, Assessment of the PM Program at Sequoyah Nuclear Plant by the Preventive Maintenance Working group (PMWG), 6/21/2013

Protective Coating Monitoring and Maintenance Program
0-TI-DXX-000-010.1, Protective Coatings Program for Coating Service Level I and II and Corrosive Environmental Applications, Rev. 0
Commitment Tracking Document NCO114454588, Unit 1 Periodic Surveillance and Preventive Maintenance/SQN LRA Section B.1.32
Commitment Tracking Document NCO114454607, Unit 2 Periodic Surveillance and Preventive Maintenance/SQN LRA Section B.1.32
G-55, Technical and Programmatic Requirements for the Protective Coating Program for TVA Nuclear Plants, Rev. 18
PER 682498, License Renewal NRC Commitment # 25
Procedure M&AI-5.3, Application and Repair of Protective Coatings, Rev. 12
SQN-DC-V-2.9, Design Criteria for Protective Coatings for the Interior of the Containment Vessel and Items Located within the Containment Vessel, 05/30/73
WO 113805332, Inspect Upper Containment Protective Coating
WO 113805337, Inspect RB Inner Crane Wall Protective Coating
WO 113805342, Dome Liner

Reactor Head Closure Studs Program
Commitment Tracking Document NCO114454762, Unit 1 Reactor Head Closure Studs Program/SQN LRA Section B.1.33
Commitment Tracking Document NCO114454795, Unit 2 Reactor Head Closure Studs Program/SQN LRA Section B.1.33
PER 685211, License Renewal NRC Commitment # 26
Procedure 0-MI-MRR-068-006.0, Installation of Reactor Pressure Vessel Head and Attachments, Rev. 38, 8/28/12

Reactor Vessel Internals Program
Commitment Tracking Document NCO114454821, Unit 1 Reactor Vessel Internals Program/SQN LRA Section B.1.34
Inspection Report No. 0108, Visual Examination of PWR Interior and Core Structure Components, SQN Unit 1 Cycle 16, April 2009
Inspection Report No. 0128, Visual Examination of PWR Interior and Core Structure Components, SQN Unit 2 Cycle 16, November 2009
PER 684468, License Renewal NRC Commitment # 27
Technical Instruction 0-TI-RVI-000-301.0, PWR Rector Vessel Internals Inspection Program, Rev. 0
WCAP-14577, Westinghouse Owners Group – Transmittal of Approved Version of WOG Aging Management Report, License Renewal Evaluation: Aging Management for Reactor Internals, Rev. 1-A
WCAP-17691-P, DRAFT – PWR Vessel Internals Program Plan for Aging Management of Reactor Internals at Sequoyah Unit 2, Rev. 0-A

Reactor Vessel Surveillance Program

Commitment Tracking Document NCO114454987, Unit 1 Reactor Vessel Surveillance Program /SQN LRA Section B.1.34
Commitment Tracking Document NCO114455060, Unit 2 Reactor Vessel Surveillance Program /SQN LRA Section B.1.34
PER 682501, License Renewal NRC Commitment # 28
Surveillance Instruction SI-255, Surveillance Program for Reactor Irradiation Specimen, Rev. 09
WCAP- 15224, Analysis of Capsule "Y" from the SQN Unit 1 RV Radiation Surveillance Program, Rev. 0, June 1999
WCAP- 15320, Analysis of Capsule "Y" from the SQN Unit 2 RV Radiation Surveillance Program, Rev. 0, December 1999
WCAP-17539-NP, Sequoyah Units 1 and 2 TLAA on Reactor Vessel Integrity, Rev. 0

Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Plants Program

Procedure 0-PI-ENV-000-002.0, Inspection of Ponds, Channels and Dikes, Rev. 0
Mesa Report No. 1257003-CR001-001, Dam Safety Inspection Report – Class A, 08/06/12
PS 4.M.1.1 (R25), Material Fabrication and Handling Requirements for Austenitic Stainless Steel, Dated: 6/10/11
SQN-CI-96-02, Lead Civil Engineer Instruction Procedure for Walk-down of Structures for Maintenance Rule, Rev. 1
Procedure TI-4, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting– 10 CFR 50.65, Rev. 24
Visual Inspection of SQN Ponds, Dikes, and Channels, Date: 01/13/09-01/14/09

