UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., Suite 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

May 14, 2018

Mr. Peter P. Sena, III
President and Chief Nuclear Officer
PSEG Nuclear LLC - N09
P.O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNITS 1 AND 2 – INTEGRATED INSPECTION REPORTS 05000272/2018001 AND 05000311/2018001

Dear Mr. Sena:

On March 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Salem Nuclear Generating Stations (Salem) Units 1 and 2. On April 19, the NRC inspectors discussed the results of this inspection with Mr. Charles McFeaters, Salem Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented three findings of very low safety significance (Green) in this report. Two of these findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at Salem. In addition, if you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC, 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at Salem.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Part 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Fred L. Bower, III, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Docket Nos: 50-272 and 50-311
License Nos. DPR-70 and DPR-75

Enclosure:
Inspection Report 05000272/2018001 and
05000311/2018001

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SUBJECT: SALEM NUCLEAR GENERATING STATION, UNITS 1 AND 2 – INTEGRATED INSPECTION REPORTS 05000272/2018001 AND 05000311/2018001 DATED MAY 14, 2018

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Nos.	50-272 and 50-311
License Nos.	DPR-70 and DPR-75
Report Nos.	05000272/2018001 and 05000311/2018001
Enterprise Identifier:	I-2018-001-0050
PSEG:	PSEG Nuclear LLC PSEG
Facility:	Salem Nuclear Generating Station (Salem) Units 1 and 2
Location:	Hancocks Bridge, NJ 08038
Dates:	January 1, 2018 through March 31, 2018
Inspectors:	P. Finney, Senior Resident Inspector A. Ziedonis, Resident Inspector L. Dumont, Acting Resident Inspector J. Furia, Senior Health Physicist J. Kulp, Senior Reactor Inspector N. Floyd, Reactor Inspector
Approved By:	Fred L. Bower, III, Chief Reactor Projects Branch 3 Division of Reactor Projects

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring PSEG's performance at Salem Units 1 and 2 by conducting the baseline inspections described in this report in accordance with (IAW) the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information. NRC identified and self-revealing findings, violations, and additional items are summarized in the table below.

List of Findings and Violations

Implementing Procedures for Beyond Design Basis FLEX Mitigating Strategies Not Followed			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green Finding (FIN) FIN 05000272/2018001-01 and 05000311/2018001-01 Closed	H.5 – Human Performance – Work Management	71111.04
A Green finding was identified by the inspectors for multiple examples of PSEG not following the station specific procedures that implement the Salem and Hope Creek Generating Station (HCGS) Final Integrated Plans for Beyond Design Basis FLEX Mitigating Strategies, EM-SA-100-1000 and EM-HC-100-1000, respectively. Specifically, since compliance with the FLEX order was met on November 10, 2016, PSEG did not follow the common PSEG fleet Preventive Maintenance (PM) Process and diesel fuel oil testing program procedures, MA-AA-716-210, CY-AB-140-410, and SC.OP-LB.DF-0001 for the annual fuel oil sampling of FLEX equipment. In addition to this, between December 6, 2017, and March 8, 2018, PSEG did not follow site specific procedures for FLEX equipment unavailability and mitigation capability protection in accordance with the Salem and HCGS procedures, OP-HC-108-115-1001 and OP-SA-108-115-1001, Operability Assessment and Equipment Control Program.			

Inadequate Procedure Step Results in Service Water Strainer Trip			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green Non-Cited Violation (NCV) NCV 05000272/2018001-02 Closed	H.5 – Human Performance, Work Management	71152
A self-revealing Green non-cited violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR), Appendix B, Criterion V, was identified because PSEG procedure WC-AA-111, "Predefine Process," Revision 8, step 4.8.11, did not adequately prescribe activities that affected the quality of the safety-related 11 service water (SW) strainer. Specifically, step 4.8.11 did not adequately prescribe controls associated with the performance of partial PM activities that affected the quality of the safety-related structures, systems and components (SSCs). Consequently, the 11 SW corrosion control sacrificial anodes were not replaced prior to the PM overdue date and eventually broke into pieces, which rendered the 11 SW pump and strainer inoperable and unavailable from June 8 – 11, 2017.			

Failure to Establish Containment Integrity during Plant Startup			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000272/2018001-03 Closed	H.8 – Human Performance, Procedure Adherence	71153
The inspectors determined there was a self-revealing Green non-cited violation (NCV) of Technical Specification (TS) 6.8.1, "Procedures and Programs," when PSEG did not follow procedure S1.OP-SO.SG-0002, "Maintaining Steam Generators in Wet Layup," Revision 10, step 5.7.7L, to close the 14 steam generator (SG) blowdown manual nitrogen supply valves prior to entry into MODE 4 on November 7, 2017, and MODE 3 on November 9, 2017. Specifically, 14 SG blowdown manual nitrogen supply valves were left open during startup transition from MODE 5 through MODE 3 (Hot Standby), which resulted in a steam leak into the Unit 1 auxiliary building (AB) through an actual open pathway upstream of the 14 SG blowdown containment isolation valve.			

Additional Tracking Items

Type	Issue number	Title	Report Section	Status
URI	05000272/2016002-01	Baffle-Former Bolts with Identified Anomalies	71152	Closed
LER	05000272/2016001-00	Unanalyzed Condition Due to Degraded Reactor Baffle to Former Bolts	71153	Closed
LER	05000272/2017001-00 (See above NCV 05000272/2018001-03)	Containment Integrity Inoperable for Longer Than Allowed by TSs	71153	Closed

PLANT STATUS

Unit 1 began the inspection period at full rated thermal power. There were no other operational power changes of regulatory significance for the remainder of the inspection period.

Unit 2 began the inspection period at full rated thermal power. On March 24, the unit reduced power to approximately 75 percent in support of planned main turbine valve testing. The unit was returned to rated thermal power later that same day. There were no other operational power changes of regulatory significance for the remainder of the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess PSEG's performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards."

REACTOR SAFETY

71111.04 - Equipment Alignment

Partial Walkdown (4 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

(1) Unit 2, 22 component cooling water (CCW) train with 22 CCW heat exchanger out of service on January 2, 2018
(2) Common, 11 and 21 safety injection (SJ) pumps while 12 and 22 SJ pumps were out of service on January 3, 2018
(3) Common, offsite power while the 11 and 22 station power transformers (SPTs) were out of service on March 12, 2018
(4) Common, Mitigating System Flexible (FLEX) coping strategy equipment readiness on March 15, 2018

71111.05A/Q - Fire Protection Annual/Quarterly

Quarterly Inspection (5 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

(1) Unit 1, turbine building with compensatory fire watches on January 2, 2018
(2) Unit 1, mechanical penetration area on January 3, 2018
(3) Unit 1, relay room with compensatory fire watches on February 9, 2018
(4) Unit 2, relay room with compensatory fire watches on February 9, 2018
(5) Common, main control room on February 21, 2018

71111.06 - Flood Protection Measures

Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections of the service water intake structure on February 27, 2018.

