UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

October 1, 2010

Mr. Thomas P. Joyce
President and Chief Nuclear Officer
PSEG Nuclear LLC
One Alloway Creek Neck Road
Hancock's Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION UNITS 1 AND 2, AND HOPE CREEK GENERATING STATION - NRC LICENSE RENEWAL INSPECTION REPORT 05000272/2010010, 05000311/2010010, 05000354/2010010

Dear Mr. Joyce:

On August 26, 2010, the NRC completed the onsite portion of the inspection of your application for license renewal of your Salem Nuclear Generating Station Units 1 and 2, and Hope Creek Generating Station. The NRC inspection is one of several inputs into the NRC review process for license renewal applications. The enclosed report documents the results of the inspection, which were discussed on August 26, 2010 with members of your staff.

The purpose of this inspection was to examine the plant activities and documents that support the application for a renewed license of Salem Nuclear Generating Station Units 1 and 2, and Hope Creek Generating Station. The inspection reviewed the screening and scoping of non-safety related systems, structures, and components as required in 10 CFR 54.4(a)(2), and determined if the proposed aging management programs are capable of reasonably managing the effects of aging.

The inspection team concluded screening and scoping of non-safety related systems, structures, and components, was implemented as required in 10 CFR 54.4(a)(2), and the aging management portion of the license renewal activities were conducted as described in the License Renewal Application. The inspection results support a conclusion that the proposed activities will reasonably manage the effects of aging in the systems, structures, and components identified in your application. The inspection also concluded the documentation supporting the application was in an auditable and retrievable form.

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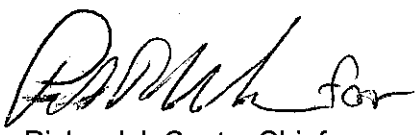
Sincerely,



Richard J. Conte, Chief
Engineering Branch 1
Division of Reactor Safety

Docket No. 50-272, 50-311, 50-354
License No. DPR-70, DPR-75, NPF-57

Enclosure: Inspection Report No. 05000272/2010010, 05000311/2010010, 05000354/2010010

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Sincerely,

*/RA/ Peter R. Wilson for:*

Richard J. Conte, Chief
Engineering Branch 1
Division of Reactor Safety

Docket No. 50-272, 50-311, 50-354
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REGION I

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|---|---|
| Docket No: | 50-272, 50-311, 50-354 |
| License No: | DPR-70, DPR-75, NPF-57 |
| Report No: | 05000272/2010010, 05000311/2010010, 05000354/2010010 |
| Licensee: | PSEG Nuclear LLC |
| Facility: | Salem Nuclear Generating Station Units 1 and 2, and<br>Hope Creek Generating Station |
| Location: | Hancock's Bridge, NJ |
| Dates: | June 7 – 10, 21 – 24, August 9 – 12, 2010 |
| Inspectors: | M. Modes, Team Leader, Division of Reactor Safety (DRS)<br>G. Meyer, Sr. Reactor Inspector, DRS<br>S. Chaudhary, Reactor Inspector, DRS<br>T. O'Hara, Reactor Inspector, DRS<br>J. Tifft, Reactor Inspector, DRS |
| Approved By: | Richard J. Conte, Chief<br>Engineering Branch 1<br>Division of Reactor Safety |

## SUMMARY OF FINDINGS

IR 05000272, 05000311, 05000354/2010010; June 7 – 10, 21 – 24, August 9 – 12, 26, 2010; Salem Nuclear Generating Station, Units 1 and 2, and Hope Creek Generating Station; Inspection of the Scoping of Non-Safety Systems and the Proposed Aging Management Programs for the PSEG Nuclear LLC Application for Renewed License for Salem Nuclear Generating Station Units 1 and 2, Hope Creek Generating Station.

This inspection of license renewal activities was performed by five regional office engineering inspectors. The inspection was conducted in accordance with NRC Manual Chapter 2516 and NRC Inspection Procedure 71002. This inspection did not identify any "findings" as defined in NRC Manual Chapter 0612. The inspection team concluded screening and scoping of non-safety related systems, structures, and components was implemented as required in 10 CFR 54.4(a)(2), and the aging management portions of the license renewal activities were conducted as described in the License Renewal Application. The inspection results supported a conclusion that the proposed activities will reasonably manage the effects of aging in the systems, structures, and components identified in the application for a renewed license. The inspection concluded the documentation supporting the application was in an auditable and retrievable form.

REPORT DETAILS

4OA2 Other - License Renewal

a. Inspection Scope

This inspection was conducted by NRC Region I based inspectors in order to evaluate the thoroughness and accuracy of the screening and scoping of non-safety related systems, structures, and components, as required in 10 CFR 54.4(a)(2) and to evaluate whether the proposed aging management programs will be capable of managing the identified aging effect with reasonable assurance.

The inspection team selected a number of systems for review using the NRC accepted guidance in order to determine if the methodology applied by the applicant appropriately captured the non-safety systems affecting the safety functions of a system, component, or structure within the scope of license renewal.

The inspection team selected a sample of aging management programs to verify the adequacy of the applicant's documentation and implementation activities. The selected aging management programs were reviewed to determine whether the proposed aging management implementing process would adequately manage the effects of aging on the system.

The inspectors selected a risk significant system from each plant and conducted a review of the Aging Management Basis documents for each selected system to determine if the applicant had adequately applied the Aging Management Programs to ensure that reasonable assurance exists for the monitoring of aging effects on the selected systems. The Salem Unit 2 feed and condensate system was chosen and the inspection team walked-down the accessible portions of the system with the system engineer, reviewed the basis documents, several system health reports, and discussed the applicant's aging management actions (inspections, repairs, replacements, etc.). It was determined the proposed aging management programs would adequately address the effects of aging for the passive, long-lived components of this system.

The inspectors reviewed supporting documentation and interviewed applicant personnel to confirm the accuracy of the license renewal application conclusions. For a sample of plant systems and structures, inspectors performed visual examinations of accessible portions of the systems to observe aging effects.

The inspection team concluded screening and scoping of non-safety related systems, structures, and components, was implemented as required in 10 CFR 54.4(a)(2), and the aging management portion of the license renewal activities were conducted as described in the License Renewal Application. The inspection team concluded the documentation supporting the application was in an auditable and retrievable form. The inspection team concluded the applicant adequately considered operational experience in formulating their proposed aging management programs.

This inspection verified the acceptability of the existing, modified, or proposed aging management programs and determined that PSEG, LLC demonstrated the capability to

manage the effects of aging during the period of extended operation. The inspection results support a conclusion the proposed activities will reasonably manage the effects of aging, in the systems, structures, and components identified in the application, for the extended period of operation.

a.1. Scoping of Non-Safety Related Systems, Components, and Structures per 10 CFR 54.4 (a)(2)

For scoping, the inspectors reviewed program guidance procedures and summaries of scoping results for Salem Nuclear Generating Station Units 1 and 2, Hope Creek Generating Station to assess the thoroughness and accuracy of the methods used to bring systems, structures, and components within the scope of license renewal into the application, including non-safety-related systems, structures, and components, as required in 10 CFR 54.4 (a)(2). The inspectors determined that the procedures were consistent with the NRC accepted guidance in Sections 3, 4, and 5 of Appendix F to

Nuclear Energy Institute (NEI) 95-10, Rev. 6, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54," (Section 3: non-safety-related systems, structures, and components within scope of the current licensing basis; Section 4: non-safety-related systems, structures, and components directly connected to safety-related systems, structures, and components; and Section 5: non-safety-related systems, structures, and components not directly connected to safety-related systems, structures, and components). Minor errors identified by the inspectors, which were related to omissions in the basis documents, were corrected by the applicant (LRCR # SA-REGION-14, LRCR # HC-REGION-7). The inspectors confirmed by drawing reviews and in-plant walk-downs that these errors had not resulted in any scoping errors.

