UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

July 25, 2013

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

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 – NRC INTEGRATED INSPECTION REPORT 05000272/2013003 AND 05000311/2013003

Dear Mr. Joyce:

On June 30, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Salem Nuclear Generating Station, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on July 18, 2013, with Mr. Wagner, Plant Manager of Salem Operations, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents two NRC-identified and four self-revealing findings of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. Additionally, a licensee-identified violation, which was determined to be of very low safety significance, is listed in this report. However, because of the very low safety significance, and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs), consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Salem Nuclear Generating Station. In addition, if you disagree with the cross-cutting aspect assigned to any finding 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 Regional Administrator, Region I, and the NRC Resident Inspector at Salem Nuclear Generating Station.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records component of the NRC's Agencywide Documents Access Management System (ADAMS). ADAMS is accessible from the NRC website at http://www.nrc.gov/reading-rm/adams.htmL (the Public Electronic Reading Room).

Sincerely,

/RA Richard S. Barkley Acting for/

Glenn T. Dentel, Chief
Reactor Projects Branch 3
Division of Reactor Projects

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

Enclosure: Inspection Report 05000272/2013003 and 05000311/2013003
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.:	50-272, 50-311
License Nos.:	DPR-70, DPR-75
Report No.:	05000272/2013003 and 05000311/2013003
Licensee:	PSEG Nuclear LLC (PSEG)
Facility:	Salem Nuclear Generating Station, Units 1 and 2
Location:	P.O. Box 236 Hancocks Bridge, NJ 08038
Dates:	April 1, 2013 through June 30, 2013
Inspectors:	J. Hawkins, Acting Senior Resident Inspector E. Bonney, Acting Senior Resident Inspector P. McKenna, Resident Inspector R. Rolph, Acting Resident Inspector F. Arner, Senior Reactor Engineer R. Barkley, Senior Project Engineer M. Draxton, Project Engineer M. Modes, Senior Reactor Inspector N. Nimitz, Senior Health Physicist M. Orr, Reactor Inspector
Approved By:	Glenn T. Dentel, Chief Reactor Projects Branch 3 Division of Reactor Projects

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SUMMARY

IR 05000272/2013003, 05000311/2013003; 04/01/2013 - 06/30/2013; Salem Nuclear Generating Station Units 1 and 2; Equipment Alignment, Maintenance Risk Assessment and Emergent Work Control, Operability Determinations and Functionality Assessments, Refueling and Other Outage Activities, Radiological Hazard Assessment and Exposure Controls, and Follow-Up of Events and Notices of Enforcement Discretion.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Inspectors identified six non-cited violations (NCVs) and one licensee-identified violation of very low safety significance (Green). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP), dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Components Within Cross-Cutting Areas," dated October 28, 2011. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated January 28, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Initiating Events

- Green. A self revealing NCV of Technical Specification (TS) 6.8.1 "Procedure and Programs," resulted from operators' failure to implement the loss of condenser vacuum procedure. Specifically, operators failed to follow S1.OP-AB.COND-0001, "Loss of Main Condenser Vacuum," which directed closure of the main steam isolation valves (MSIVs). This resulted in the inability to potentially recover the condenser as a heat sink, after the loss of circulating water (CW) pumps initiator was recovered, due to the actuation of the 11 low pressure (LP) turbine shell rupture disk. Corrective actions from the cause evaluation include developing additional abnormal operating procedure guidance to address a loss of all CW pumps, and designing simulator training scenarios to focus on secondary plant stabilization following reactor and turbine trips.

  The performance deficiency (PD) was determined to be more than minor because it was associated with the human performance attribute of the initiating events cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The finding was considered associated with the initiating events cornerstone since it occurred during recovery actions after the reactor trip. The finding was determined to be of very low safety significance (Green) per IMC 0609, "Significance Determination Process (SDP)," Appendix A, Exhibit 1 "Initiating Events," Section B, "Transient Initiators," because the PD did not cause both a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. Specifically, the PD occurred after the reactor trip and resulted in the loss of one system (main condenser) of a number of available mitigation systems used to transition the plant to a stable shutdown condition. The PD did not cause the initiating event of a loss of condenser heat sink, but instead it only affected the ability to potentially recover the heat sink after CW was restored. This finding has a cross-cutting aspect in the area of Human Performance, Resources, in that PSEG did not ensure that the crew was skilled in secondary plant stabilization and recovery. Specifically, PSEG did not ensure that the training program previously focused on the secondary plant stabilization and / or recovery post trip. [H.2(b)] (Section 4OA3)

Cornerstone: Mitigating Systems

- Green. A self revealing NCV of Salem TS 6.8.4.j, "Inservice Testing (IST)," that implements the IST program for American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components in accordance with the ASME Operations and Maintenance (OM) code was identified. Specifically, the opening stroke time for a Unit 2 service water (SW) accumulator discharge valve (22SW535) exceeded the IST acceptance criteria of 1.0 seconds on four occasions during the 92 day test interval, after the acceptance criteria was incorrectly changed on December 21, 2010. The PSEG corrective action for the IST results not meeting the acceptance criteria was to perform an engineering evaluation which reduced the margin of the SW pressure decrease in the SW system downstream of the containment fan cooling units (CFCUs) while changing the IST 45 degree opening stroke time to 1.25 seconds. PSEG also entered this issue into their corrective action program (CAP) under Notification 20607549.

  The PD was determined to be more than minor because it is similar to IMC 0612, Appendix E, Example 2.a, in that, in the performance of reviewing a completed IST, it was discovered that the acceptance criteria was incorrect and that the recorded stroke time of 22SW535 exceeded the correct acceptance criteria to meet action range limits. The PD is also associated with the equipment performance attribute of the mitigating systems cornerstone, and it adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the 45 degree opening time of 22SW535 was greater than its acceptance criteria of 1.0 seconds to meet the TS 6.8.4.j, "IST Program," requirements. The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations (IMC 0609A)." The inspectors determined that the finding was of very low safety significance (Green) because the deficiency did not affect the design or qualification of the SW system and it did not represent a loss of system or train safety function. This finding has a cross-cutting aspect in the area of Human Performance, Resources, because PSEG did not ensure that complete, accurate, and up-to-date design documentation, procedures, and work packages. Specifically, PSEG made a non-conservative revision to the IST acceptance criteria to the SW accumulator discharge valves without evaluating this change was adequate to assure nuclear safety. [H.2(c)] (Section 1R15)

- Green. The inspectors identified an NCV of 10 CFR 50, Appendix B, Criterion V, "Procedures," because PSEG did not ensure adequate separation was maintained between temporary scaffolding and safety-related equipment. Specifically, the inspectors identified numerous scaffolds installed in the plant with less than the minimum standoff distance to safety-related equipment specified in PSEG procedures and no engineering evaluation to support these deviations. Following inspector identification of the issue, PSEG performed independent walkdowns of all scaffolding and entered all discrepancies into their CAP. All discrepancies were corrected and assessed for any potential impact to the operability or functionality of the system and PSEG determined that there was no loss or degradation of equipment or function specifically designed to mitigate a seismic event. PSEG also initiated an apparent cause evaluation (ACE 70152874) on numerous scaffolding issues identified by the inspectors and PSEG Nuclear Oversight (NOS) personnel.