71111.07 - Heat Sink Performance

Heat Sink (1 Sample)

The inspectors evaluated PSEG's monitoring and maintenance of 12A CCW heat exchanger on March 20, 2018.

71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated a crew of licensed operators in the plant's simulator during licensed operator requalification training that involved a turbine auxiliary cooling leak, steam leak, and a steam generator tube rupture on February 20, 2018.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (1 Sample)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

(1) Common, 230V transformers on March 15, 2018

71111.13 - Maintenance Risk Assessments and Emergent Work Control (3 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

(1) Unit 1, shutdown bank control rod 2SB2 loss of position indication on January 29, 2018
(2) Common, control area ventilation during planned maintenance with Unit 2 control room emergency air conditioning system out of service on February 22, 2018
(3) Common, 11 and 22 SPTs out of service during planned maintenance on March 12, 2018

71111.15 - Operability Determinations and Functionality Assessments (6 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) Unit 1, 11SW536, service water (SW) accumulator check valve back-leakage on January 23, 2018
(2) Unit 1, shutdown bank control rod 2SB2 position indication erratic on February 1, 2018
(3) Unit 1, 12 SW pump in-service test (IST) performance on March 19, 2018
(4) Unit 2, 21 chiller following a trip on freeze protection on January 29, 2018
(5) Common, main control room envelope breach on January 3, 2018
(6) Common, reactor coolant pump seal functionality during fire scenarios on February 9, 2018

71111.18 - Plant Modifications (1 Sample)

The inspectors evaluated the following permanent modification:

(1) Unit 2, steam generator blowdown radiation monitors on January 16, 2018

71111.19 - Post Maintenance Testing (6 Samples)

The inspectors evaluated post maintenance testing for the following maintenance/repair activities:

(1) Unit 1, 15 SW pump following replacement on January 3, 2018
(2) Unit 1, main feedwater motor operated stop check isolation valve on January 18, 2018
(3) Unit 1, 11 reactor coolant system (RCS) over temperature delta temperature loop following corrective maintenance on January 24, 2018
(4) Unit 1, failure of solid state protection system control board de-multiplier on February 26, 2018
(5) Unit 2, 22CC3, CCW crossover valve yoke belt missing on February 13, 2018
(6) Unit 2, 25 containment fan cooling unit fan bearing repack on February 14, 2018

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (2 Samples)

(1) Unit 1, 1B emergency diesel generator monthly surveillance test on February 5, 2018
(2) Unit 2, 2C 4kV undervoltage functional test on February 12, 2018

Inservice (2 Samples)

(1) Unit 2, 26 SW pump failed on February 15, 2018
(2) Unit 2, 23 auxiliary feedwater pump on March 16, 2018

Reactor Coolant System Leak Detection (1 Sample)

(1) Unit 1, RCS leakage with pressurizer power operated relief valve leakage on February 1, 2018

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Radiological Hazard Assessment (1 Sample)

The inspectors conducted independent radiation measurements during walkdowns of the facility and reviewed the radiological survey program, air sampling and analysis, continuous air monitor use, recent plant radiation surveys for radiological work activities, and any changes to plant operations since the last inspection to verify survey adequacy of any new radiological hazards for onsite workers or members of the public.

Instructions to Workers (1 Sample)

The inspectors reviewed high radiation area work permit controls and use, observed containers of radioactive materials and assessed whether the containers were labeled and controlled IAW with requirements.

71124.02 - Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls

Radiological Work Planning (1 sample)

The inspectors selected the following radiological work activities based on exposure significance for review:

(1) RWP 12, 1R25 containment activities
(2) RWP 14, 1R25 pressurizer/RCP/miscellaneous containment activities
(3) RWP 15, 1R25 RP support activities
(4) RWP 17, 1R25 primary generator activities

For each of these activities, the inspectors reviewed: ALARA work activity evaluations, exposure estimates, exposure reduction requirements, results achieved (dose rate reductions, actual dose), person-hour estimates and results achieved and post-job reviews that were conducted to identify lessons learned.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified PSEG's performance indicators submittals listed below for the period from January 2017 through December 2017. (4 Samples)

(1) Unit 1, RCS specific activity on February 13, 2018 (BI01)
(2) Unit 2, RCS specific activity on February 13, 2018 (BI01)
(3) Unit 1, RCS leak rate on February 8, 2018 (BI02)
(4) Unit 2, RCS leak rate on February 8, 2018 (BI02)

71152 - Problem Identification and Resolution

Annual Follow-up of Selected Issues (3 Samples)

The inspectors reviewed PSEG's implementation of its corrective action program related to the following issues:

(1) Unit 1, 11 SW strainer anode failure on February 6, 2018
(2) Unit 1, Unresolved Item regarding unexpected number of baffle-former bolt failures on February 26, 2018
(3) Unit 1, 13 steam generator tube leak on January 31, 2018

71153 - Follow-up of Events and Notices of Enforcement Discretion

Licensee Event Reports (2 Samples)

The inspectors evaluated the following PSEG event reports which can be accessed at https://lersearch.inl.gov/LERSearchCriteria.aspx:

(1) Licensee Event Report 05000272/2016-001-00, Unanalyzed Condition Due to Degraded Reactor Baffle to Former Bolts on February 26, 2018
(2) Licensee Event Report 05000272/2017-001-00, Containment Integrity Inoperable for Longer than Allowed by Technical Specifications, on February 21, 2018

INSPECTION RESULTS

Implementing Procedures for Beyond Design Basis FLEX Mitigating Strategies Not Followed			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green Finding FIN 05000272/2018001-01 and 05000311/2018001-01 Closed	H.5 – Human Performance – Work Management	71111.04

A Green finding was identified by the inspectors for multiple examples of PSEG not following the station specific procedures that implement the Salem and HCGS Final Integrated Plans for Beyond Design Basis FLEX Mitigating Strategies, EM-SA-100-1000 and EM-HC-100-1000, respectively. Specifically, since compliance with the FLEX order was met on November 10, 2016, PSEG did not follow the common PSEG fleet PM Process and diesel fuel oil testing program procedures, MA-AA-716-210, CY-AB-140-410, and SC.OP-LB.DF-0001 for the annual fuel oil sampling of FLEX equipment. In addition to this, between December 6, 2017, and March 8, 2018, PSEG did follow site specific procedures for FLEX equipment unavailability and mitigation capability protection in accordance with the Salem and HCGS procedures, OP-HC-108-115-1001 and OP-SA-108-115-1001, Operability Assessment and Equipment Control Program.