The inspectors reviewed the set of license renewal drawings submitted with the Salem Nuclear Generating Station Units 1 and 2, Hope Creek Generating Station License Renewal Application, which was color-coded to indicate non-safety related systems and components in scope for license renewal. The inspectors interviewed personnel, reviewed license renewal program documents, and independently inspected numerous areas within Salem Nuclear Generating Station Units 1 and 2, Hope Creek Generating Station to confirm that: (1) appropriate non-safety-related systems, structures, and components had been included within the license renewal scope; (2) systems, structures, and components excluded from the license renewal scope had an acceptable basis; and (3) the boundary for determining license renewal scope within the systems, including seismic supports and anchors, was appropriate.

The Salem Nuclear Generating Station Units 1 and 2, Hope Creek Generating Station in-plant areas reviewed included the following:

- Salem Turbine Buildings
- Salem Auxiliary Buildings, including 1B and 2A Emergency Diesel Generators
- Salem Unit 1 Service Building
- Salem Unit 1 Service Water Accumulator Building
- Salem Pipe Tunnel

- Hope Creek Auxiliary Building Service/Radwaste Area
- Hope Creek Auxiliary Building Control/Diesel Area, including B EDG
- Hope Creek Reactor Building
- Hope Creek Turbine Building

For systems, structures, and components selected regarding spatial interaction (failure of non-safety-related components adversely affecting adjacent safety-related components), the inspectors determined the in-plant configuration was accurately and acceptably categorized within the license renewal program documents. Isolated scoping errors, related to the Salem Pipe Tunnel and Hope Creek Radwaste Building Corridor identified by the inspectors were corrected (LRCR # SA-REGION-14, LRCR # HC-REGION-7). The inspectors determined the personnel involved in the process were knowledgeable and appropriately trained.

For systems, structures, and components selected regarding structural interaction (seismic design of safety-related components dependent upon non-safety-related components), the inspectors determined that structural boundaries had been accurately determined and categorized within the license renewal program documents. The inspectors determined that the applicant had thoroughly reviewed applicable isometric drawings to determine the seismic design boundaries and had correctly included the applicable components in the license renewal application, based on the inspector's independent review of a sample of the isometric drawings and the seismic boundary determinations.

In summary, the inspectors concluded that the applicant had implemented an acceptable method of scoping of non-safety-related systems, structures and components, and this method resulted in accurate scoping determinations

a. 2. Programs

B.2.1.4 BWR Vessel ID Attachment Welds (Hope Creek Generating Station)

The BWR Vessel ID Attachment Welds Program is an existing program credited with managing the aging affects of weld cracking in vessel ID attachment welds in the Hope Creek Generating Station. The aging effects are managed by visual inspections of vessel ID attachment welds, evaluation of the inspection results for continued operation, and through additional, periodic weld inspections to monitor the condition of any detected cracking.

The inspectors reviewed the Hope Creek BWR Vessel ID Attachment Weld Program basis documents and interviewed the program owner to understand the scope of the program and recent inspection results.

B.2.1.6 / B.2.1.10 Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)

At Salem Generating Station the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel aging management program is a new program that augments the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI Inservice Inspection program which is implemented in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, 1998 Edition, 2000 Addenda. The Thermal Aging Embrittlement of Cast Austenitic Stainless Steel aging management program is used to detect the effects of loss of fracture toughness due to thermal aging Embrittlement in addition to the Salem Section XI Inservice Inspection program.

At Hope Creek Generating Station the Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel aging management program is a new program limited to the cast austenitic stainless steel components contained in the reactor vessel. The Hope Creek reactor vessel internals receive a visual inspection in accordance with the American Society of Mechanical Engineers Code Section XI, Subsection IWB, Category B-N-1 and B-N-2. The vessel internals receive an inspection, complying with the Section XI requirements, following the guidance contained in the BWR Vessel Internals program. The applicant will supplement the BWR Vessel Internals Program inspections to detect the effects of loss of fracture toughness due to thermal aging and neutron irradiation embrittlement of cast austenitic stainless steel reactor vessel internals that are susceptible to a loss of fracture toughness.

The inspectors reviewed the implementing procedures for each facility and interviewed the responsible program managers. The Salem Generating Station implementation covers a broad set of components in the primary loop while the Hope Creek Generating Station implementation covers a small population of components in the reactor vessel. The responsible individuals were knowledgeable about the component location, screening criteria, and inspection requirements.

B.2.1.8 BWR Penetrations (Hope Creek Generating Station)

The BWR Penetrations aging management program is an existing program that manages the effects of cracking of the reactor vessel instrumentation Penetrations (nozzles) exposed to reactor coolant through water-chemistry and in-service inspections. This is a part of existing American Society of Nuclear Mechanical Engineers, Section XI, Inservice Inspection program. The scope of the program includes beltline Instrumentation-nozzles and other instrumentation nozzles; except for the Standby Liquid Control/core plate differential pressure nozzle and the jet pumps instrumentation nozzles, which are in the scope of program 8.2.1.1, American Society of Nuclear Mechanical Engineers Section XI In-service Inspection, Subsections IWB, IWC, and IWD. The BWR Penetrations aging management program incorporates the inspection and evaluation recommendations of BWRVI P-49-4, instrument Penetration Inspection and Flaw Evaluation Guidelines", as well as the water-chemistry recommendations contained in BWRVIP-190, "BWR Vessel and Internals Project BWR Water Chemistry

Guidelines". The program is implemented through station procedures that provide for mitigation of cracking through water-chemistry and condition monitoring through examinations of reactor vessel instrument penetrations welds.

B.2.1.8 / B.2.1.11 Flow Accelerated Corrosion

The Flow Accelerated Corrosion Aging Management Program is an existing program credited with managing the erosion and corrosion aging affects in the feedwater and condensate systems in the Salem Unit 1, Salem Unit 2 and the Hope Creek Generating Stations. The aging effects are managed by computer modeling of the affected systems, periodic ultrasonic piping thickness measurements and evaluation of the results to determine acceptability for continued operation or for repair or replacement.

The inspectors reviewed the reporting and evaluation of a sample of inspection results from the spring 2010 Salem Unit 1 outage. The inspectors reviewed the evaluation of the inspection results from the #12 SG feedwater elbow thinning. The inspectors also verified that the Checkworks model had been updated for the Salem Unit 1 and Unit 2 power up-rate completed in 2002. Also, the inspectors verified that PSEG Nuclear LLC had updated the Checkworks model for the 2008 power up-rate of Hope Creek. PSEG Nuclear LLC representatives are participants in the Checkworks users group and remain current with the industry best practices in the use of the Checkworks models for Salem Nuclear Generating Station Unit 1 and Unit 2 and for Hope Creek Generating Station.