  This PD was considered more than minor because it affected the protection against external factors attribute of the mitigating systems cornerstone and its objective to ensure the

availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, PSEG routinely did not evaluate scaffold installations when insufficient separation to safety-related equipment was provided. Additionally, it was similar to example 4.a in IMC 0612, Appendix E, "Examples of Minor Issues," which states that the issue of failing to appropriately evaluate scaffold installation as required by procedures is more than minor if the licensee routinely failed to perform engineering evaluations. The issue was evaluated in accordance with IMC 0609, Appendix A, "The SDP for Findings At-Power," and determined to be of very low safety significance (Green) since it did not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic event. This finding has a cross-cutting aspect in the area of Human Performance, Work Practices, because PSEG did not ensure that personnel work practices support human performance. Specifically, PSEG personnel did not follow scaffold installation procedures when they routinely installed scaffold within the allowable clearance of safety-related equipment without an engineering evaluation. [H.4(b)] (Section 1R20)

Cornerstone: Barrier Integrity

- Green. The inspectors identified an NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," associated with PSEG failing to adequately trend an adverse condition and initiate effective corrective actions to address declining performance. Specifically, PSEG did not take adequate corrective actions to address an adverse trend in radiation monitor channel spiking caused by defective detector foil. As a result of these ineffective corrective actions, on April 20, 2013, a spike of the 2RIB channel 2 radiation monitor (2RIB-2) unintentionally resulted in an unanalyzed post-accident dose analysis condition for the Salem common control room (CR). PSEG has entered this issue into their CAP as Notification 70154084.

  The PD was determined to be more than minor because it affected the Human Performance attribute of the barrier integrity cornerstone to maintain the radiological barrier functionality of the CR post-accident. The PD was also similar to IMC 0612, Appendix E, example 3.i, in that, the CR post-accident dose analysis calculation was required to be reperformed by PSEG to assure the post-accident dose analysis limits were not exceeded. The finding is of very low safety significance (Green) per IMC 0609, Attachment 4, "Phase 1, Appendix A, Exhibit 3 – Barrier Integrity Screening Questions," because it only represented a degradation of the radiological barrier function provided for the control room. The finding had a cross-cutting aspect in the area of Problem Identification and Resolution (PI&R), CAP, because PSEG did not adequately trend and assess information from the CAP to identify programmatic and common cause problems. Specifically, PSEG did not take adequate corrective actions to address an adverse trend in the 2R1B-2 detector foil replacement and as a result of these ineffective corrective actions, on April 20, 2013, a spike of the radiation monitor unintentionally resulted in an unanalyzed post-accident dose analysis condition for the Salem common CR. [P.1(b)] (Section 1R04)

- Green. A self-revealing NCV of Unit 1 of 10 CFR Part 50, Appendix B, Criterion VIII, "Identification and Control of Materials, Parts, and Components," because PSEG did not prevent the installation and use of incorrect components. Specifically, PSEG installed an incorrect bladder that was being used as a substitution component for establishing adequate containment closure during refueling operations. On May 2, 2013, while serving as a credited containment boundary, the installed bladder failed, causing Unit 1 to suspend fuel movements during refueling operations and enter TS 3.9.4 for "Containment Building Penetrations."

The PD was determined to be more than minor because it affected the configuration control attribute of the barrier integrity cornerstone to provide reasonable assurance that physical design barriers, containment boundaries, are preserved and protect the public from radionuclide releases caused by accidents or events. This finding is also similar to IMC 0612, Appendix E, example 5.c, in that, an incorrect and inadequate part was installed and placed in service for establishing containment closure during refueling operations. The finding is of very low safety significance (Green) per 0609 Appendix G, "Shutdown Operations SDP," Figure 1 and Attachment 1, Checklist 4, "Pressurized Water Reactor (PWR) Refueling Operation: RCS Level >23' or PWR Shutdown Operation with Time to Boil >2 hours and Inventory in the Pressurizer," because it did not require a qualitative assessment and although this issue created a direct pathway from the containment atmosphere to the mechanical penetration area, invalidating PSEG's credited containment closure boundaries during refueling operations, it did not increase the likelihood of a loss of reactor coolant system inventory or degrade the licensee's ability to terminate a leak path or recover decay heat removal once it is lost. The finding had a cross-cutting aspect in the area of Human Performance, Resources, in that, PSEG did not ensure that complete, accurate and up-to-date design documentation, procedures, and work packages, and correct labeling of components. Specifically, PSEG failed to prevent the installation and use of incorrect components credited for containment closure during refueling operations because the incorrect part number was used in the procurement process and work order(WO). [H.2(c)] (Section 1R13)

Cornerstone: Occupational Radiation Safety

- Green. The inspectors identified a self-revealing finding of very low safety significance associated with failure to implement TS 6.8 procedures. Specifically, the inspectors identified that PSEG did not implement radiation protection procedure requirements associated with survey and access control to the Unit 2 reactor cavity on November 7, 2012, resulting in lack of identification and control of a TS 6.12, "Locked High Radiation Area (LHRA)." PSEG entered this issue into their CAP as Notification 20582871.