Description: PSEG is committed to comply with NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, and NRC Order on Mitigation Strategies, EA-12-049.

FLEX Equipment Preventive Maintenance

Section 11.5.2 of NEI 12-06 states, in part, that portable equipment that directly performs a FLEX mitigation strategy for the core, containment, or spent fuel pool (SFP) should be subject to maintenance and testing guidance provided in Institute of Nuclear Power Operations (INPO) AP 913, Equipment Reliability Process, to verify proper function. The maintenance program should ensure that the FLEX equipment reliability is being achieved. Standard industry templates (e.g., EPRI) and associated bases will be developed to define specific maintenance and testing.

In complying with NRC Order EA-12-049, PSEG implemented EM-HC-100-1000 and EM-SA-100-1000. In Sections 2.18.7 of these procedures it states that FLEX mitigation equipment is subject to initial acceptance testing and subsequent periodic maintenance and testing to verify proper function. FLEX diesel generators and pumps are in PSEG's fleet common PM process, MA-AA-716-210, which defines periodic testing and maintenance and follows the PM template requirements in EPRI's Preventive Maintenance Basis for FLEX Equipment – Project Overview Report (EPRI Report 3002000623), dated September 2013.

The inspectors reviewed a number of recent equipment and PM issues at PSEG associated with the HCGS, Salem, and fleet common FLEX diesel generators and pumps. During the review, the inspectors found that this equipment is scheduled per PSEG's PM program and, in accordance with Electric Power Research Institute (EPRI) guidance, should be tested

every 6 months and the fuel oil be sampled every 12 months. Based on inspector requests and questions related to the FLEX fuel oil cloud point and sample results, PSEG found that the initial fuel oil samples for all of the FLEX diesel generators and pumps were either never taken (at Salem) or not analyzed (at HCGS). Because of this, the inspectors determined that since compliance with the FLEX order was met on November 10, 2016, PSEG did not follow the common PSEG fleet PM Process and diesel fuel oil testing program procedures, MA-AA-716-210, CY-AB-140-410, and SC.OP-LB.DF-0001, for the annual fuel oil sampling of FLEX equipment.

FLEX Equipment Unavailability and Protection

Section 11.5.3 of NEI 12-06 states, in part, that the unavailability of equipment and applicable connections that directly performs a FLEX mitigation strategy for the core, containment, and SFP should be managed such that risk to mitigating strategy capability is minimized. The unavailability of installed plant equipment is controlled by existing plant processes such as the technical specifications.

PSEG's FLEX equipment allowable outage times and required actions for equipment unavailability are maintained in site specific operations procedures OP-HC-108-115-1001 and OP-SA-108-115-1001 in order to meet the requirements in NEI 12-06.

For the three site FLEX diesel pumps (H1FLX-10-P-500 (HCGS); SCFLX-1FLXE18 (Salem); C1FLX-1FLXE42 (back-up common to Salem and HCGS)), a loss of two of three represents a loss of a FLEX mitigation capability. OP-HC-108-115-1001 and OP-SA-108-115-1001 state, in part, that when installed equipment which supports FLEX strategies becomes unavailable, then the FLEX strategy affected by this unavailability does not need to be maintained during the unavailability. The required beyond design basis (BDB)/FLEX equipment may be unavailable for 90 days provided that the site's BDB/FLEX capability (N) is met. If the site BDB/FLEX capability is met but not protected for all of the site's applicable hazards (flood, earthquake, high winds from hurricane or tornado, or local intense precipitation), then the allowed unavailability is reduced to 45 days.

On February 19, 2018, PSEG documented NOTF 20787557 for the FLEX diesel back-up pump common to Salem and HCGS (C1FLX-1FLXE42) failure to start that was not returned to an available condition until March 8. A NOTF 20783115 dated December 6, 2017, 75 days earlier, documented a failure to start with the same common FLEX diesel pump. The inspectors noted that no actions were taken to resolve the December issue other than attempting to start the pump multiple times over 12 days until the pump started on December 18, 2017. At this point, PSEG declared the pump available without performing any corrective maintenance or documenting any basis for the pump being available. The inspectors questioned PSEG about the time period mentioned above and how PSEG's BDB/FLEX capability was protected during that time for all of the applicable site hazards as all three pumps are located in outside FLEX storage areas at ground level. Because of this, the inspectors determined that PSEG did not follow site specific procedures for FLEX equipment unavailability and mitigation capability protection for this common diesel pump between December 6, 2017, and March 8, 2018 (92 days).

Based on all of the information above, the inspectors determined that there were multiple examples of PSEG not following the station specific procedures for FLEX Mitigating Strategies. Specifically, PSEG did not follow the common PSEG fleet PM Process and diesel fuel oil testing program procedures for the annual fuel oil sampling of FLEX equipment, or site

specific procedures for FLEX equipment unavailability so that equipment issues were appropriately tracked and adequately protected to allow it to be unavailable for greater than 90 days when unavailability should have been limited to less than 45 days.

Corrective Actions: PSEG's corrective actions for the above issues included obtaining fuel oil samples from all the Salem, HCGS, and common FLEX equipment onsite and analyzing the samples to ensure the fuel oil quality remained adequate. PSEG also replaced the starting solenoid on the common FLEX diesel pump that failed to start and returned the pump to an available status on March 8, 2018, 92 days after it first became unavailable.

Corrective Action References: 20787557, 20783115, 60138024, 20787861, 20787862, 20787863, 20787879, 20787880, 20787881, 20787882, 20787883, 20787884, 20791977, 20791974, and 80122006.

Performance Assessment:

Performance Deficiency: PSEG's station specific procedures EM-SA-100-1000 and EM-HC-100-1000 implement the Salem and HCGS FLEX Mitigating Strategies, which includes FLEX equipment PM and unavailability. The inspectors determined that since January 2017, there were multiple examples of PSEG not implementing these procedures utilizing existing procedures for the PM process, diesel fuel oil testing or operability assessment and equipment control, and that this represented a performance deficiency.

Screening: The performance deficiency is more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The inspectors also reviewed IMC 0612, Appendix E, Examples of Minor Issues, and found it was sufficiently similar to Example 3.k, in that significant programmatic deficiencies were identified that could have led to worse outcomes.

Significance: Issues identified concerning FLEX are evaluated through a cross-regional panel using IMC 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria," as informed by Appendix O, "Post Fukushima Mitigation Strategies Significance Determination Process (Orders EA-12-049 and EA-12-051)" (ML16055A351). The finding was determined to be of very low safety significance (Green) because the inspector answered "no" to the five questions in the draft Appendix O. Specifically, this condition was not associated with SFP level instrumentation required by NRC Order EA–12–051 and did not result in a complete loss of function to maintain or restore core cooling, containment pressure control/heat removal and/or SFP cooling capabilities.