B.2.1.9 / B.2.1.12 Bolting Integrity

The Bolting Integrity Program is an existing aging management program, as described in Appendix B, Section 2.1.7 for the license renewal application. This program implements bolting monitoring requirements specified by EPRI NP-5067, "Good Bolting Practices" and maintenance recommendations of EPRI TR-104213, "Bolted Joint Maintenance & Application Guide". The Bolting Integrity Program manages loss of preload, cracking, and loss material due to corrosion of bolts within scope of license renewal. The Bolting Integrity program incorporates NRC and industry recommendations delineated in NUREG-1339, "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants," "Bolted Joint Maintenance & Applications Guide," and EPRI NP 5769, "Degradation and Failure of Bolting in Nuclear Power Plants," as part of the comprehensive corporate component pressure retaining bolting program.

The inspectors reviewed the program description and supportive material for the Bolting Integrity Program. This program is implemented through the System Walk-down Program; In-service Inspection (ISI) Program for mechanical bolting; and by the Inservice Inspection Program - IWF; and the Structures Monitoring Program (SMP) for structural bolting. The inspectors reviewed inspection reports, condition reports, site procedures, drawings, and related references used to manage the aging effects related to most of the programs mentioned above. The applicant presented documentation to support maintenance work and observation related to bolts in structural and mechanical elements. Observed conditions with potential to affect intended functions are, evaluated or corrected in accordance with the corrective action process. The Bolting Integrity

Program is consistent with the ten elements of aging management program XI.M18, "Bolting Integrity" as specified in NUREG-1801, with some exceptions, as mentioned in the program description

B.2.1.11/ B.2.1.13 Open-Cycle Cooling Water System

The Salem Nuclear Generating Station and Hope Creek Generating Station Open-Cycle Cooling Water System aging management program is an existing program structured in response to Generic Letter 89-13 "Service Water System Problems Affecting Safety-Related Equipment." The program includes sodium hypochlorite injection, system testing, periodic inspections and NDE in order to manage aging effects caused by bio-fouling, corrosion, erosion, protective coating failures, and silting in the Open-Cycle Cooling Water system.

The Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment" program is regularly reviewed by the NRC during the inspection IP71111.07 "Heat Sink Inspection". During the last inspection of Salem (IR05000272/2006003 and 05000311/2006003) the 21 charging pump gear oil cooler, the 11 auxiliary feedwater pump room cooler, and the 2C emergency diesel generator lube oil cooler were chosen as samples and the inspectors reviewed the testing and cleaning methods used by PSEG Nuclear LLC to ensure heat removal capabilities were consistent with commitments made in response to Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment," and accepted industry practices. The inspectors determined that the procedure used to quantify macrofouling of the charging pump coolers was adequate and in accordance with accepted industry practices. The inspectors also reviewed methods for monitoring and controlling biotic and macrofouling and verified their effectiveness. The inspectors did not find any significant issues during the inspection.

As part of the license renewal inspection, the following systems components were walked-down:

Salem Nuclear Generating Station

No. 12 Service Water Pump and Strainer
No. 11 Nuclear Header 24" and 11/12 cross tie
No. 12 Safety Injection Pump Lube Oil Cooler
No. 11 RHR Pump Room Cooler
No. 11 Component Cooling Heat Exchanger
4" Crosstie for Chiller Condenser 11 and 12 Header
Containment Penetrations for 11, 12, 13 containment fan coil unit and motor cooler
Service Water Accumulator Vessel Piping

Hope Creek Generating Station

Traveling screen spray piping
30"-HZC-019 SACS Heat Exchanger Cross Tie

No degradation of the systems was noted during the walk-down.

B.2.1.12 / B.2.1.14 Closed-Cycle Cooling Water System

The Closed-Cycle Cooling Water System aging management program is an existing program that uses preventive measures, inspections, and performance testing to manage the aging effects of loss of material, cracking, and reduction of heat transfer in in-scope closed-cycle cooling water components. Preventative measures include maintaining water purity such as chloride and fluoride levels, and the addition of corrosion inhibitors in accordance with the guidelines contained in EPRI 1007820 "Closed Cooling Water Chemistry Guidelines", 2004. The inspection team noted that NUREG-1801 accepts a prior revision of the "Closed Cooling Water Chemistry Guidelines" ( EPRI TR-107396).

Inspection and performance testing includes surveillance tests, preventive maintenance, performance monitoring of heat exchangers and pumps, and system walk downs during plant operating conditions. The inspection team interviewed system managers, walked down selected portions of the Closed-Cycle Cooling Water Systems, and reviewed health reports and performance data.

B.2.1.14 / B.2.1.16 Compressed Air Monitoring

The Compressed Air Monitoring Program is an existing program at Salem and Hope Creek, which manages the aging of components in the compressed air systems for loss of material in air and gas. The program is based on the Salem and Hope Creek responses to NRC Generic Letter 88-14, "Instrument Air System Problems," and includes activities, such as air quality checks at various locations in the compressed air systems to ensure that dew point, particulates, lubrication content, and contaminants are maintained within specified limits.

The inspectors reviewed application sections B.2.1.14 and B.2.1.16, and the program basis document, and discussed program activities with the Salem compressed air system manager and other responsible personnel. In addition, the inspectors reviewed a sample of corrective action program documents for operating experience applicability, implementing procedures, and monitoring and trending data reports. At Salem, the inspectors walked down the 1, 2, and 3 station air compressors, the 11, 12, 21, and 22 control air dryers, the 1 and 2 emergency control air compressors, and the station blackout diesel compressor.

B.2.1.15 / B.2.1.17 Fire Protection

The Fire Protection aging management program is an existing program modified for the purpose of aging management credited with managing the aging effects in the fire barrier system, the diesel driven fire pump, and the Halon and CO2 fire suppression systems at the Salem Generating Station Units 1 and 2 and Hope Creek Generating Station. The aging effects are managed by periodic inspection of fire barrier penetration seals and fire barrier envelop systems, fire barrier walls, ceilings, and floors, and periodic inspection and testing of fire rated doors and dampers. Aging effects are also

managed by the periodic inspection and testing of the diesel driven fire pump to ensure that the fuel supply line can perform its intended function. Aging effects for the Halon and CO2 fire suppression systems are managed by performing periodic operability testing and visual walk-downs of the systems.

This program uses existing surveillances and tests to manage aging effects. Existing visual inspections for fire barrier penetration seals, envelop systems, walls, ceilings, and floors are credited along with visual inspections and periodic testing of fire barrier doors and dampers. An enhancement discussed in the application to the current program, for the purpose of license renewal, will be made to improve the inspection acceptance criteria for the fire barrier walls, ceilings, and floors, to include degradation due to cracking, spalling, and loss of material caused by freeze-thaw, chemical attack, and reaction with aggregates.

The program credits the existing surveillance tests performed on the diesel driven fire pump to monitor the aging effects on the fuel supply line. These surveillance tests demonstrate that the fuel supply line can deliver sufficient fuel for the pump to meet its intended function. Enhancements to the surveillance test procedure will provide guidance for visual inspection of the diesel fuel supply line for external surface corrosion. To monitor aging effects of the in-scope Halon and CO2 fire suppression systems, existing periodic operability testing and visual walk-downs of the systems are credited. The operational tests for these systems occur at a frequency of 18 months. These are less frequent than the six month frequency recommended in NUREG-1801.

The inspectors reviewed the existing fire protection program and supporting documents to verify the effectiveness of the program. The inspectors conducted interviews and performed walk-downs of various fire barriers throughout the plants to observe the effectiveness of the existing program. The inspectors also walked down the diesel driven fire pumps and the associated fuel supply lines and accessible portions of the carbon dioxide and halon suppression systems. Surveillance procedures and results were reviewed for completeness and compliance with applicable codes. Program enhancements were reviewed for adequacy and completeness.