  The failure to implement TS required radiation protection procedures is a PD. The PD was determined to be more than minor because it was related to the programs and process attribute of the occupational radiation safety cornerstone, and adversely affected the cornerstone objective to ensure adequate protection of worker health and safety from exposure to radiation from radioactive material during routine reactor operation. Further, if left uncorrected, the PD had the potential to lead to a more significant safety concern if the LHRA was undetected. The finding was assessed using IMC 0609, Appendix C, 2 Enclosure, "Occupational Radiation Safety SDP," dated August 19, 2008, and was determined to be of very low safety significance (Green) because it was not related to as low as reasonably achievable (ALARA), did not result in an overexposure or a substantial potential for overexposure, and did not compromise PSEG's ability to assess dose. This finding has a cross-cutting aspect in the area of Human Performance, Work Control. Specifically, PSEG did not effectively coordinate this work activity by incorporating actions to address the impact of the work on different job activities, and the need for work groups to maintain interfaces and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance. [H.3(b)] (Section 2RS1)

Other Findings

A finding of very low safety significance that was identified by PSEG was reviewed by the inspectors. Corrective actions taken or planned by PSEG have been entered into PSEG's CAP. This violation and corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent power and operated at full power until April 14, 2013, when operators commenced a shutdown for a planned refueling and maintenance outage (S1R22). Following the completion of refueling and maintenance activities, operators commenced a reactor startup on May 22, 2013. Operators returned the unit to 100 percent power on May 30, 2013, and remained at or near 100 percent power for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power and remained at or near 100 percent power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 2 samples)

.1 Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors reviewed the actions completed by PSEG to prepare for major thunderstorms and a predicted Derecho (wind storm) between June 12 and 15, 2013. The inspectors evaluated PSEG's implementation of severe weather and procedures and compensatory measures for extreme wind speed and rain. The inspectors verified that adequate operating staffing was onsite for the predicted conditions. The inspectors walked down risk significant structures, systems, and components (SSCs) to ensure that weather related conditions did not adversely impact SSC operability. In addition, the inspectors walked down the entire site to ensure that equipment and temporary structures were firmly secured so as to not create hazards during the predicted high winds. The inspectors performed detailed walkdowns of the SW intake structure, emergency diesel generators (EDGs), the main turbine and generators, and all outside equipment laydown areas. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

.2 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors performed a review of PSEG's readiness for the onset of seasonal high temperatures. The review focused on SW, component cooling water (CCW), and the EDGs. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), TSs, control room logs, and the CAP to determine what temperatures or other seasonal weather could challenge these systems, and to ensure PSEG personnel had adequately prepared for these challenges. The inspectors reviewed station procedures, including

PSEG's seasonal weather preparation procedure and applicable operating procedures. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during hot weather conditions.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04Q – 3 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 2 refueling water storage tank during the week of April 8, 2013
- Units 1 and 2, control area ventilation (CAV) system due to auto swap from maintenance mode on April 20, 2013
- Unit 1 auxiliary feedwater (AFW) prior to ascending to Mode 4 on May 10, 2013

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, TSs, WOs, notifications, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted system performance of their intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether PSEG staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

b. Findings

Introduction. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," associated with PSEG failing to adequately trend an adverse condition and initiate effective corrective actions to address declining performance. Specifically, PSEG did not take adequate corrective actions to address an adverse trend in radiation monitor channel spiking caused by a defective detector foil. As a result of these ineffective corrective actions, on April 20, 2013, a spike of 2RIB-2 unintentionally resulted in an unanalyzed post-accident dose analysis condition for the Salem common CR.

Description. Each unit at Salem has separate ventilation intakes that supply the common CR emergency air conditioning system (CREACS). These ventilation intakes contain two radiation monitor detector channels providing input to each unit (1R1B-1 and 2R1B-2 for Unit 1; 1R1B-2 and 2R1B-1 for Unit 2). On a high radiation signal these channels will provide a signal (one out of two logic) to initiate CREACS to realign the

ventilation system to accident pressurization mode (APM). When in APM, the accident unit's emergency air intake dampers close and the non-accident unit's emergency air intake dampers open. These dampers are prevented from being realigned to respond to a second accident on the non-accident unit until the initial accident unit signal is reset.

At 4:22 a.m. on April 20, 2013, while refueling Unit 1 and at 100 percent power on Unit 2, 2R1B-2 in the Unit 1 CR intake spiked above the high radiation set-point, causing CREACS to swap to APM. The Unit 1 emergency air intake dampers closed, and the Unit 2 emergency air intake dampers opened per system design. The spike on the 2R1B-2 resulted in the Unit 2 emergency air intake dampers receiving a blocking signal to remain open until operators validated and reset the signal, approximately 35 minutes later. PSEG determined 2R1B-2 spiked due to a failed detector foil.

PSEG's existing CR post-accident dose analysis did not analyze this CREACS alignment for a worst case design-basis accident (DBA) on Unit 2 since it did not consider invalid radiation monitor actuations. The operating shift entered the applicable TSs for both units and restored the CR ventilation back to an analyzed condition.

PSEG initially documented in Event Report 48949 that with only one train of CREACS operable, the post-accident dose analysis indicates that the requirements of General Design Criteria (GDC) 19 can only be met during a worst case DBA if the Unit 2 CREACS intake dampers are closed and the Unit 1 CREACS intake dampers are open. Therefore, until the CREACS intake dampers were reset and realigned, Unit 2 would not have been able to mitigate the consequences of an accident.

After the event on April 20, 2013, PSEG performed a detailed Technical Evaluation (TE 70152756-0010) to estimate the radiological consequences of a DBA occurring at Unit 2 with the Unit 2 emergency air intake dampers being initially open and manual operator action required to align the intake to Unit 1. The TE determined that the failed condition of the 2R1B Channel 2 radiation monitor causing the adverse intake alignment with the Unit 2 intake dampers blocked open would have adversely affected the calculated CR post-accident dose analysis, but the CR design dose limits would not have been exceeded. The estimated increase in the CR dose from this adverse intake alignment was 0.03 rem, which PSEG determined would not result in more than a minimal increase in the consequences of an accident and would not exceed the requirements of GDC 19. PSEG retracted Event Report 48949 on June 13, 2013, because their evaluation determined CREACS would have been capable of performing its accident mitigation function.

In response to this issue, the inspectors reviewed PSEG's TE, the calculated post-accident dose analysis, previous causal evaluations, and CAP database to determine the adequacy of PSEG's response to the issue.