Cross-Cutting Aspect: This finding has a cross-cutting aspect in the area of Human Performance, Work Management, because PSEG did not implement a process of planning, controlling, and executing work activities such that nuclear safety was the overriding priority and did not identify and manage the coordination of different Salem, HCGS, and PSEG common work groups or job activities. Specifically, PSEG did not execute work activities associated with the FLEX fuel oil sampling or corrective maintenance activities on FLEX equipment that would ensure that equipment's reliability and availability. (H.5)

Enforcement: This finding does not involve enforcement action because no violation of regulatory requirements was identified. Because the finding does not involve a violation of regulatory requirements and has very low safety significance, it is identified as a finding.

Inadequate Procedure Step Results in Service Water Strainer Trip			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000272/2018001-02 Closed	H.5 – Human Performance, Work Management	71152 (1)

A self-revealing Green NCV of 10 CFR, Appendix B, Criterion V, was identified because PSEG procedure WC-AA-111, "Predefine Process," Revision 8, step 4.8.11, did not adequately prescribe activities that affected the quality of the safety-related 11 SW strainer. Specifically, step 4.8.11 did not adequately prescribe controls associated with the performance of partial PM activities that affected the quality of the safety-related SSCs. Consequently, the 11 SW corrosion control sacrificial anodes were not replaced prior to the PM overdue date and eventually broke into pieces, which rendered the 11 SW pump and strainer inoperable and unavailable from June 8 – 11, 2017.

Description: On June 8, 2017, the 11 SW strainer tripped on thermal overload (TOL) following a manual start of the 11 SW pump, which generated an overhead alarm in the main control room. Operators appropriately responded to the alarm, and subsequently secured the 11 SW pump and declared the pump and strainer inoperable. With the 13 SW pump already out of service for maintenance, two inoperable SW pumps associated with the same SW header required entry into an unplanned 72-hour Technical Specification action statement (TSAS) 3.7.4.1, "Service Water System."

In response to 11 SW strainer trip, PSEG maintenance technicians performed disassembly and internal inspection of the "as-found" conditions of the 11 SW strainer. The inspectors observed the as-found inspection activity performed by PSEG. PSEG discovered several pieces of strainer anode material had broken, becoming wedged between the rotating strainer drum and stationary strainer body backwash pads and resulting in a high current draw on the strainer motor and the subsequent TOL trip. On June 9, 2017, 13 SW pump was restored to Operable, and TSAS 3.7.4.1 was exited within 25 hours of the 72 hour action statement. On June 10, 2017, PSEG replaced all ten anodes in the 11 SW strainer, and restored 11 SW strainer and pump to service on June 11, 2017.

PSEG engineering performed Equipment Reliability Evaluation (ERE) 70194682, and determined the cause of the strainer trip was attributed to "a PM that was executed without replacing the anodes within the specified timeframe, as required by the Preventive Maintenance Plan." The ERE determined when the three-year open-and-inspect PM WO 30215207 was performed on the 11 SW strainer in January of 2015, the anodes were required to be replaced as one of the activities under the PM WO. In consultation with Engineering, maintenance decided not to replace the 11 SW strainer anodes because the proper anode material was not available on-site, and captured this under NOTF 20676687. The ERE noted that maintenance completed the additional WO tasks under the PM, and subsequently closed the WO. The ERE further noted that no new WO was generated from 20676687 to schedule replacing the anodes at a later date.

The inspectors reviewed the ERE, and reviewed station procedures regarding the performance of PM tasks. The inspectors noted WC-AA-111, "Predefine Process," Revision 8, step 4.8.11, discussed the concept of partial PM completion. Specifically, the step states, in part, when determining partial performance completion, the implementing PM order should be closed to maintain periodicity and a one-time PM order should be initiated

with the uncompleted items in the object list to accomplish the remaining requirements. The new work order (WO) shall maintain the original due and overdue dates. The inspectors identified inconsistent use of "should" and "shall" terminology in step 4.8.11 and discussed this with PSEG. PSEG initiated NOTF 20790902 to request changing the "should" terminology in step 4.8.11 to "shall," and acknowledged in the NOTF that the current step, as-written, had the potential to miss the PM overdue date. The inspectors concluded that the WC-AA-111, step 4.8.11, did not provide adequate instructions for the performance of partial PM tasks. Although PSEG did not discuss the 11 SW strainer PM overdue date in the ERE, the inspectors performed a review of PM and corrective maintenance (CM) WOs for the 11 SW strainer, and determined that a reasonable PM overdue date would have been August 1, 2016, or approximately 10 months prior to the June 8, 2017, equipment failure. The inspectors determined the overdue date based on the three-year PM frequency, plus a procedurally-allowable grace period of 25 percent (9 months), from the date of previous anode installation under CM WO 60106377, which occurred on November 1, 2012.

Corrective Action: PSEG took corrective action to restore compliance with the PM program by replacing all anodes in 11 SW strainer with the correct material type on June 10, 2017, and restored 11 SW pump and strainer to OPERABLE on June 11, 2017. Additionally, PSEG entered this issue into the corrective action program (CAP) to evaluate the cause of the equipment failure as discussed above, and wrote a procedure change request NOTF to evaluate the necessary changes to WC-AA-111 as discussed above.

Corrective Action References: ERE 70194682; NOTFs 20790902, and 20766832

Performance Assessment:

Performance Deficiency: The inspectors concluded that the procedure governing the partial performance and subsequent completion of PM tasks was a performance deficiency that was within PSEG's ability to foresee and correct, and should have been prevented. Specifically, WC-AA-111, step 4.8.11, did not adequately prescribe the completion of PM activities prior to the overdue date, which affected the quality of the safety-related 11 SW strainer.

Screening: The inspectors determined this issue was more than minor because it was associated with the equipment performance attribute of the Mitigating System cornerstone and adversely impacted its objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, 11 SW pump and strainer were rendered inoperable and unavailable from June 8 to June 11, 2017, after the anodes failed as a result of not being replaced prior to the PM overdue date.

Significance: Using IMC 0609, "Significance Determination Process (SDP)," Attachment 4, "Initial Characterization of Findings," and Appendix A, "The SDP for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined that this finding was of very low safety significance, or Green, because the finding did not represent a loss of system or function for greater than the Technical Specification-allowed outage time.