An acceptable exception to the NUREG-1801 guidance was noted for frequency of the functional tests of the halon systems and carbon dioxide systems. NUREG-1801 states that the functional tests for these systems should be performed once every six months. The Salem and Hope Creek programs specify performance of these tests once every 18 months. This is acceptable, because visual inspections occur on the halon systems for system charge and storage tank weight at least every six months and the carbon dioxide systems undergo a visual storage tank level and pressure check at least weekly. Also, there have not been any aging-related events adversely affecting system operation. These conditions have been granted previously by the NRC in license renewal safety evaluation reports as conditions necessary to recognize the frequency in the current licensing basis as acceptable. The inspectors reviewed the systems surveillance and corrective action histories and determined that these conditions were met.

B.2.1.16 / B.2.1.18 Fire Water System

The Fire Water System aging management program is an existing program modified for the purpose of aging management credited with managing the aging effects from loss of material due to corrosion, microbiologically induced corrosion, or biofouling in water-based fire protection systems in the Salem Generating Station Units 1 and 2 and Hope Creek Generating Station. The aging effects are managed by periodic testing and inspection of systems and components exposed to fire water including sprinklers, nozzles, fittings, valves, hydrants, hose stations, standpipes, water storage tanks, and above-ground and underground piping and components.

The program credits existing tests and inspections to monitor the aging effects on the fire water system. Fire system main header flushes are performed annually and fire system main header flow tests are conducted every three years. Fire hydrant flow tests are performed annually. Fire pump functional tests are performed every 18 months and Salem and annually at Hope Creek to confirm adequate discharge flow and pressure.

The program will be enhanced, as discussed in the application, to include periodic non-intrusive volumetric fire protection piping wall thickness measurements. These non-intrusive inspections will include selected portions of the fire protection system piping located above ground and exposed to water and will measure the thickness of the pipe wall and the inside diameter of the piping. The inspections will be conducted prior to the end of the current term and repeated on a frequency not exceeding every ten years.

Sprinkler and deluge system visual inspections are performed periodically to detect signs of degradation such as corrosion. The program will be enhanced to perform sprinkler head sampling in accordance with NFPA 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems" (2002 Edition), Section 5-3.1.1. Representative samples of sprinkler heads from in scope sprinkler systems will be submitted to a testing laboratory prior to being in service 50 years. Thereafter, the testing will be repeated on a frequency of once every ten years.

The inspectors reviewed program bases documents and implementing procedures to assess the effectiveness of the existing program. The inspectors reviewed the implementing procedures for and results of previous periodic flow testing, along with other relevant surveillance results. The inspectors also conducted interviews and performed walk-downs of portions of the fire water system to observe the effectiveness of the existing program. Program enhancements, including draft implementing procedures, were reviewed for adequacy and completeness.

B.2.1.20 / B.2.1.22 One-Time Inspection

The One-Time Inspection Program is a new, one-time program for Salem and Hope Creek that will be implemented prior to the period of extended operation. The program will verify the effectiveness of other aging management programs, including Water Chemistry, Fuel Oil Chemistry, and Lubricating Oil Analysis Programs, by reviewing various aging effects for impact. Where corrosion resistant materials and/or non-corrosive environments exist, the One-Time Inspection Program is intended to verify that

an aging management program is not needed during the period of extended operation by confirming that aging effects are not occurring or are occurring in a manner that does not affect the safety function of systems, structures, and components. Non-destructive examinations will be performed by qualified personnel using procedures and processes consistent with the approved plant procedures and appropriate industry standards.

The inspectors reviewed application sections B.2.1.20 and B.2.1.22, program basis document, sampling plan basis documents, and implementing procedures, discussed the planned activities with the responsible staff, and reviewed a sample of corrective action program documents for applicable components.

The inspectors noted that the program had over 170 planned inspections. For the potential aging effect of loss of material, the program specified that all inspection samples be performed on carbon steel, based on the likelihood that if the aging effect was experienced, it would occur on that material. While the inspectors agreed that there was a sound technical basis for the aging effect to most likely occur on carbon steel, the confirmatory nature of the program merited that other materials be tested for loss of material. The applicant initiated program changes to include inspection samples for loss of material on other materials, including aluminum and copper alloys in various environments (LRCR SA- REGION-19).

B.2.1.21 / B.2.1.23 Selective Leaching of Materials

The Selective Leaching of Materials Program is a new, one-time program for Salem and Hope Creek that will be implemented prior to the period of extended operation. The program is credited with managing the aging of components made of gray cast iron, copper alloys with greater than 15% zinc, and aluminum bronze with greater than 8% aluminum, exposed to raw water, treated water, and soil environments, which may lead to the selective leaching of material constituents, e.g., graphitization and dezincification. The program will include a one-time visual inspection and hardness measurement test of selected components that may be susceptible to selective leaching to determine whether loss of material due to selective leaching is occurring, and whether the leaching process will affect the ability of the components to perform their intended function during the period of extended operation.

The inspectors reviewed application sections B.2.1.21 and B.2.1.23, program basis document, sampling plan basis documents, and implementing procedures, discussed the planned activities with the responsible staff, and reviewed a sample of corrective action program documents for applicable components.

The inspectors noted both applications provided operating experience related to selective leaching which had occurred at Salem and Hope Creek and provided some information about ongoing activities to address the selective leaching. Specifically, the materials of aluminum bronze and gray cast iron have experienced selective leaching in a raw water environment, i.e., brackish water. Neither the applications nor the program basis document provided a complete approach to how these aging effects would be managed. For example, the population of affected components and component types

was uncertain, and ongoing aging management programs to be used had not been determined.

The applicant stated that this concern would be resolved by re-evaluating the aging management for selective leaching, supplementing the license renewal applications, and revising the program basis document to address the aging management due to selective leaching of aluminum bronze and gray cast iron (Hope Creek letter LR-N10-0319 dated Aug 26, 2010, "Supplement to the Hope Creek Generating Station License Renewal Application Related to Selective Leaching.").

B 2.1.22 / B.2.1.24 Buried Piping Inspection

The Buried Piping Inspection Program is an existing program, which is credited with managing the effects of external corrosion on the pressure-retaining capability of buried carbon steel, cast iron, and stainless steel piping components in a soil environment. The aging effects will be managed by preventive measures (i.e., coatings and wrappings) to mitigate corrosion, in accordance with standard industry practice for maintaining external coatings and wrappings and by visual inspections during planned excavations. The program specified performing at least one inspection of each material type within the 10 year period prior to the period of extended operation, either during an excavation for other purposes (i.e., opportunistic) or during an excavation planned for this inspection.

An additional inspection will also be performed during the first 10 years of extended operation. The program will provide inspection and acceptance criteria, and will require evaluation of the inspection results. Inspections will be performed in accordance with approved station procedures.

The inspectors reviewed the program basis document and program implementing procedures. The inspectors also reviewed a sample of corrective action program documents related to buried piping, including inspection records for nuclear river water piping in December 2005, which had been replaced because of a microbiologically induced corrosion leak, and an apparent cause evaluations for condensate storage tank piping, and microbiologically induced corrosion and buried piping. The inspectors also interviewed selected system and component engineers responsible for the associated program elements and buried components. The inspectors performed field walk-downs to independently assess the material condition of the visible portion of a short section of cast iron fire header piping, which was exposed for unrelated valve work.