The inspectors noted that on multiple occasions since 2003, failures of individual radiation monitor channels in the CREACS system have caused the system to realign to APM. Since April 25, 2011, the 2R1B-2 detector foil has been replaced six times. The inspectors noted that the frequency of the foil replacement on 2R1B-2 has been approximately every six months due to foil failures even though the preventative maintenance frequency to replace the foil on the detector remains unchanged at an interval of 18 months.
PSEG procedures for the CAP, LS-AA-125, and Coding and Analysis Manual, LS-AA-125-1005, require trending adverse conditions and ensuring actions are initiated to

correct declining performance. PSEG's trending analysis is predictive, allowing the site to proactively detect adverse trends, evaluate the issues and resolve vulnerabilities at a low level before major events, plant upsets or quality problems occur.

Contrary to these CAP procedures, the inspectors determined that PSEG did not take adequate corrective actions to address an adverse trend in the replacement frequency of the 2R1B-2 detector foil. As a result of these ineffective corrective actions, on April 20, 2013, a spike of the 2RIB-2 unintentionally resulted in an unanalyzed post-accident dose analysis condition for the Salem common CR, which required PSEG to reanalyze the post-accident dose analysis to ensure the CR design dose limits would not have been exceeded. PSEG has entered this issue into their CAP as Notification 70154084.

Analysis. PSEG failing to adequately trend an adverse condition and initiate effective correct actions to address declining performance in the 2R1B-2 detector foil replacement was a PD. The PD was determined to be more than minor because it affected the Human Performance attribute of the barrier integrity cornerstone to maintain the radiological barrier functionality of the CR post-accident. The PD was also similar to IMC 0612, Appendix E, example 3.i, in that, the CR post-accident dose analysis calculation was required to be reperformed by PSEG to assure the post-accident dose analysis limits were not exceeded. The finding is of very low safety significance (Green) per IMC 0609, Attachment 4, "Phase 1, Appendix A Exhibit 3 – Barrier Integrity Screening Questions," because it only represented a degradation of the radiological barrier function provided for the control room.

The finding had a cross-cutting aspect in the area of PI&R, CAP, because PSEG did not adequately trend and assess information from the CAP to identify programmatic and common cause problems. Specifically, PSEG did not take adequate corrective actions to address an adverse trend in the 2R1B-2 detector foil replacement and as a result of these ineffective corrective actions, on April 20, 2013, a spike of the 2RIB-2 radiation monitor unintentionally resulted in an unanalyzed post-accident dose analysis condition for the Salem common CR. [P.1(b)].

Enforcement. 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected." Contrary to the above, PSEG did not take adequate corrective actions to address an adverse trend in the 2R1B-2 detector foil replacement and as a result of these ineffective corrective actions, on April 20, 2013, a spike of the radiation monitor unintentionally resulted in an unanalyzed post-accident dose analysis condition for the Salem common CR. Because this finding is of very low safety significance and has been entered into the CAP as Notification 70154084, this violation is being treated as a NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000272/2013003-01 Inadequate Corrective Actions to Address an Adverse Trend in the 2R1B-2 Radiation Monitor)**

.2 Full System Walkdown (71111.04S – 1 sample)

a. Inspection Scope

On May 6 through May 10, 2013, the inspectors performed a complete system walkdown of accessible portions of the Unit 1 11 nuclear SW header, to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures,

surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, hangar and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related condition reports and WOs to ensure PSEG appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire Protection

Resident Inspector Quarterly Walkdowns (71111.05Q – 5 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that PSEG controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service (OOS), degraded or inoperable fire protection equipment, as applicable, in accordance with procedures and discussed with station personnel the repair plans for degraded equipment.

- Unit 1 containment on April 23-24, 2013
- Unit 1 inner piping penetration area & chiller room, elevation 100', on April 25, 2013
- Site fire pump house on May 9, 2013
- Unit 2 CVCS holdup tank area, elevation 64', on June 12, 2013
- Unit 1 switchgear (SWGR), elevation 84', on June 25, 2013

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to verify that PSEG's flooding mitigation plans and equipment for the Unit 2, AFW pump and letdown heat exchanger (HX) areas are consistent with the design requirements and the risk analysis assumptions. The inspectors also reviewed the CAP to determine if

PSEG identified and corrected flooding problems and whether operator actions for coping with flooding were adequate. The inspectors focused on the Unit 2 AFW pump and letdown HX areas to verify the adequacy of equipment seals located below the flood line, floor and water penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07A – 2 samples)

a. Inspection Scope

The inspectors reviewed the Unit 2 residual heat removal (RHR) room cooler due to Notification 20602826 for valve 21SW153 stroke issues on April 23, 2013. The inspectors reviewed the design basis for the component and verified PSEG's commitments to NRC Generic Letter 89-13. The inspectors discussed the results of the most recent inspection with engineering staff and reviewed pictures of the as-found and as-left conditions. The inspectors verified that PSEG initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the HX did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R08 In-service Inspection Activities (71111.08P – 1 sample)

a. Inspection Scope

From April 15 - 29, 2013, the inspectors conducted an inspection of the PSEG's in-service inspection activities during the Salem Nuclear Generation Station, Unit 1 refueling outage. Inspection samples were chosen based on the procedure objectives and where degradation would result in a significant increase in risk. The inspectors reviewed documentation, and interviewed licensee personnel to verify that the nondestructive examination (NDE) activities, performed as part of the Salem Nuclear Generation Station Unit 1 in-service inspection program, were conducted in accordance with the requirements of the ASME Boiler and Pressure Vessel Code Section XI, 1998 Edition.

NDE Activities and Welding Activities (IMC Section 02.01)

The inspectors performed a review of NDE activities and reviewed records of nondestructive testing as listed below.

ASME Code Required Examinations:

The inspectors reviewed procedures, qualification records, and reports for ultrasonic inspections requiring ASME Boiler and Pressure Vessel Code Section XI, 1998 Edition, Appendix VIII, qualification. The ultrasonic procedure 54-ISI-132-011, "Manual

Ultrasonic Examination of Vessel Nozzle Inner Radius Regions," used to inspect the "pressurizer relief nozzle inside radiused section" (WO 50145481 - Summary 007000), and "spray nozzle inside radiused section" (WO 50145481 - Summary 007400) was compared against the requirements of the Code. Code reconciliation, for the procedures used at Salem Nuclear Generation Station Unit 1, were verified using the Electric Power Research Institute (EPRI) Report 1026510, "NDE: Performance Demonstration Initiative (PDI) Comparison to ASME Section XI, Appendix VIII 2007 Edition with 2008 Addendum, and 10 CFR 50.55a, Year 2011," November 2012 in order to establish a baseline framework from which to assess the Salem program.