Cross-Cutting Aspect: The finding had a cross cutting aspect in the area of Human Performance, Work Management, in that the organization implements a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. Specifically, PSEG did not implement procedure requirements to adequately plan, control, and execute the performance of partial PMs, such that task were completed or evaluated for PM deferral prior to the PM overdue dates. [H.5]

Enforcement:

Violation: Title 10 CFR, Appendix B, Criterion V states, in part, that activities affecting quality shall be prescribed by documented procedures, of a type appropriate to the circumstances, and shall be accomplished IAW these procedures. PSEG procedure WC-AA-111, "Predefine Process," Revision 8, step 4.8.11 required when a PM WO was partially performed with certain tasks not completed, a new PM WO should be initiated to perform the uncompleted tasks, and the new PM WO shall maintain the original overdue date or a PM deferral should be processed.

Contrary to the above, from May 3, 2013, through the end of the inspection period, adequate prescriptive controls associated with a quality activity involving the performance of partial PM activities that affected the quality of the safety-related SSCs were not provided. Specifically, step 4.8.11 of WC-AA-111 did not require a new PM WO to be generated upon partial performance of a PM. Consequently, when the PM task to replace the 11 SW strainer anodes was not completed during the three-year internal inspection of the 11 SW strainer, conducted on January 25, 2015, a new PM WO was not created, the anodes were not replaced prior to the PM overdue date, and the anodes corroded until they broke into pieces that jammed the strainer.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Unresolved Item (Closed)	**Baffle-Former Bolts with Identified Anomalies**	71152 (2)

Description: This unresolved item was opened to review PSEG's root cause evaluation "Unexpected High Number of Baffle-Former Bolt Failures" to determine if a performance deficiency exists. PSEG identified the root cause of the baffle former bolt failures to be irradiation assisted stress corrosion cracking. PSEG's corrective action to prevent recurrence was to implement PSEG Pressurized Water Reactor - Reactor Vessel Internals project maintenance and inspection requirements consistent with revised PSEG asset management / project strategy and industry guidance.

The inspectors reviewed the root cause evaluation performed by PSEG as well as the supporting laboratory report which confirmed PSEG's conclusion that the baffle-former bolt failures were due to irradiation assisted stress corrosion cracking. Previous inspections, which are documented in NRC inspection report 05000272/2016002 Section 4OA2 and 1R08, documented PSEG's immediate corrective actions completed prior to restart from the 2016 refueling outage and implementation of industry guidance, outlined in MRP-227-A "Pressurized Water Reactor Internals Inspection and Evaluation Guidelines," Revision 0, which was in effect when the degraded baffle bolts were identified in 2016. The inspectors reviewed PSEG's reactor vessel internals aging management and long-term asset management program documents and noted they had been updated with the latest industry guidance for management of the baffle-former bolt degradation issue. The inspectors determined that PSEG appropriately implemented industry guidance regarding the issue of failed baffle-former bolts.

Corrective Action Reference: NOTF 20772538

Closure Basis: The failure of baffle former bolts in Salem Unit 1 discovered during the 2016 refueling outage occurred despite PSEG appropriately implementing existing industry guidance. The inspectors concluded that it was not reasonably within PSEG's ability to foresee and correct baffle former bolts failures until the failures were discovered during the 2016 refueling outage and no performance deficiency exists. This URI is closed.

NRC Tracking Number: URI 05000272/2016002-01

Observations	71152 (3)

Unit 1, 13 steam generator tube leak during 2017 (Reviewed on January 31, 2018)

PSEG determined that the most probable cause of the primary-to-secondary side leak in steam generator 13 was wear due to a loose part, although a loose part was not located during PSEG's subsequent visual inspection. PSEG also determined that its foreign material exclusion program contained some weaknesses when compared to industry standards with regard to high risk systems and components.

PSEG conducted a thorough technical review of the leaking tube, which included advanced eddy current testing, internal visual inspections of the steam generator, and a secondary side pressure test. PSEG's extent of condition review, consisting of additional tube examinations, did not identify similar degradation in the other three steam generators. Corrective actions included in-situ pressure testing and plugging of the leaking tube, revising the foreign material exclusion procedure to align with industry standards, and performing additional training for supervisors and workers.

The inspectors performed an in-depth review of PSEG's root cause evaluation and corrective actions associated with NOTF 20779014 for identification of a leaking tube. The inspectors interviewed engineering staff and reviewed PSEG's maintenance activities and past operability regarding the leaking tube. The inspectors determined PSEG's overall response to the issue was commensurate with the safety significance, was timely, and included appropriate corrective actions.

However, during the review of WOs associated with the root cause, the inspectors identified multiple examples where PSEG staff were not documenting the completion of close-out cleanliness inspections for foreign material exclusion areas as required by the procedure MA-AA-716-008, "Foreign Material Exclusion Program." MA-AA-716-008 requires staff to perform a cleanliness inspection just before final system closure and document it in a separate attachment. The inspectors noted that the lack of documentation did not mean the inspections were missed; and in a few cases, there were details in the WO indicating that an inspection was performed, but did not have the supporting attachment.

This documentation issue associated with the foreign material control exclusion program was determined to be a violation of minor significance because there was no direct consequence of that deficiency and in accordance with IMC 0612, "Power Reactor Inspection Reports," is not subject to enforcement action in accordance with the NRC's Enforcement Policy. PSEG entered the inspectors' observations into the corrective action program as notification 20786580.

Observations	71152 (1)

Unit 1, 11 SW strainer anode failure on February 6, 2018

The inspectors reviewed WO 70194682, and determined the cause of the strainer trip was attributed to "a PM that was executed without replacing the anodes within the specified timeframe, as required by the Preventive Maintenance Plan." Additionally, the ERE documented that PSEG specified a change in the zinc anode insert material from carbon steel to stainless steel in 2014. During the extent of condition (EOC) review, as required by PIA-036, "Equipment Reliability Evaluation," Revision 1, PSEG identified that some stainless steel anode inserts were not installed during the performance of the last PM in 13, 22, 23, 25, and 26 SW strainers, and assigned WOs to replace all the carbon steel anode inserts with stainless steel. However, the inspectors identified that there was no evidence in the ERE that described whether the new WOs would be scheduled prior to the PM overdue dates, or if a PM deferral was performed, as required by WC-AA-111. PSEG captured this observation in NOTF 20792130, and was in the process of re-reviewing the EOC WOs with respect to the PM overdue dates at the close of the inspection period. The inspectors considered the incomplete EOC issue an observation, and not a performance deficiency. At the close of the inspection period, no additional anode inserts were discovered past their PM overdue date, and no SW strainers had failed to perform their required safety function as a results of any anode failures.