B.2.1.23 One-Time Inspection of ASME Code Class 1 Small Bore-Piping / B.2.2.6 Small-Bore Class 1 Piping Inspection (Salem Nuclear Generating Station)

The Salem Nuclear Generating Station One-Time Inspection of ASME Code Class 1 Small-Bore Piping aging management program is part of the Risk Informed Inservice Inspection program. Because the Risk Informed Inservice Inspection program requires examination of selected high and medium risk weld locations to detect cracking in ASME Code Class 1 piping, small bore piping must be included in the selection. As a consequence the One-Time Inspection of ASME Code Class 1 Small Bore-Piping

program was promulgated separately to address the aging effect of cracking in small bore piping.

The program will consist of nondestructive examinations, both volumetric and visual, performed using procedures consistent with Section XI of the ASME Code and 10CFR50, Appendix B. The applicant is currently working with the Electric Power Research Institute to develop a meaningful ultrasonic test technique. Because the program is a detection program there is no procedural guidance for mitigation or prevention. This is a find-and-fix program.

B.2.2.6 Small-Bore Class 1 Piping Inspection (Hope Creek Generating Station)

The Hope Creek Generating Station Class 1 Small-Bore Piping Inspection aging management program is a new program that manages cracking due to stress corrosion, thermal and mechanical loading in ASME Code Class 1 piping, fittings, and branch connections less than 4 inches nominal pipe size. The program will periodically inspect accessible Class 1 socket welds in the recirculation system using ultrasonic or other qualified testing techniques.

Hope Creek Generation Station has experienced small bore piping failures. Small bore piping on the reactor recirculation containing original root weld imperfections, combined with vibrations induced by the reactor recirculation system, have caused failures. The Hope Creek Generating Station Class 1 Small-Bore Piping Inspection aging management program will supplement the existing risk informed inservice inspection program which currently performs visual examinations of small bore piping. The small bore samples, selected for volumetric examination will be based on the piping susceptibility to degradation and an assessment of the consequences of the piping failure. This selection criterion is based on EPRI TR-112657 and ASME Code Case N-578-1.

B.2.1.24 / B.2.1.25 External Surfaces Monitoring

At both the Salem Nuclear Generating Station, and the Hope Creek Generating Station, the External Surfaces Monitoring aging management program consists of periodic visual inspections performed during system inspections and walk-downs. The program manages the aging effect of loss of external surface material through visual inspection of external surfaces for evidence of loss of material. This program does not manage the loss of material due to boric acid corrosion which is managed by the Boric Acid Corrosion program. This program does not manage the external surfaces of buried piping, tanks, or above ground tanks.

The inspection team reviewed associated documents, and noted the external condition of surfaces during the walk-down of the Open-Cycle Cooling Water System noted earlier in this report. Interviews of the system engineers indicated that external surface visual inspection guidance, or surveillance checklists, were not proceduralized for this aging management program. These procedural revisions are not required prior to the extended period of operation.

B.2.1.28 / B.2.1.28 ASME Section XI, Subsection IWE

The ASME Section XI, Subsection IWE aging management program is an existing program, credited in the LRA, which provides for inspecting the reactor building liner plate and related components for loss of material, loss of pressure retaining bolting preload, cracking due to cyclic loading, loss of sealing, and leakage through seals, gaskets and moisture barriers in accordance with ASME Section XI. Areas of the reactor building adjacent to the moisture barrier and the moisture barrier are subject to augmented examination.

The inspectors reviewed applicable procedures, the latest Inservice Inspection program results and interviewed the Inservice Inspection program manager. The inspectors reviewed a sample of recent corrective action reports from Section IWE examinations.

The inspectors concluded that the Inservice Inspection program was in place, had been implemented, was an on-going program subject to NRC review, and included the elements identified in the license renewal application. As it is a currently required program subject to periodic review and inspection, the applicant provided adequate guidance to ensure the aging effects will be appropriately assessed and managed.

B.2.1.29 ASME Section XI, Subsection IWL (Salem Generating Station)

The Salem ASME Section XI, Subsection IWL aging management program is an existing program which implements the examination requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Subsection IWL for reinforced and pre-stressed concrete containments (Class CC), 1998 Edition with the 1998 Addenda. The program requires periodic inspection of Containment Structure concrete surfaces as specified by ASME Section XI, Subsection IWL. Accessible concrete surfaces are subject to General Visual examination to detect deterioration and distress such as defined in ACI 201.1, including loss of material, cracks and distortion, and loss of bond. Concrete surfaces that are suspect of deterioration and distress, based on General Visual examination, are subject to Detailed Visual examination to determine the magnitude and extent of deterioration and distress.

In a prior NRC audit, it was observed that the acceptance criteria for concrete defects in the containment structure was significantly less stringent than the industry standard ACI 349.3R. However, the team observed that the acceptance criteria established in the controlling procedure had not been used to resolve any detected concrete anomaly, i.e., defect, degradation, or material concerns, in the containment. Furthermore, the applicant has revised the procedure to incorporate acceptance criteria established in the current ACI standard (SAP 80096881-0403, 80096880-4902)

The inspectors reviewed applicable procedures, the latest In-service Inspection program, performed a walkthrough inspections to assess the effectiveness of currently implemented inspection program, and interviewed the In-service Inspection program manager.

B.2.1.32 / B.2.1.31 Masonry Wall Program and B.2.1.33 / B.2.1.32 Structures Monitoring Program

The Structures Monitoring Program at Salem Nuclear Generating Station Units 1 and 2, and Hope Creek Generating Station is an existing program that is to be further enhanced to be consistent with guidance set forth in 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," NUMARC 93-01, "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," and Regulatory Guide 1.160, Rev. 2, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants". This program is described in Appendix B, Section 2.39 for the license renewal application. PSEG Nuclear LLC uses the structural monitoring program to monitor the condition of structures and structural components within scope of the Maintenance Rule, thereby providing reasonable assurance that there is no loss of intended function of structure or structural component. The program will be enhanced to include additional structures and structural components identified in the license renewal aging management review. Enhancements to the PSEG Nuclear LLC Structural Monitoring Program will be implemented prior to the period of extended operation.

The scope of the program also includes condition monitoring of masonry walls and water-control structures as described in the Masonry Wall Program and in the RG 1.127, "Inspection of Water-Control Structures Associated With Nuclear Power Plants," aging management program. The program elements incorporate the requirements of NRC IEB 80-11, "Masonry Wall Design," the guidance in NRC IN 87-67, "Lessons learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11," and the requirements of NRC Regulatory Guide 1.127, "Inspection of Water-Control Structures Associated with Nuclear Power Plants".

Aging effects or material degradation in concrete identified within the scope of the Structures Monitoring Program such as loss of material, cracking, change in material properties, and loss of form are detected by visual inspection of external surfaces prior to the loss of the structure's or component's intended function.

The inspectors reviewed the Aging Management Program description for the Structural Monitoring Program, the Program Evaluation Document for the Structural Monitoring Program, engineering documents, inspection reports, condition reports, corrective action documents, work request documents, site procedures, and related references used to manage the aging effects on the structures. On August 12, 2010, the inspectors conducted a general walkthrough inspection of the site, including the turbine building, reactor containment building, diesel generator building, control room, the intake structure, and other applicable structures, systems, and components related to the Structural Monitoring Program. The inspectors held discussions with applicant's supervisory and technical personnel to verify that areas where signs of degradation, such as spalling, cracking, leakage through concrete walls, corrosion of steel members, deterioration of structural materials and other aging effects, had been identified and documented. Also, the inspectors verified that the applicant maintains appropriate (photographic and/or written) documentation of these inspections to facilitate effective monitoring and trending of structural deficiencies and degradations.