The qualifications of the ultrasonic test (UT) technician implementing the above procedure were verified independently at the EPRI web site EPRIQ.com. The essential variables, described in ASME Boiler and Pressure Vessel Code Section XI, 1998 Edition, Appendix VIII, such as pulse repetition rate, delay, frequency, recorded in the UT reports were independently verified against the generically qualified UT procedure maintained by the PDI program at the EPRI NDE Center.

The inspectors reviewed the results of the ultrasonic inspections discussed above in order to determine if reported indications were dispositioned properly. No indications were reported.

Review of Previous Indications

No previously identified indications were examined during this outage.

Repair/Replacement Consisting of Welding Activities

The inspectors reviewed activities associated with the replacement of 13SJ270, safety injection accumulator outlet test line vent globe valve under NUCM 60102748. The inspectors also reviewed activities associated with the replacement of valve 12GB19, steam generator blowdown line drain, under NUCM 6009446. The inspectors compared the activities, work controls, and results against procedural requirements, and the repair-replacement program requirements of ASME Boiler and Pressure Vessel Code Section XI.

PWR Vessel Upper Head Penetration Inspection Activities (IMC Section 02.02)

No PWR vessel upper head penetration inspection activities were implemented during this inspection.

Boric Acid Corrosion Control Inspection Activities (IMC Section 02.03)

During initial containment entry the NRC resident inspectors observed the boric acid leakage identification process. The inspectors reviewed the boric acid visual inspection procedure ER-AP-331-1001. The inspectors reviewed selected corrective actions issued as a consequence of discovered boric acid leakage (20603657, "BAC 2CV170 Leaking," 20603919, "Minor Dry White Boron on Diaphragm Valve," 20603920, "Minor Dry Brown Boron on Packing") to determine what actions were planned, and if the remediation was appropriate for the safety significance of the leaking component. The inspectors reviewed photographic inspection records of boric acid leakage and compared them against the corrective action description to determine if they were characterized appropriately.

Steam Generator Tube Inspection Activities (IMC Section 02.04)

In-Situ Pressure Testing

No in-situ pressure testing was performed.

Degradation Assessment, Eddy Current Examination Scope, Newly Identified

Degradation, Inspection Resource Assessment, Tube Repairs

The inspectors reviewed SAP 8009215, "1R20 Steam Generator Degradation Assessment," April 2010 to determine the results of the last outage during which the generators were inspected. The current number of plugs (224) and secondary side pressure (830 – 850 psig) was compared against the design plugging limit (562 plugs at 735 psig) to determine the overall degradation margin. The assessment was evaluated against the criteria in EPRI Report 1019038, "Steam Generator Management Program: Steam Generator Integrity Assessment Guidelines," Revision 3 (ML100480243) and the sampling plan, derived from the assessment, was evaluated against the operational experience applicable to the generator type at Salem. The inspectors reviewed the type of degradation previously reported and independently compared selected types, such as tube wear, against current operational experience to determine if the eddy current testing, being planned, took into account industry experience.

Identification and Resolution of Problems (IMC Section 02.05)

The inspectors verified that selected in-service inspection related problems and nonconforming conditions were properly identified, characterized and evaluated for disposition within the CAP.

Boric Acid Corrosion Control Inspection Activities

The inspectors confirmed the extent of plant boric acid leakage in containment following the plant shutdown process. The inspectors also noted the condition of the containment liner at various locations on the lower levels of containment where the liner insulation was removed for inspection purposes. All corrosion noted was superficial in nature.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11Q – 2 samples)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training on June 20, 2013, which included a fire on Unit 1 requiring realignment of the charging system utilizing the crosstie, a loss of individual rod position indication, a loss of CCW, a reactor trip, and having to use natural circulation cool down feeding through main feedwater. The inspectors evaluated operator performance during the simulated event and verified

completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the CR supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the TS action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main CR

a. Inspection Scope

The inspectors observed and reviewed the Unit 1 reactor shutdown for a refueling outage on April 14, 2013; Unit 1 RCS drain down to reactor vessel flange level on April 16, 2013; and the RCS drain from flange to mid loop on May 6, 2013. The inspectors observed infrequently performed test or evolution briefings, pre-shift briefings, and reactivity control briefings to verify that the briefings met HU-AA-1211, "Pre-job Briefings." Additionally, the inspectors observed test performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on SSC performance and reliability. The inspectors reviewed system health reports, CAP documents, maintenance WOs, and maintenance rule (MR) basis documents to ensure that PSEG was identifying and properly evaluating performance problems within the scope of the MR. For each sample selected, the inspectors verified that the SSC was properly scoped into the MR in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by PSEG staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these SSCs to (a)(2). Additionally, the inspectors ensured that PSEG staff was identifying and addressing common cause failures that occurred within and across MR system boundaries.

- 11 EDG control area breaker failure during the week of April 22, 2013 (Notification #20602947)
- 13 control area ventilation SWGR room supply fan motor failure (Notification #20594424 and ACE 70149975)

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that PSEG performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that PSEG personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When PSEG performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- 1B EDG endurance run during outage preparations on April 10, 2013
- Unit 1 preventative maintenance deferral risk review for PM023726 (Non-SEG-2 Bus S14kv-1 Bus 2-1) on April 22, 2013
- Corrective maintenance for radiation monitor 2R1B CH2 spike on May 2, 2013
- 11 essential control inventer lost during fire protection panel breaker replacement (Mode 6 – refueling) on May 2, 2013
- 13 MS10 with leak-by of 11/12 MS10's during Mode 3 power ascension (NOP/NOT)

b. Findings

Introduction. A self-revealing Green NCV of Unit 1 of 10 CFR Part 50, Appendix B, Criterion VIII, "Identification and Control of Materials, Parts, and Components," because, PSEG did not prevent the installation and use of incorrect components. Specifically, PSEG installed an incorrect bladder that was being used as a substitution component for establishing adequate containment closure during refueling operations. On May 2, 2013, while serving as a credited containment boundary, the installed bladder failed, causing Unit 1 to suspend fuel movements during refueling operations and enter TS 3.9.4 for "Containment Building Penetrations."