Failure to Establish Containment Integrity during Plant Startup			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000272/2018001-03 Closed	H.8 – Human Performance, Procedure Adherence	71153 (2)

The inspectors determined there was a self-revealing Green NCV of TS 6.8.1, "Procedures and Programs," when PSEG did not follow procedure S1.OP-SO.SG-0002, "Maintaining Steam Generators in Wet Layup," Revision 10, step 5.7.7L, to close the 14 SG blowdown manual nitrogen supply valves, 14GB47 and 14 GB48, prior to entry into MODE 4 on November 7, 2017, and MODE 3 on November 9, 2017. Specifically, 14 SG blowdown manual nitrogen supply valves were left open during startup transition from MODE 5 (Cold Shutdown) through MODE 3 (Hot Standby), which resulted in a steam leak into the Unit 1 auxiliary building (AB) through an actual open pathway upstream of the 14 SG blowdown containment isolation valve.

Description: On November 9, 2017, at 10:54 PM, with Unit 1 in MODE 3, the main control room received a fire alarm for the Unit 1 AB mechanical penetration area (MPA). Operators responded and reported no smoke or fire at 11:05 PM, but also reported a steam leak in area of the SG blow down lines. Operators subsequently determined the steam leak was associated with the 14 SG blowdown line, and entered primary containment to close the steam generator blowdown stop valve, 14BG3, and successfully isolated the leak at 11:14 PM. After isolating the steam leak, operators in the MPA identified a failed hose connection from a pipe fitting downstream of the opened 14GB47 and 14GB48 manual nitrogen supply valves, while the plant was heating up in MODE 3. Additionally, the 14GB47 and 14GB48 were located upstream of the SG blowdown automatic isolation valve, such that manual

closure of the 14GB47 and 14GB48 was required to satisfy the TS 1.7 definition of CONTAINMENT INTEGRITY. At 11:16 PM, operators closed the 14GB47 and 14GB48. Operators performed an extent of condition on the 11, 12, and 13 SG blowdown line nitrogen supply valves, and found all remaining valves in their required closed position.

PSEG entered this issue into the CAP under NOTF 20781774, performed a prompt investigation (PINV), and performed work group evaluation (WGE) 70197758. As part of the WGE, PSEG constructed a timeline of activities leading up to the steam leak. On November 5, 2017, with Unit 1 in MODE 5, valve 14GB47 was verified as locked closed during performance of the primary containment valve surveillance lineup in preparation to enter MODE 4 (Hot Shutdown). On November 6, 2017, at 4:16 AM, operators opened the 14GB47 and 14GB48 valves, IAW S1.OP-SO.SG-0002, step 5.7.7D, to support sparging with nitrogen bottle hose connections to 14 SG during wet layup conditions. Sparging was completed at 4:47 AM, and operators subsequently request chemistry sampling, IAW step 5.7.7I, to determine if additional sparging was required. At 12:20 PM, chemistry reported satisfactory sample results to the Unit 1 control room supervisor. Step 5.7.7L required several actions once sparging was completed with satisfactory chemistry results, including closure of the 14GB48 valve, locking closed the 14GB47 valve, and removal of the hose connection from the nitrogen supply line. Operations did not perform step 5.7.7L when 14 SG sparging was completed. On November 7 at 10:38 PM, Unit 1 entered MODE 4. On November 9 at 7:18 PM, Unit 1 entered MODE 3. On November 9 at 10:54 PM, the Unit 1 fire alarm actuated in response to the steam leak in the MPA.

PSEG WGE 70197758 determined the cause was attributed to a procedure deficiency because S1.OP-SO.SG-0002 did not require closure of the 14GB47 and 14GB48 valves prior to requesting chemistry sampling, and assigned corrective actions to revise the procedures for Unit 1 and Unit 2. PSEG determined this event was reportable under 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by plant TS, because the manual valves 14GB47 and 14GB48 were open, and were not closed to satisfy Primary CONTAINMENT INTEGRITY IAW TS 3.6.1.1, which is applicable in Modes 1, 2, 3 & 4, prior to transitioning from Mode 5 to Mode 4. Additionally, TS 3.0.4 was not complied with when Unit 1 transitioned from MODE 5 to MODE 3 with TS LCO 3.6.1.1 not met.

Corrective Action(s): PSEG took corrective action to close the 14GB47 and 14GB48 valves and restore TS compliance on November 9, 2017. Additionally, PSEG entered this issue in the CAP, and performed a PINV and WGE to evaluate the cause as discussed above.

Corrective Action References: WGE 70197758 and NOTF 20781774

Performance Assessment:

Performance Deficiency: The inspectors determined that not closing the 14 SG nitrogen supply valves following completion of SG sparging, IAW S1.OP-SO.SG-0002, step 5.7.7L, was a performance deficiency that was within PSEG's ability to foresee and correct, and should have been prevented.

Screening: The inspectors determined this issue was more than minor since it was associated with the configuration control attribute of the Barrier Integrity cornerstone, and adversely impacted its objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, 14 SG blowdown manual nitrogen supply valves were left open during startup transition from MODE 5 through MODE 3, such that containment integrity was not met, and

resulted in a steam leak into the Unit 1 AB through an actual open pathway upstream of the 14 SG blowdown CIV.

Significance: Because this finding involved operation during hot standby conditions (MODE 3) that are considered at-power per the SDP, this finding was screened using IMC 0609, Attachment 4 and Appendix A, Exhibit 3, "Barrier Integrity Screening Questions," which directed further screening IAW IMC 0609, Appendix H, "Containment Integrity Significance Determination Process." Additionally, because this finding involved operation during shutdown conditions (MODE 4), this finding was screened IAW IMC 0609, Appendix G, "Shutdown Operations SDP," which also required this finding to be screened IAW IMC 0609, Appendix H. Using Appendix H, the inspectors determined this finding was of very low safety significance, or Green, because this was a Type B finding (Section 4.0), involving isolation valves that were not connected to the RCS, as described in Table 4.1.

Cross-Cutting Aspect: The finding had a cross-cutting aspect in the area of Human, Performance, Procedure Adherence, in that individuals follow processes, procedures and work instructions. Specifically, PSEG did not follow procedure S1.OP-SO.SG-0002, "Maintaining Steam Generators in Wet Layup," Revision 10, step 5.7.7L, to close the 14 SG blowdown manual nitrogen supply valves following completion of nitrogen sparging to 14 SG. [H.8]

Enforcement:

Violation: TS 6.8.1, "Procedures and Programs," requires, in part, that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide (RG) 1.33, Revision 2. RG 1.33, Section 9.d, includes procedures for filling, draining and refilling steam generators. PSEG procedure S1.OP-SO.SG-0002, "Maintaining Steam Generators in Wet Layup," Revision 10, step 5.7.7L, requires closing the 14 SG blowdown manual nitrogen supply valves upon completion of nitrogen sparging.