Selective Leaching Program

Commitment Tracking Document NCO114455109, Unit 1 Selective Leaching Program/SQN LRA Section B.1.37
Commitment Tracking Document NCO114455154, Unit 2 Selective Leaching Program/SQN LRA Section B.1.37
PER 684469, License Renewal NRC Commitment # 29
PER 684469, License Renewal NRC Commitment #29
SQN-RPT-10-LRD03, Aging Management Program Evaluation Report Non-Class 1 Mechanical, Rev. 3

Service Water Integrity Program

CNL-13-105, Response to NRC Request for Additional Information Regarding the Review of the Sequoyah Nuclear Plant, Units I and 2, Application, Sets 10 (3.0.3-1, Requests 3, 4, 6), 12 (B.1.6-1b, B.1.6-2b), 16 (4.3.1-8a) (TAC Nos. MF0481 and MF0482), 11/4/2013 (ADAMS Accession Number ML13312A005)
Commitment Tracking Document NCO115278723, Service Water Integrity Program/SQN LRA Section B.1.38
PER 439930, 1A Diesel Heat Exchanger, 09/29/2011
PER 810780, License Renewal NRC Commitment # 38
Procedure 0-PI-DXX-000-704.1, MIC and Cavitation Degradation Monitoring Program, Rev. 4
Procedure 0-PI-OPS-067-003.0, ERCW System Flushing for Molluskicide Injection, Plant Inspections, and Post-Maintenance Testing, Rev. 5
Procedure 0-PI-SFT-067-004.A, ERCW Train A Flushing, Rev. 11
Procedure 0-PI-SFT-070-002.0, Performance Testing of Component Cooling Heat Exchangers OB1, OB2, Rev. 11
Procedure 0-TI-SXX-000-146.0, Program for Implementing NRC Generic Letter 89-13, Rev. 3

Procedure NPG-SPP-09.0.1, Conduct of Systems Engineering, Rev. 1
Procedure NPG-SPP-09.0.1.1, System Monitoring and Trending, Rev. 0
Procedure NPG-SPP-09.0.6, Conduct of Engineering Programs, Rev. 1
Procedure NPG-SPP-09.14, Generic Letter (GL) 89-13 Implementation, Rev. 3
Procedure NPG-SPP-09.7, Corrosion Control Program, Rev. 2
Procedure NPG-SPP-09.7.3, Raw Water Corrosion Program, Rev. 0
SQN-CEM-S-13-003, TVA Nuclear Power Group Snapshot Self-Assessment Report - ERCW Chemical Treatment, 4/8/13
SQN-ENG-S-12-90, Snap-Shot Self Assessment of Sequoyah Nuclear Plant's Generic Letter 89-13 Program, 04/30/12
System Health Report, Essential Raw Cooling Water System, January – June, 2013
WO 111233579, Inspect D/G 2B-1 Heat Exchanger for Clams, MIC, and Other Degradation, Clean as Required, 10/25/11
WO 112826987, SIS Pump Cooler 1A-A, 5/15/12
WO 113997890, 2-PI-SFT-070-001.0 CCS Heat Exchangers Performance Test – 2A1 & 2A2, 5/13/13
WO 114026619, 2A1 CCS HX Requires Cleaning due to Increase in Fouling Factor, 11/28/12