Description. During refueling operations, containment closure is required in the event of a fuel handling accident (FHA) or loss of RHR. PSEG TS 3.9.4 provides containment closure requirements during fuel movements stating "[containment] isolation may be achieved by an operable automatic or manual isolation valve, blind flange, or equivalent." PSEG procedures for "Procurement Engineering Support Activities," SM-AA-300, and "Right Parts Selection, Development and Maintenance of SAP Bills of Materials," SM-AA-300-1002, prescribe the responsibilities and activities for selecting and ensuring the correct parts to support WOs and maintenance on equipment that is important for maintaining plant safety.

During 1R22, PSEG planned to perform the 12 steam generator (SG) internal inspections and work on the 12BF22 valve concurrently. 12BF22 is a motor-operated, stop check valve upstream of the 12 SG in the 14" diameter feed water supply line. Under normal conditions, containment closure for a breached SG credits the 12BF22 valve in the closed position as an isolation boundary. Because of the work on 12BF22, an inflatable bladder was substituted as an equivalent isolation boundary per the containment closure procedure.

The bladder was installed in the piping 3' upstream of 12BF22 and inflated to 20 psig in accordance with PSEG's TE 60059176 Operation 362. This TE was performed on March 13, 2013, during pre-outage preparation for a McMaster-Carr model 3058K9 (MM 5005722) or 3058K12 inflatable bladder. This type of bladder requires inflation be maintained between 15-25 psig.

On April 30, 2013, a bladder, staged for CAN-7 isolation, failed while individuals were preheating and welding the 12BF22 valve. Notification 20606325 was written documenting the failure of the bladder. This notification states that replacement of the seal will be needed to keep containment closure isolation per the CAN-7 procedure, but if the second bladder fails there is no other option available to continue work. The notification also states that heat transfer from the welding on 12BF22 was ruled out as a cause of the bladder failure.

On May 2, 2013 at 1200, a second bladder, the same type as the first bladder that failed, was installed upstream of 12 BF22 and inflated to 20 psig. At 1757, Operations shifted the containment boundary to this bladder per the containment closure procedure, utilizing it as a credited containment boundary during refueling operations.

Approximately three hours after shifting the containment boundary to the bladder, workers walking down another work area observed the bladder to be failed with no pressure indicated on the pressure gauge. PSEG immediately suspend fuel movements, entered TS 3.9.4 and restored containment closure at 2115 by shutting multiple main steam and steam generator isolation valves.

PSEG initiated a prompt investigation into the second failure of the bladder and determined that both of the bladders that failed were different products than the one evaluated by the TE per PSEG's containment closure procedure. The installed bladders that failed had a maximum pressure rating of 20 psig, not 25 psig.

PSEG determined that the incorrect bladder was used in this application because the incorrect part number was used in the procurement process and work order. PSEG also determined that at the time of the second bladder failure, a direct pathway from the containment atmosphere to the mechanical penetration area was created, invalidating containment closure during refueling operations. PSEG has entered this issue into their CAP under Notification 20606402.

Analysis. The inspectors determined that the failure to prevent the installation and use of incorrect components credited for containment closure was a PD that, based on the initial bladder failure and reviews conducted by outage management, was within the capability of PSEG to foresee and correct, and should have prevented the second failure of the bladder days later. The PD was determined to be more than minor because it affected the configuration control attribute of the Barrier Integrity cornerstone to provide

reasonable assurance that physical design barriers, containment boundaries, are preserved and protect the public from radionuclide releases caused by accidents or events. This finding is also similar to IMC 0612, Appendix E, example 5.c, in that, an incorrect and inadequate part was installed and placed in service for establishing containment closure during refueling operations.

The finding is of very low safety significance (Green) per 0609 Appendix G, "Shutdown Operations SDP," Figure 1 and Attachment 1, Checklist 4, "PWR Refueling Operation: RCS Level >23' or PWR Shutdown Operation with Time to Boil >2 hours and Inventory in the Pressurizer," because it did not require a qualitative assessment and although this issue created a direct pathway from the containment atmosphere to the mechanical penetration area, invalidating PSEG's credited containment closure boundaries during refueling operations, it did not increase the likelihood of a loss of RCS inventory or degrade the licensee's ability to terminate a leak path or recover decay heat removal once it is lost.

The finding had a cross-cutting aspect in the area of Human Performance, Resources, in that, PSEG did not ensure that complete, accurate and up-to-date design documentation, procedures, and work packages, and correct labeling of components. Specifically, PSEG failed to prevent the installation and use of incorrect components credited for containment closure during refueling operations because the incorrect part number was used in the procurement process and WO. [H.2(c)].

Enforcement. 10 CFR Part 50, Appendix B, Criterion VIII, "Identification and Control of Materials, Parts, and Components," requires, in part, that measures shall be established for the identification, control of materials, parts and components and prevent the use of incorrect or defective material, parts and components. Contrary to the above, PSEG did not prevent the installation and use of incorrect components. Specifically, PSEG installed an incorrect bladder that was being used as a substitution component for establishing adequate containment closure during refueling operations. On May 2, 2013, while serving as a credited containment boundary, the installed bladder failed, causing Unit 1 to suspend fuel movements during refueling operations and enter TS 3.9.4 for "Containment Building Penetrations." Because this issue is of very low safety significance (Green) and was entered into the CAP as Notification 20606402, this finding is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000272/2013003-02, Incorrect Component Installed for Containment Closure)**

1R15 Operability Determinations and Functionality Assessments (71111.15 – 7 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions:

- Unit 2, 21 charging pump high vibrations past operability on April 8, 2013
- Unit 1, 12-029, Revision 1, N31 SR detector spiking - operability justification due to delay in replacement on April 17, 2013
- Unit 2, 20604397 Prompt investigation for 2R1B CH2 radiation monitor spike on April 20, 2013
- Unit 1, 20605655 TE for safety injection relief valve 12SJ39 high lift setpoint on

May 1, 2013
- Unit 2, 70162526-10 TE for 28 volt battery surveillance testing on May 2, 2013
- Unit 2, SW accumulator discharge valves opening stroke time on May 10, 2013
- Unit 1, Medium Voltage Electrical Penetration 1-25 TE for low nitrogen pressure on May 8, 2013

The inspectors selected these issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the operability determinations to assess whether TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TSs and UFSAR to PSEG's evaluations to determine whether the components or systems were operable. The inspectors compared the local leak rate testing limits in the appropriate sections of the TSs and 10 CFR 50 to PSEG's evaluations to determine whether the components or systems remained operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by PSEG. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations.

b. Findings

Introduction. A self revealing, Green NCV of Salem TS 6.8.4.j, "IST," that implements the IST program for ASME Code Class 1, 2, and 3 components in accordance with the ASME OM code was identified. Specifically, the opening stroke time for a Unit 2 SW accumulator discharge valve (22SW535) exceeded the IST acceptance criteria of 1.0 seconds on four occasions during the 92 day test interval, after the acceptance criteria was incorrectly changed on December 21, 2010.