TS LCO 3.6.1.1, "CONTAINMENT INTEGRITY," states, in part, that without primary CONTAINMENT INTEGRITY, restore CONTAINMENT INTEGRITY within one hour or be in at least Mode 3 within the next 6 hours and Mode 5 within the following 30 hours. TS 1.7 defines CONTAINMENT INTEGRITY as all penetrations required to be closed during accident conditions are either capable of being closed automatically, or otherwise closed by manual valves. TS 3.6.1.1 is applicable in operational MODES 1, 2, 3 and 4.

TS LCO 3.0.4, "Applicability," states, in part, that when a limiting condition for operation is not met, entry into a Mode or other specified condition in the Applicability shall only be made when the associated Actions to be entered permit continued operation in the Mode or other specified condition in the Applicability for an unlimited period of time; or after performance of a risk assessment addressing inoperable systems and components and establishment of RMAs; or when allowance is otherwise stated.

Contrary to the above, PSEG did not perform step 5.7.7L of S1.OP-SO.SG-0002 to close the 14 SG blowdown manual nitrogen supply valves, following completion of nitrogen sparging, prior to entry into MODE 4 at 23:38 November 7, 2017, and MODE 3 at 19:18 on November 9, 2017. Consequently, the sparging hose connections upstream of the 14 SG blowdown automatic containment isolation valve over-pressurized during plant heat-up, which caused steam leakage into the Unit 1 AB and actuated a fire alarm. Thus TS 3.0.4 was not met because containment integrity did not exist in the Modes 3 or 4.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Observations	71153 (1)

Licensee Event Report 05000272/2016-001-00: Unanalyzed Condition Due to Degraded Reactor Baffle to Former Bolts on February 26, 2018

In May 2016, PSEG staff performed scheduled visual examinations of the Salem Unit 1 reactor vessel internal components during the 1R24 refueling outage. As a result of visual anomalies observed on the baffle-former bolts, PSEG performed ultrasonic testing to determine the extent of condition of the observed degradation of the baffle-former bolting. PSEG's examinations resulted in the discovery of a greater than expected amount of degraded baffle-former bolts. PSEG determined that the number and location of baffle-former bolts did not meet the acceptance criteria provided in the pre-outage bolt pattern analysis to support plant startup, and as a result, PSEG reported this as an unanalyzed condition to the NRC as Event Notification No. 51902 on May 3, 2016 and Licensee Event Report 272/2016-001-00, "Unanalyzed Condition Due to Degraded Reactor Baffle to Former Bolts" on July 5, 2016. The inspectors performed inspections documented in Section 4OA2 of this report and in Sections 1R08 and 4OA2 of NRC Inspection Report 05000272/2016002 as a follow-up to the event. The inspectors did not identify any findings or violations of NRC requirements during the review of this Licensee Event Report. This Licensee Event Report is closed.

EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed that proprietary information was controlled to protect from public disclosure.

- On February 1, the inspectors presented the Problem Identification & Resolution (PI&R) annual sample inspection results on the steam generator tube leak to Harry Balian (Site Regulatory Compliance.)

- On February 28, the inspectors presented the PI&R annual sample results on the baffle bolts to Tom Cachaza (Site Regulatory Compliance).

- On March 2, the inspectors presented the radiation safety inspection results to Mr. Paul Martitz, Radiation protection Manager, and other members of the PSEG staff.

- On April 19, the inspectors presented the quarterly resident inspector inspection results to Mr. Charles McFeaters, Salem Vice President, and other members of the PSEG staff.

DOCUMENTS REVIEWED

71111.01 - Adverse Weather Protection

Condition Reports (*initiated in response to inspection)
20786129*
20786130*

71111.04 - Equipment Alignment

Procedures
CY-AB-140-410, Hope Creek Station Diesel Fuel Oil Testing Program, Revision 8
EM-HC-100-1000, Hope Creek Final Integrated Plan for Beyond Design Basis FLEX Mitigating Strategies, Revision 1
EM-SA-100-1000, Salem Final Integrated Plan for Beyond Design Basis FLEX Mitigating Strategies, Revision 1
ER-AP-333, Pressurized Water Reactor Vessel Internals Aging Management Program, Revision 1
HC.MD-GP.ZZ-0014, Single Cell Battery Charging, Replacement and Jumpering, Revision 26
MA-AA-716-004, Conduct of Troubleshooting, Revision 14
MA-AA-716-011, Work Execution and Close Out, Revision 13
MA-AA-716-210, Preventive Maintenance Program, Revisions 10 and 11
MA-AA-716-210-1005, Predefine Change Processing, Revision 4
MA-AA-726-101, Stored Battery Cell Inspection, Charging and Performance Discharging, Revision 7
OP-HC-108-115-1001, Operability Assessment and Equipment Control Program, Revision 36
OP-SA-108-115-1001, Operability Assessment and Equipment Control Program, Revision 10 Review, and Post-Job Brief, Revision 9
SC.OP-LB.DF-0001, Salem Diesel Fuel Oil Testing Program, Revision 3

Condition Reports (*initiated in response to inspection)

20772899	20787862	20787881	20791974*
20783115	20787863	20787882	20791977
20787557	20787879	20787883	
20787861	20787880	20787884	

Maintenance Orders/Work Orders
60137462
60138024
80122006

71111.05 - Fire Protection

Procedures
SC.OP-PT.ZZ-0002, Station Preparation for Seasonal Conditions, Revision 15

Condition Reports (*initiated in response to inspection)

20690706	20784560	20788156*	20785915
20752963	20784785	20785533	20791406
20758732	20786498*	20785913	
20773239	20787393	20785914	

Maintenance Orders/Work Orders
70176931
70195842

Miscellaneous
NRC Memo from Sunil Weerakkody to John Hannon: Resolution of Questions Concerning Compliance with Section III.L.2 of Appendix R, dated February 10, 2005
S-C-ZZ-NDC-1315, Reactor Cooldown Time for a Postulated Appendix R Fire, Revision 0
S-C-ZZ-NEE-0839, Time Analysis of Alternate Shutdown Capability for an Appendix R Fire Scenario, Revision 0
S1.OP-AB.CR-0002, Control Room Evacuation due to Fire in the Control Room, Relay Room, 460/230V Switchgear Room, or 4kV Switchgear Room, Revision 28
SC.ER-PS.FP-0001-A3, Programmatic Standard for Fire Protection, Appendix 3: Salem Fire Protection Report – Safe Shutdown Analysis, Revision 0
SC.ER-PS.FP-0001-A3 (003), Programmatic Standard for Fire Protection, Appendix 3: Salem Fire Protection Report – Safe Shutdown Analysis, Volume 3: Safety Shutdown Manual Action Feasibility Assessment, Revision 1