Steam Generator Integrity Program
Commitment Tracking Document NCO114455213, Unit 1 Steam Generator Integrity Program/SQN LRA Section B.1.39
Commitment Tracking Document NCO114456037, Unit 2 Steam Generator Integrity Program/SQN LRA Section B.1.39
PER 685210, License Renewal NRC Commitment #30
Procedure 1-MI-MXX-003-002.0, Unit 1 Steam Generator Secondary Side Maintenance Activities, Rev. 0005
Procedure 1-MI-MXX-068-005.0, Unit 1 Steam Generator Primary Side Maintenance, Rev. 0009
Procedure 1-SI-SXI-068-114.3, Unit 1 Steam Generator Tubing In-service Inspection and Augmented Inspections, Rev. 0015
Procedure 2-MI-MXX-003-002.0, Unit 2 Steam Generator Secondary Side Maintenance Activities, Rev. 0007
Procedure 2-MI-MXX-068-005.0, Unit 1 Steam Generator Primary Side Maintenance, Rev. 0013
Procedure 2-SI-SXI-068-114.3, Unit 2 Steam Generator Tubing In-service Inspection and Augmented Inspections, Rev. 0016
Procedure NDEP-16, Steam Generator Program, Rev. 0013
SQN-ENG-S-12-107, Snapshot Self-Assessment Report Unit 1 In-service Inspection – Steam Generator Replacement, 7/1/12
SQN-ENG-S-12-30, Snapshot Self-Assessment Report U1R18 NRC In-service Inspection Readiness (ISI & Steam Generator), 11/28/11
SQN-ENG-S-12-38, Snapshot Self-Assessment Report Unit 1 In-service Inspection – Steam Generator Replacement, 7/1/12

Structures Monitoring Program
B87 090505 002, Maintenance Rule Structures Inspection, 4/29/2009
B87 100119 001, Maintenance Rule Structures Inspection, 12/16/2009
B87 101215 001, Maintenance Rule Structures Inspection, 12/8/2010
B87 130917 007, Maintenance Rule Structures Inspection, 9/17/2013
Commitment Tracking Document NCO114456053, Unit 1 Structures Monitoring Program/SQN LRA Section B.1.40
Commitment Tracking Document NCO114456121, Unit 2 Structures Monitoring Program/SQN LRA Section B.1.40

Drawing LRA-1, 2-47W814-2, Flow Diagram Ice Condenser System, Rev. 0
NPG-SPP-03.4, Maintenance Rule Performance indicator Monitoring, Trending and Reporting – 10CFR50.65, Rev. 1
PER 683897, License Renewal NRC Commitment # 31
Procedure 0-PI-CEM-000-001.3, Periodic Chemistry Requirements for Chilled Water Systems, Rev. 9
Procedure 0-PI-ENV-000-002.0, Inspection of Ponds, Channels and Dikes, Rev. 0
PS 4.M.1.1 (R25), Material Fabrication and Handling Requirements for Austenitic Stainless Steel, Dated: 6/10/11
SQN111115-03, License Renewal Project Request for Information (RFI), Rev. 0
SQN-CI-96-02, Lead Civil Engineer Instruction Procedure for Walk-down of Structures for Maintenance Rule, Rev. 1

Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program
Commitment Tracking Document NCO114456134, Unit 1 Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)/SQN LRA Section B.1.41
Commitment Tracking Document NCO114456168, Unit 2 Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)/SQN LRA Section B.1.41
PER 684471, License Renewal NRC Commitment # 32
SQN Component Calculation Sheet Using Method Shown in NUREG/CR-4513, Calculation of Ferrite Content for the Thermal Aging Embrittlement of CASS Program Using Hull's Equivalent Factors, Rev. 0
SQN Unit 1 Cycle 14, 90-Day In-service Inspection (ISI) Summary Report, 8/4/2006
SQN Unit 2 Cycle 17, 90-Day In-service Inspection Summary Report, 9/20/2011
WCAP-14575-A, "Aging Management Evaluation for Class 1 Piping and Associated Pressure Boundary Components," December, 2000
WCAP-14575-A, Aging Management Evaluation for Class 1 Piping and Associated Pressure Boundary Components, December 2000