Description. The SW accumulator discharge valves (21&22SW534 and 21&22SW535) are the isolation valves for the 21 and 22 SW accumulators and have a safety related function to open to ensure that the SW system downsteam of the CFCU remains water solid following a loss-of-offsite-power when the SW pumps trip. The accumulators prevent a potential water hammer event when the SW pumps restart as loads are sequenced onto the vital buses after the EDGs start. Each SW accumulator has two discharge valves, which are located in parallel in the SW piping.

TS 4.6.2.3.d requires that in accordance with (IAW), the Surveillance Frequency Program (SFP) each SW accumulator vessel discharge valve response time is within limits upon receiving a loss of offsite power test signal. The SFP states that this test frequency is every 18 months. It is performed by PSEG procedure S2.MD-TR.4KV-0011, SW Undervoltage Detection & Valve 11/12SW534 and 11/12SW535 Stroke Times. The acceptance criteria for this procedure for the discharge valves to be 45 degrees open is less than 1.5 seconds. The SW accumulator discharge valves also are incorporated into Salem's IST program. Salem TS 6.8.4.j states that the required frequency for quarterly ASME OM code tests is 92 days. The IST for these valves, which does not test the UV relay, is performed by PSEG procedure S2.OP-ST.SW-0016, Inservice Testing Service Water Accumulator Discharge Valves. PSEG procedure S2.RA-ST.SW-0016, IST SW Accumulator Discharge Valves Acceptance Criteria, stated, as of December 21, 2010, that the acceptance criteria for the IST of the valves to

be 45 degrees open is 1.5 seconds. Prior to December 21, 2010, it was less than 1.0 seconds for the valve IST opening stroke time.

The main difference in the two testing procedures is that S2.MD-TR.4KV-0011 measures the UV relay actuation time and the time to the valves are open 45 degrees whereas S2.OP-ST.SW-0016 only measures the valve opening to 45 degrees stroke time and assumes a 0.5 second time for the UV relay to actuate. The UV relay actuation time can only be measured when Salem Units 1 or 2 are shutdown.

On December 21, 2010, PSEG procedure S2.OP-ST.SW-0016 was revised to change the acceptance criteria for the 45 degree opening stroke time of the SW accumulator fast acting discharge valves to 1.5 seconds from 1.0 seconds. The purpose of the revision was to align the acceptance criteria with the engineering calculation, S-C-SW-MDC-2146, SW Storage Tank Process Parameters and was performed because some of the valves were trending towards the required action range (1.0 seconds) for stroke time. This revision was incorrect due to a misinterpretation of the accumulator process parameter calculation and should have remained at 1.0 seconds.

The problem with the revised acceptance criteria was revealed during the refueling outage 18 month testing of the Unit 1 SW accumulator discharge valves, when one valve did not meet the 1.5 second acceptance criteria. When the problem with the acceptance criteria was discovered, the inspectors reviewed testing data for the Unit 2 valves and discovered that 22SW535 did not meet the 92 day ST acceptance criteria for 4 tests performed from November 13, 2012 to January 24, 2013 with the longest stroke time being 1.05 seconds. The last IST performed on April 27, 2013, was within specifications with a time of 1.0 seconds. The PSEG corrective action for the IST results not meeting the acceptance criteria was to perform an engineering evaluation which reduced the margin of the SW pressure decrease in the SW system downstream of the CFCUs while changing the IST 45 degree opening stroke time to 1.25 seconds. PSEG also entered this issue into their CAP under Notification 20607549.

Analysis. The inspectors determined that the failure of PSEG to realize that the revision of the acceptance criteria of the SW accumulator discharge valves was outside the bounds of the engineering calculation, S-C-SW-MDC-2146 was a PD and was within PSEG's ability to foresee and correct. The PD was determined to be more than minor because it is similar to IMC 0612, Appendix E, Example 2.a, in that, in the performance of reviewing a completed IST, it was discovered that the acceptance criteria was incorrect and that the recorded stroke time of 22SW535 exceeded the correct acceptance criteria to meet action range limits. The PD is also associated with the equipment performance attribute of the mitigating systems cornerstone, and it adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the 45 degree opening time of 22SW535 was greater than its acceptance criteria of 1.0 seconds to meet the TS 6.8.4.j, IST Program, requirements.

The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations" (IMC 0609A). The inspectors determined that the finding was of very low safety significance (Green) because the deficiency did not affect the design or qualification of the SW system and it did not represent a loss of system or train safety function. This finding has a cross-cutting aspect in the area of Human Performance, Resources component, because PSEG did not ensure that complete, accurate and up-to-date

design documentation, procedures and work packages. Specifically, PSEG made a non-conservative revision to the IST acceptance criteria to the SW accumulator discharge valves without evaluating this change was adequate to assure nuclear safety. [H.2(c)].

Enforcement. TS 6.8.4.j provides controls for the IST of ASME code class 1, 2, and 3 components. PSEG's IST program implements 10 CFR 50.55(a)(f)(4) for IST requirements set forth in the ASME OM code. Section ISTC-5123 of the OM code covers motor-operated valves. Paragraph (b) of this section states, in part, that valves that do not meet the acceptance criteria shall be immediately retested or declared inoperable. Contrary to the above, between November 13, 2012, and April 12, 2013, PSEG did immediately retest or declare inoperably 22SW535 when it failed to meet its acceptance criteria. Specifically, because the opening stroke time acceptance criteria of the SW accumulator discharge valves was incorrectly changed from 1.0 seconds to 1.5 seconds on December 10, 2012, it went unrecognized that the opening stroke time of 22SW535 did not meet the acceptance criteria on 4 occasions during the above time frame. Because this issue is of very low safety significance (Green), PSEG entered this into their CAP as Notification 20607549 and implemented corrective actions to evaluate a correct acceptance criteria for the SW accumulator discharge valves, this finding is being treated as an NCV consistent with the NRC Enforcement Policy. **(NCV 05000311/2013003-03, Failure to Evaluate Unit 2 SW Accumulator Discharge Valve IST Not Meeting Acceptance Criteria)**

1R18 Plant Modifications (71111.18 – 2 samples)

Permanent Modifications

Inspection Scope

The inspectors completed the two permanent modification inspection samples listed below:

The inspectors evaluated a modification to increase the 1SJ10 boron injection tank (BIT) discharge relief valve set pressure to 2825 psig by design change package (DCP) 80406053. The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modification. In addition, the inspectors reviewed modification documents associated with the upgrade and design change.