71111.06 - Flood Protection Measures

Condition Reports (*initiated in response to inspection)

20788154*	20788301*	30296478	70197998

71111.11 - Licensed Operator Requalification Program

Condition Reports (*initiated in response to inspection)
20787613*

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Condition Reports (*initiated in response to inspection)

20786195	20787888*	20788074*	20789818*
20786322*	20788173*	20788804*	

Miscellaneous
60137880
VTD 313968
DWGs
613450, No. 1 Unit, Rod Control Shutdown Bank B Rod 2SB2 Position, Revision 2

Procedures
S1.OP-AB.ROD-0004, Rod Position Indication Failure, Revision 7
SC.RE-RA.RCS-0017, RCCA Position Verification, Revision 5

71111.15 - Operability Determinations and Functionality Assessments

Condition Reports (*initiated in response to inspection)

20784458	20787909	20789124*
20787677*	20789367*	20789125*

Maintenance Orders/Work Orders
60137581

Miscellaneous
Breach 17-074
GL 2003-01
RG 1.196
RG 1.197

71111.18 - Plant Modifications

Condition Reports (*initiated in response to inspection)
20782578*
20780080

Miscellaneous
80111425, 2R19A-D Detectors – Replacement of the RD-53 detectors with High Temp RD 53-50HPHT

71111.19 - Post-Maintenance Testing

Condition Reports (*initiated in response to inspection)

20736593	20785819	20786620	20787762
20780807	20786121	20786795*	20789350
20785397	20786157	20786867	
20785767*	20786230	20787353	

Maintenance Orders/Work Orders

40044105	60137745	60138042
60137646	60137844	

Miscellaneous
240131, Solid State Reactor Protection Train A De-mutiplexer, Revision 4
MA-AA-716-012, Post Maintenance Testing, Revision 20
MA-AA-734-461, Bolt Torquing and Bolting Sequence Guidelines, Revision 2
S2.OP-SO.CBV-0001, Containment Ventilation Operation, Revision 33

71111.22 - Surveillance Testing

Procedures
S2.OP-SO.RC-0004, Identifying and Measuring Leakage, Revision 16
S2.OP-ST.RC-0008, Reactor Coolant System Water Inventory Balance, Revision 40

Condition Reports (*initiated in response to inspection)

20765696	20784445	20786518*	20787305
20784364	20784538	20786093*	20792036*

Miscellaneous
S2.MD-FT.4KV-0003, ESFAS Instrumentation Monthly Functional Test 2C 4KV Vital Bus Undervoltage, Revision 34
S1.OP-ST.DG-0002, 1B Diesel Generator Surveillance Test, Revision 49
50201198
50200012
50199347
50200736

71124.01 - Radiological Hazard Assessment and Exposure Controls

Miscellaneous
RP-AA-460, Rev. 18, Control for High and Very High Radiation Areas
RP-AA-463, Rev. 4, High Radiation Area Key Control

711124.02- Occupational As Low As Reasonably Achievable (ALARA) Planning and Controls

Miscellaneous
RP-AA-401, Rev 14, ALARA Program
Salem Unit 1 25th ALARA Outage Report

71151 - Performance Indicator Verification

Condition Reports (*initiated in response to inspection)
20787726*

71152 - Problem Identification and Resolution

Procedures
ER-AP-333, Pressurized Water Reactor Vessel Internals Aging Management Program, Revision 1
LS-AA-125-1001, Cause Analysis, Revision 11
MA-AA-716-011, Work Execution and Close Out, Revision 13
MA-AA-716-010-1000, Maintenance Planning, Revision 6
MA-AA-716-210, Preventive Maintenance Program, Revisions 10 and 11
MA-AA-716-210-1005, Predefine Change Processing, Revision 4
WC-AA-111, Predefine Process, Revision 8

Condition Reports (*initiated in response to inspection)

20676687	20676688	20727535	20766832
20770925	20772312	20772313	20772314
20777124	20774649	20774650	20779014
20784404*	20784848	20784849	20787879
20785334*	20785418*	20785600*	20785638*
20785934*	20786230*	20786247	20786580*
20786730*	20786730*	20786868*	20787054*
20787343*	20787503*	20788304*	20788437*
20788535*	20789370*	20789520*	20789629*
20789629*	20789958*	20789975*	20790536*
20790638*	20790925*	20790902*	20792130*

Maintenance Orders/Work Orders
30203856 30215207 70186481 70194692
70197357

Miscellaneous
Maintenance Plan S1203529
MRP-227-A, Pressurized Water Reactor Internals Inspection and Evaluation Guidelines, Revision 0
MRP-425, Hot Cell Testing of Baffle-to-Former Bolts Removed from U.S. Pressurized Water Reactors, dated December 2017
LTR-RIAM-16-38, Salem Unit 1 Real-Time Analysis results for LOCA/Seismic Dynamic Analysis and Fuel Grid Impact Analysis, Revision 0, dated May 3, 2016
70186481, Root Cause Evaluation: Unexpected High Number of Baffle-Former Bolt Failures, Revision 0
Long Term Asset Management Strategy: PWR Reactor Vessel Internals, dated March 13, 2017
NSAL-16-1, Baffle-Former Bolts, Revision 1

71153 - Follow-Up of Events and Notices of Enforcement Discretion

Procedures
OP-SA-108-115-1001, Operability Assessment and Equipment Control Program, Revision 10
PIA-004, Work Group Evaluation, Revision 4
S1.OP-SO.SG-0002, Maintaining Steam Generations in Wet Layup, Revision 10
S1.OP-ST.CAN-0001, Primary Containment Valves Monthly, Revision 13

Condition Reports (*initiated in response to inspection)
20780477 20780478 20780534 20781771
20781774 20784190 20784521 20788087
20788092

Maintenance Orders/Work Orders
70197751 70197758

Drawings
205225, Unit 1 Steam Generator Drains and Blowdown, Sheet 1, Revision 45
205225, Unit 1 Steam Generator Drains and Blowdown, Sheet 2, Revision 55

Miscellaneous
70186481, Root Cause Evaluation: Unexpected High Number of Baffle-Former Bolt Failures, Revision 0
ER-SA-380-1005, Attachment 2, Components Exempt from Appendix J Testing, Revision 1
LER 272/2016-001-000, Unanalyzed Condition Due to Degraded Reactor Baffle to Former Bolts, dated July 5, 2016
MRP-425, Hot Cell Testing of Baffle-to-Former Bolts Removed from U.S. Pressurized Water Reactors, dated December 2017
S-C-VAR-MEE-1125, Review of Containment Isolation Valves – Salem, Revision 1
Standard Review Plan 6.2.4, Containment Isolation System