Through the review of documents, walkthrough inspections, and discussions with engineering and plant personnel, the inspector identified some weaknesses in the structural aging management program. The following observations were common to all the three reviewed programs as currently implemented.

A technically acceptable trending system was not implemented to establish the status of observed cracks (stable or active), and qualification and certification of inspectors/examiners was not explicitly established and documented to assure assignment of qualified individuals for inspection. The inspection personnel selection is left to the supervisor of the group. Also, there was a lack of clear quantitative acceptance/evaluation criteria established by the procedure to assure consistency in observation, evaluation, and assessment of inspection results by different inspectors and technical personnel/engineers and at different times. The applicant has initiated a review and revision of all structural inspection and documentation practices as noted in TM-AMRBD-S-2.4.13,19, 20, Rev 1, Ref 5.12 "Further Evaluations Summary Report". The results of this review will be considered during the NRC's subsequent inspection of license renewal commitments: IP170003, "Post-Approval Site Inspection for License Renewal."

B.2.1.35 / B.2.1.34 Protective Coating Monitoring and Maintenance Program

The Protective Coating Monitoring and Maintenance Program is an existing program that is credited with managing the aging affects in Service Level I coatings that protect structural steel and concrete components in Salem Unit 1, Salem Unit 2 and the Hope Creek Generating Stations. The aging effects are managed by monitoring Service Level I coatings for visible defects such as blistering, cracking, flaking, peeling, rusting, delaminating, and physical damage. Observed conditions are evaluated for potential repair and for continued service.

The inspector reviewed documents related to the Protective Coatings Monitoring and Maintenance Program and interviewed the program owner to understand how the program is implemented. The inspectors reviewed videos of the Hope Creek torus coating inspection which was completed in 2004 and reviewed the records of the Hope Creek drywell inspection completed in 2009. The inspectors also reviewed the qualifications of inspection personnel who conduct visual inspections. The inspectors also reviewed the qualification testing documents which demonstrated the ability of the selected coating materials to protect the coated structures and surfaces.

B.2.1.36 / B.2.1.35 Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program is a new program credited with managing the aging effects from insulation degradation due to adverse environmental conditions in cables and connections in the Salem Generating Station Units 1 and 2 and Hope Creek Generating Station. The aging effects are managed by a sampling visual inspection of cables and connections in adverse localized environments.

This new program will perform periodic visual inspections of cables and connections in adverse localized equipment environments caused by heat, radiation, or moisture which can accelerate aging of electrical cables. A representative sample of accessible electrical cables and connections installed in adverse localized environments and ambient conditions in excess of 60-year service-limiting environments will be visually inspected for jacket surface anomalies that indicate insulation or connection degradation.

The inspectors reviewed the draft procedure, conducted walk-downs, and had discussions with plant personnel to assess the proposed program and assure it will be capable of managing aging effects. The inspectors reviewed the scope of the program, which will not distinguish between environmentally qualified and non-environmentally qualified cables within each area inspected, and determined that it conservatively increased the scope of cables inspected.

B.2.1.37 / B.2.1.36 Electrical Cables and Connections Not Subject To 10 CFR 50.49 Environmental Qualification Requirements Used In Instrumentation Circuits

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits aging management program is a new program credited with managing the aging effects due to reduced insulation resistance in in-scope instrumentation cables at the Salem Nuclear Generating Station Units 1 and 2 and Hope Creek Generating Station. The aging effects are managed by performance of existing calibration tests for instrumentation containing in-scope cables and connections in the Radiation Monitoring System and Reactor Protection System at Salem and in the Leak Detection and Radiation Monitoring System at Hope Creek. The aging effects are also managed by the addition of cable testing of the in-scope cables in the Neutron Monitoring System at Hope Creek.

This program credits calibration and surveillance testing for in-scope circuits in the Radiation Monitoring System and Reactor Protection System at Salem and in the Leak Detection and Radiation Monitoring System at Hope Creek. Review of the calibration and surveillance results provide an indication of the existence of aging effects. The first reviews will be completed prior to the period of extended operation and every ten years thereafter.

The new program will include cable testing. For the in-scope portions of the Neutron Monitoring System at Hope Creek, the cables will be tested for reduced insulation resistance using a proven test method such as Time Domain Reflectometry. This testing will be initially performed prior to the period of extended operation and the test frequency will be once every ten years.

The inspectors reviewed procedural guidance and results of instrument testing. The inspectors interviewed relevant applicant personnel regarding how the proposed program will identify age related deficiencies. The inspectors reviewed existing surveillance and calibration procedures and results.

B.2.1.38 / B.2.1.37 Inaccessible Medium Voltage Cables Not Subject To 10 CFR 50.49 Environmental Qualification Requirements

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program is a new program credited with managing the aging effects in inaccessible medium-voltage cables that are exposed to significant moisture and significant voltage in the Salem Generating Station Units 1 and 2 and Hope Creek Generating Station. The aging effects are managed by periodic inspection for water collection in cable manholes and conduit and draining water as needed. Also, in-scope cables will be periodically tested to provide an indication of the condition of the conductor insulation.

This new program will include periodic inspections of cable manholes containing in-scope cables and draining water out of the manholes if needed. These inspections will occur at a frequency based on existing practices and adjusted based on inspection results. The maximum time between inspections will be no more than two years. These inspections are designed to be a preventative measure for insulation damage due to moisture intrusion and water trees.

The new program will also include cable testing. The first testing will occur before the period of extended operation and will continue at a frequency of every ten years. The method of testing will be determined prior to the first test and will be a test method proven to determine insulation deterioration, such as power factor or partial discharge testing.

The inspectors reviewed data from previous manhole inspections. The inspectors reviewed the applicant's action plan for managing water intrusion of in-scope manholes, along with results of completed steps. The inspectors interviewed relevant applicant personnel regarding how the proposed program will prevent and identify age related deficiencies. The inspectors reviewed draft procedural guidance for cable testing using acceptable testing methods.

B.2.1.40 / B.2.1.39 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements

The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements aging management program is a new program credited with managing the aging effects from degradation of the metallic parts of cable connections associated with cables within the scope of license renewal in the Salem Generating Station Units 1 and 2 and Hope Creek Generating Station. The aging effects are managed by integrity testing of in-scope cable connections.

This new program includes one-time integrity testing of a representative sample of in-scope cable connections. The technical basis for the sample selection will be documented. Thermography is the test method that will be used. Where thermography is not possible, or if results are inconclusive, another proven test method for connection integrity will be used. These tests will be performed prior to the period of extended operation.

The inspectors reviewed thermography procedures and test results. The inspectors reviewed draft sample selection basis documents and interviewed relevant applicant personnel to assess the proposed program. The inspectors reviewed the program against the guidance in LR-ISG-2007-02 and determined that the program adequately implemented the guidance therein.

B.2.2.1 High Voltage Insulators (Salem Nuclear Generating Station)

The High Voltage Insulators aging management program is a new program credited with managing the aging effects on high voltage insulation degradation in the Salem Generating Station Units 1 and 2 and Hope Creek Generating Station. The aging effects are managed by a periodic visual inspection of in-scope high voltage insulators.