Water Chemistry Control – Closed Treatment Water Systems Program
Commitment Tracking Document NCO114456202, Unit 1 Water Chemistry Control – Closed Treatment Water Systems Program/SQN LRA Section B.1.42
Commitment Tracking Document NCO1144566237, Unit 2 Water Chemistry Control – Closed Treatment Water Systems Program/SQN LRA Section B.1.42
CRP-TPR-S-09-004, Chemistry Self-Assessment, Dated June 23 – 30, 2009
PER 682487, License Renewal NRC Commitment # 33
Procedure TI-19.1, Chemical Feed Controls Closed Cooling Water, Rev. 02, 6/14/2012

Water Chemistry Control – Primary and Secondary Program
Procedure 0-TI-CEM-000-001.1, "Secondary Chemistry Specifications," Rev. 46, Dated 06/19/2013
Procedure 0-TI-CEM-000-001.3, Primary Chemistry Specifications, Rev. 70, Dated 06/13/2013
Procedure AOP-S.07, Secondary Chemistry Out of Limits, Rev. 5, dated 1/10/2012

Other Documents
CNL-13-130, Response to NRC Request for Additional Information Regarding the Review of the Sequoyah Nuclear Plant, Units 1 and 2, License Renewal Application (TAC Nos. MF0481 and MF0482), 12/16/2013 (ADAMS Accession Number ML13357A722)
CNL-14-010, Response to NRC Request for Additional Information Regarding the Review of the Sequoyah Nuclear Plant, Units 1 and 2, License Renewal Application (TAC Nos. MF0481 and MF0482), 01/16/2014 (Proprietary Document)

Commitment Tracking Document NCO114940317, Unit 1 SQN Eng Program: OE for the AMPs/RAI B.0.4-1
Commitment Tracking Document NCO114940344, Unit 2 SQN Eng Program: OE for the AMPs/RAI B.0.4-1
Commitment Tracking Document NCO114940352, Unit 1 Corp Performance Improvement: OE for the AMPs/RAI B.0.4-1
Commitment Tracking Document NCO114940363, Unit 2 Corp Performance Improvement: OE for the AMPs/RAI B.0.4-1
Commitment Tracking Document NCO114940367, Unit 1 Corp OE Program for the AMPs/RAI B.0.4-1
Commitment Tracking Document NCO114940371, Unit 2 Corp OE Program for the AMPs/RAI B.0.4-1
EN-FAP-LR-001, License Renewal Overview and Project Plan, Rev. 5
EN-FAP-LR-003, System and Structure Scoping for License Renewal, Rev. 2
L44 130920 004, Response to NRC Request for Additional Information Regarding the Review of the Sequoyah Nuclear Plant, Units I and 2, License Renewal Application, (TAC Nos. MF0481 and MF0482), September 20, 2013
NPG-SPP-03.1, Corrective Action Program, Rev. 5
NPG-SPP-31.0, Procedures and Document Control, Rev. 0
PER 810761, License Renewal NRC Commitment # 37
PER 810780, License Renewal NRC Commitment # 37
SQN-RPT-10-LRD02, Aging Management Program Evaluation Report Class 1 Mechanical, Rev. 3
SQN-RPT-10-LRD03, Aging Management Program Evaluation Report Non-Class 1 Mechanical, Rev. 3
SQN-RPT-10-LRD03, Aging Management Program Evaluation Report Non-Class 1 Mechanical, Rev. 3
SQN-RPT-10-LRD08, Operating Experience Review Report – Aging Effects Requiring Management (AERM), Rev. 0
SQN-RPT-10-LRD09, Operating Experience Review Results – Aging Management Program Effectiveness, Rev. 1
SQN-RPT-10-LRD10, Aging Management Review Summary, Rev. 1
SR 810103, License Renewal NRC Commitment # 37
SR 810328, License Renewal NRC Commitment # 37
SR 810348, License Renewal NRC Commitment # 37
SR 810379, License Renewal NRC Commitment # 37
SR 817090, LRA ERCW Component External Environment Corrections Needed as Noted in SWI Walk-down, 12/5/13
TVA-NQA-PLN89-A, Nuclear Quality Assurance Plan (NQAP) (Quality Assurance Program Description), Rev. 27
TVASEQ005, TVA-Sequoyah Nuclear Plant License Renewal Project, Rev. 0