This new program will perform periodic visual inspections of in-scope high voltage insulators to look for degradation of insulator quality due to the presence of salt deposits and surface contamination on the insulators. These inspections will occur on a twice per year frequency and as-needed based on weather conditions. Data from these inspections will be trended, as to characterize the degradation rate of the insulation.

The inspectors reviewed the draft procedure, conducted walk-downs, and had discussions with plant personnel to assess the proposed program and assure it will be capable of managing aging effects.

B.2.2.3 Aboveground Non-Steel Tanks

The Aboveground Non-Steel Tanks aging management program is a new program used to manage the aging effects of the external surfaces of aboveground non-steel tanks within the scope of license renewal. The Aboveground Non-Steel Tanks program is credited with managing loss of material on the tank external surfaces including the exterior bottom surface of tanks that is not accessible for direct visual inspection. The outer surfaces of the tanks, up to the surface in contact with the concrete foundation, are managed by visual inspection. Ultrasonic thickness gauging is used to monitor loss of material on the inaccessible tank bottom external surfaces. Internal UT measurements are planned for the bottom of the tanks to confirm degradation is not occurring. Inspections will also be performed at the interface edge between the tank bottom and the concrete foundation, where grout or sealant is installed to minimize water and moisture from penetrating the surface. Where bird screens are installed on the tank vent, the bird screen will be visually inspected for loss of material.

The inspection team toured various Non-Steel Tanks at Salem Generating Station. The following observations were noted: benign rust stains on the outer surface of a tank caused by a rusting vent bird screen and the removal of the base grouting from one tank with chipped furrows in the surrounding concrete pad which seemed to follow cracking. The removed grouting and furrows had the appearance of an abruptly abandoned project. No adverse affects were noted for either observation.

B.2.2.4 Buried Non-Steel Piping Inspection (Hope Creek Generating Station and Salem Nuclear Generating Station)

The Buried Non-Steel Piping Inspection Program is an existing program credited with managing aging affects in service water systems in Salem Unit 1, Salem Unit 2 and the Hope Creek Generating Stations. The aging effects are managed by periodic visual inspections, surveillance testing and completion of identified deterioration and leakage.

The inspectors reviewed the aging management basis documents and implementing procedures. The inspectors also interviewed the program owner to understand the scope and results of the program. The inspectors reviewed the system health reports for the Service Water Systems at Salem Unit 1 and Unit and for Hope Creek. The inspectors reviewed videos of inspections completed during recent plant outages. Inspection results showed that deterioration is being identified, documented and analyzed for repair or replacement.

B.2.2.5 Boral Monitoring Program (Salem Nuclear Generating Station)

The Boral Monitoring Program is an existing program that monitors the Boral test coupon inspection and/or testing results at other Boiling Water Reactor sites. If these results indicate a problem with Boral neutron absorbing material potentially affecting its intended function of absorbing neutrons, Hope Creek will initiate inspection and/or testing of its Boral test coupons currently located in the Hope Creek spent fuel pool.

The Boral Monitoring Program aging management programs used at these other Boiling Water Reactor (BWR) sites are condition monitoring programs and do not rely on preventive actions. The assumption is that the spent fuel pool environments, including the pool's water chemistry and radiation field, and the Boral material characteristics are consistent enough so that the results at other BWR sites are representative of the results if the Hope Creek Boral test coupons were inspected and/or tested. The Boral Monitoring Program aging management programs used at these other BWR sites is a condition monitoring program and do not include activities for prevention or mitigation of aging effects.

The Boral surveillance performed by other Boiling Water Reactor (BWR) sites include visual inspections and/or testing of their Boral test specimens or coupons to monitor changes in physical properties of the Boral in the spent fuel pool. Examination of the Boral test coupon includes visual examination and photography, dimensional measurements, weight and density/specific gravity, and neutron attenuation measurement. The Boral test coupon is visually examined to detect aging affects such as corrosion, pitting, swelling, or other degradation. The Boral test coupon may be photographed if, in the judgment of the technician, there is any information of significance that should be photographically documented. Dimensional measurements such as length, width and thickness are taken to document if physical changes are occurring in the Boral test coupon. The Boral test coupon is weighed and in some cases, the density/specific gravity is calculated to determine if there any changes in the physical properties. A measurement by neutron attenuation is performed to determine if there has been any change in the Boron-10 content. These inspections and/or testing

are performed by a qualified contractor or measurement laboratory and will ensure against unexpected degradation of the Boral neutron-absorbing material.

b. Findings

The inspection team concluded screening and scoping of non-safety related systems, structures, and components, was implemented as required in 10 CFR 54.4(a)(2), and the aging management portion of the license renewal activities were conducted as described in the License Renewal Application. The inspection team concluded the documentation supporting the application was in an auditable and retrievable form. The inspection team concluded the applicant adequately considered operational experience in formulating their proposed aging management programs.

This inspection verified the acceptability of the existing, modified, or proposed aging management programs and determined that PSEG, LLC demonstrated the capability to manage the effects of aging during the period of extended operation. The inspection results support a conclusion the proposed activities will reasonably manage the effects of aging, in the systems, structures, and components identified in the application, for the extended period of operation.

40A6 Meetings, including Exit Meeting

The inspectors presented the inspection results to Carl Fricker and members of his staff in an exit meeting on August 26, 2010. PSEG Nuclear LLC had no objections to the NRC observations and made no presentation.

No proprietary information is present in this inspection report.

**ATTACHMENT**

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Licensee Personnel

| | |
|---|---|
| Thomas Joyce | President and Chief Nuclear Officer |
| Robert Braun | Site Vice President, Salem |
| John Perry | Site Vice President, Hope Creek |
| Carl Fricker | Vice President, Operations Support |
| Mike Gallagher | Vice President License Renewal Exelon |
| Al Fulvio | Technical Lead, Exelon License Renewal Team |
| Mark Adair | Salem Fire Protection Program Manager |
| Ashok Bhuta | Hope Creek EQ Program Manager |
| Dan Christiana | License Renewal Team Member |
| Mike Cooking | Fire Protection Superintendent |
| Gary Greer | Salem Plant Engineer |
| John Hilditch | License Renewal Team Member |
| Rich Kocher | Hope Creek Fire Protection System Engineer |
| Mike Reeser | Hope Creek Fire Protection Program Manager |
| Robert Smith | Salem EQ Program Manager |
| Jim Stead | Salem Plant Engineer |
| Keith Swing | Hope Creek Plant Engineer |
| Ken Wolf | Salem Fire Protection System Engineer |

## LIST OF DOCUMENTS REVIEWED

General License Renewal Documents

NRC Inspection Procedure 71002; License Renewal Inspection

NRC Generic Letter 89-13, Service Water System Problems Affecting Safety-Related Components, U.S. Nuclear Regulatory Commission, July 18, 1989

NRC Generic Letter 89-13, Supplement 1, Service Water System Problems Affecting Safety-Related Components, U.S. Nuclear Regulatory Commission, April 4, 1990

NRC Information Notice 81-21, Potential Loss of Direct Access to Ultimate Heat Sink, U.S. Nuclear Regulatory Commission, July 21, 1981

NRC Information Notice 85-24, Failures of Protective Coatings in Pipes and Heat Exchangers, U.S. Nuclear Regulatory Commission, March 26, 1985

NRC Information Notice 85-30, Microbiologically Induced Corrosion of Containment Service Water System, U.S. Nuclear Regulatory Commission, April 19, 1985

NRC Information Notice 86-96, Heat Exchanger Fouling Can Cause Inadequate Operability of Service Water Systems, U.S. Nuclear Regulatory Commission, November 20, 1986

No. 98-0030, *Thermal Aging Embrittlement of Cast Stainless Steel Components*, May 19, 2000.

License Renewal Basis Documents

SH-PBD-AMP-XI.M24, Program Basis Document –Compressed Air Monitoring, Rev 2
SH-PBD-AMP-XI.M32, Program Basis Document –One-Time Inspection, Rev 2
SH-PBD-AMP-XI.M33, Program Basis Document – Selective Leaching of Materials, Rev 1
SH-PBD-AMP-XI.M18, Program Basis Document – Bolting Integrity, Rev 2
SH-PBD-AMP-XI.S7, Program Basis Document – RG 1.127, Inspection of Water Control Structures
SH-AMP-PBD-XI.S5, Program Basis Document - SGS and HCGS Masonry Wall Program,
HC-SSBD-A2, 10CFR54.4 (a)(2) System Scoping and Screening Basis Document, Rev 1
HC-PBD-AMP-XI.M8, Program Basis Document - BWR Penetrations, Rev 2
HC-SSBD-SLI, Selective Leaching Inspection Sample Basis Document, Rev 0
HCGS-SSBD-OTI, One-Time Inspection Sample Basis Document, Rev 0
SA-SSBD-A2, 10CFR54.4 (a)(2) System Scoping and Screening Basis Document, Rev 1
SA-SSBD-A2, 10CFR54.4 (a)(2) System Scoping and Screening Basis Document, Rev 2
SA-SSBD-SLI, Selective Leaching Inspection Sample Basis Document, Rev 0
SGS1-SSBD-OTI, Unit 1 One-Time Inspection Sample Basis Document, Rev 0
SGS2-SSBD-OTI, Unit 2 One-Time Inspection Sample Basis Document, Rev 0
SH-PBD-AMP-PS1, "High Voltage Insulators", Rev 2
SH-PBD-AMP-XI-E1, "Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements", Rev 1
SH-PBD-AMP-XI.E2, "Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits", Rev 2

SH-PBD-AMP-XI.E3, "Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements", Rev 1
SH-PBD-AMP-XI-E6, "Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements", Rev 1
SH-PBD-AMP.XI.M26, "Fire Protection", Rev 1
SH-PBD-AMP-XI.M27, "Fire Water System", Rev 1,
SH-PBD-AMP- XI.S8, Revision 1; Protective Coating Monitoring and Maintenance Program
SH-PBD-AMP- XI.M34, Revision 2; Buried Piping Inspection Program
Salem Generating Station and Hope Creek Generating Station, Aging Management Program Basis Document SH-PBD-AMP-PS4, Revision 0; Buried Non-Steel Piping Inspection Program
Hope Creek Nuclear Generating Station Buried Piping Program Basis Document, Report No. 3602.101-01, Revision 0, 11/12/08
Salem Nuclear Generating Station Buried Piping Program Basis Document, Report No. 3601.100-01, 2/5/09
Program Basis Document, SH-PBD-AMP-PS4, Buried Non-Steel Piping Program
Program Basis Document, SH-PBD-AMP-XI.S8, Revision 1, Protective Coating Monitoring and Maintenance Program, GALL Program XI.S8 – Protective Monitoring and Maintenance Program, 7/16/09
Hope Creek Generating Station Program Basis Document HC-PBD-AMP-XI.M4, Revision 2, 12/10/09; BWR Vessel ID Attachment Welds, GALL Program XI.M4
SA-AMRBD-M-2.3.4.2, Book 1 of 1; Salem Generating Station, Main Condensate and Feedwater System, Aging Management Review Basis Document
SA-AMRBD-M-2.3.4.2, Book 1 of 1; Salem Generating Station, Electrical Commodities, Aging Management Review Basis Document

Operating Experience

20171756, Root Cause Analysis for Salem 13 B Circulating Water Pump Repeat Failure
20234681, Salem Service Water Strainer Drum
20118220, Salem Feedwater Heater
20096392, Salem Service Water Spool Piece
20288728, Salem Moisture Separator Drain
20043770, Salem Weld Penetrant Test
20234047, Salem Weld Penetrant Test
20127259, Salem Residual Heat Removal Stud Wastage
20008368, Salem Chemical Volume Control System Ultrasonic Test Indication
20234698, Salem Weld Crack
20235827, Salem Steam Generator Wall Thinning
20280574, Hope Creek Cracks in Steam Dryer
20281762, Hope Creek Service Water Pump Reservoir
20227689, Hope Creek Ultrasonic Test of 2B Feedwater Heater
20231489, Hope Creek Wall Thinning of Feedwater Pump Recirculation Line
20225342, Hope Creek Ultrasonic Test on Reactor Water Cleanup System
20219291, Hope Creek Ultrasonic Test on Condensate System
20197311, Hope Creek Ultrasonic Test Acid Tank
20227690, Hope Creek Ultrasonic Test on 2C Feedwater Heater

20222843, Hope Creek Ultrasonic Test on Feedwater System
20242247, Hope Creek B Service Water Strainer
20295758, Salem Control Air Manifolds with Rust
20305253, Salem 3 Station Air Compressor Plug Leak
20329098, Salem 11 Control Air Dryer Desiccant Spent
20324397, Salem Control Air Quality
20394597, Salem Control Air High Dew Point
20086245, Salem Instrument Air to Service Water Intake
20005260, Hope Creek Compressor Aftercooler with Rust
20171977, Hope Creek Instrument Air Line Worn
20314664, Hope Creek Air Leak
20429586, Hope Creek High Dew Point
20086246, Hope Creek Instrument Air Quality to Service Water Intake
20041101, Hope Creek Dew Point Trend Unsatisfactory
60087258, Salem Chilled Water Pipe Corrosion

Implementing Procedures

CY-AA-120-4200, Corrosion Monitoring Guidelines, Revision 1
ER-AA-330, Revision 8, "Conduct of Inservice Inspection Activities"
ER-AA-330-001, Revision 7, "Section XI Pressure Piping"
ER-AA-330-002, Revision 14, "Inservice Inspection of Section XI Welds and Components"
ER-330-014, Revision 1, "Risk Informed Inservice Inspection Program Implementation"
OU-AA-335-010, Revision 0, "Guidelines for ASME Code Allowable Flaw Evaluation and ASME Code Coverage Calculations"
OU-AA-335-014, Revision 0, "VT-1 Visual Examination"
OU-AA-335-015, Revision 0, "VT-2 Visual Examination"
OU-AA-335-1000, Revision 0, "Nondestructive Examination (NDE) Program"
SH-PBD-AMP-XI.M20, Revision 2, "Open-Cycle Cooling Water Program"
ER-AA-310, implementation of the Maintenance Rule
ER-AA-31 0-1 004, Maintenance Rule - Performance Monitoring
ER-AA-310-1 009, Condition Monitoring of Structures
ER-AA-2030 - Conduct of Plant Engineering Manual, Rev. 8
SH.MD-GP.72-0022 Bolt Torquing and Bolting Sequence Guidelines, Rev. 4
ER-AA-5400, Buried Piping Program (BPP) Guide, Rev. 1
ER-AA-5400-1002, Buried Piping Examination Guide, Rev. 1
SA-AA-1 17, Excavation, Trenching, and Shoring, Rey.9
SC.MD-CM.SW-0006, Johnston Service Water Pump Inspection and Repair, Rev.
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