The inspectors evaluated a modification to install digital positioners on the Unit 1 SG feedwater control valves, BF19/40s, by DCP 80106100. The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modification. In addition, the inspectors reviewed modification documents associated with the upgrade and design change, including replacement of the pneumatic positioners with digital positioners, and the installation of highway addressable remote transducer (HART) filters and multiplexers for the four SG feedwater control valves (BF19s) and the four SG feedwater control bypass valves (BF40s). The inspectors also reviewed revisions to the drawings and interviewed engineering personnel.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 8 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed the test procedure to verify that the procedure adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure was consistent with the information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions.

- 1C EDG outage maintenance on April 22, 2013
- 12SJ39 relief valve testing on April 29, 2013
- 1A & 1B 28 VDC battery after replacement on May 3, 2013
- 1CC215 limit switch repair on May 5, 2013
- 1 CCW PP cooler biofouling performance test on May 6, 2013
- 13 AFW pump overspeed trip repair on May 8, 2013
- 12 AFW pump motor replacement on May 13, 2013
- 13 MS10 following corrective maintenance on May 16, 2013

a. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – 1 sample)

a. Inspection Scope

The inspectors reviewed the station's work schedule and outage risk plan for the Unit 1 maintenance and refueling outage (1R22), which was conducted April 14 through May 27, 2013. The inspectors reviewed PSEG's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outage, the inspectors observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable TSs when taking equipment OOS
- Evaluation of shutdown safety during the outage as schedule shifts due to emergent equipment altered the work schedule on multiple occasions
- Implementation of clearance activities and confirmation that tags were properly hung and that equipment was appropriately configured to safely support the associated work or testing

- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and instrument error accounting
- Status and configuration of electrical systems and switchyard activities to ensure that TSs were met
- Monitoring of decay heat removal operations
- Impact of outage work on the ability of the operators to operate the spent fuel pool cooling system
- Reactor water inventory controls, including flow paths, configurations, alternative means for inventory additions, and controls to prevent inventory loss
- Activities that could affect reactivity
- Maintenance of secondary containment as required by TSs
- Refueling activities, including fuel handling and fuel receipt inspections
- Fatigue management
- Tracking of startup prerequisites, walkdown of the primary containment to verify that debris had not been left which could block the emergency core cooling system suction strainers, and startup and ascension to full power operation
- Identification and resolution of problems related to refueling outage activities

b. Findings

Introduction. The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion V, "Procedures," because PSEG did not ensure adequate separation was maintained between temporary scaffolding and safety-related equipment. Specifically, the inspectors identified numerous scaffolds installed in the plant with less than the minimum standoff distance to safety-related equipment specified in PSEG procedures and no engineering evaluation to support these deviations.

Description. 10 CFR 50 Appendix B, Criterion V, requires that activities affecting quality be prescribed by documented procedures and be accomplished in accordance with those procedures. When used in the plant, the design and installation of temporary scaffold must be controlled to ensure that it is not installed too close to safety-related equipment. During a seismic event, scaffolding installed too close to safety-related equipment can come in contact with that equipment, causing damage to it, and affect its safety function.

PSEG procedures control the installation of temporary scaffold at Salem by specifying a minimum separation between scaffolding and safety-related equipment and by requiring an engineering evaluation in cases when the minimum separation cannot be met. PSEG administrative procedure, MA-AA-796-024, "Safety-Related Area Scaffold Bracing and Attachment Criteria," Attachment 4, Revision 11, states that scaffolding shall not be supported by, in contact with, or connected to safety-related equipment except as noted; clearance between scaffold members and safety-related components is required always where feasible; and, the clearance requirement may be waived to zero if authorized by an engineering evaluation.

While performing plant walkdowns on April 12, 2013 and April 15, 2013, the inspectors identified several temporary scaffolds installed in close proximity to safety-related equipment. This included multiple installations where scaffolding poles were in contact with safety-related components, including containment ventilation ductwork, containment electrical conduit and control air piping, auxiliary feedwater pump drain lines and

electrical conduits, and electrical cabinets (1R16-4, ASTP-1 Appendix R Safe Shutdown). In these cases, the scaffolding in contact with safety-related equipment did not include engineering evaluations that supported deviation from the scaffolding procedure. Having identified many instances where PSEG personnel had not complied with the temporary scaffold installation procedures, the inspectors concluded that PSEG was not adequately controlling the design and installation of temporary scaffolds.

Following inspector identification of the issue, PSEG performed independent walkdowns of all scaffolding and entered all discrepancies into their CAP. All discrepancies were corrected and assessed for any potential impact to the operability or functionality of the system and PSEG determined that there was no loss or degradation of equipment or function specifically designed to mitigate a seismic event. The inspectors reviewed the CRs and determined that the safety function of each system potentially impacted by temporary scaffolding, which included those issues identified by the inspectors and by PSEG, would not have been degraded during a seismic event. PSEG also initiated an apparent cause evaluation (ACE 70152874) on numerous scaffolding issues identified by the inspectors and PSEG NOS personnel.

Analysis. Inspectors determined that not providing adequate separation between temporary scaffold and safety-related equipment, without an engineering basis, was a PD within PSEG's ability to foresee and correct. Specifically, several scaffolds were installed in close proximity to safety-related equipment. This included multiple installations where scaffolding poles were in contact with safety-related components.

This PD was considered more than minor because it affected the protection against external factors attribute of the mitigating systems cornerstone and its objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, PSEG routinely did not evaluate scaffold installations when insufficient separation to safety-related equipment was provided. Additionally, it was similar to example 4.a in IMC 0612, Appendix E, "Examples of Minor Issues," which states that the issue of failing to appropriately evaluate scaffold installation as required by procedures is more than minor if the licensee routinely failed to perform engineering evaluations. The issue was evaluated in accordance with IMC 0609, Appendix A, "The SDP for Findings At-Power" and determined to be of very low safety significance (Green) since it did not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic event.

This finding is related to the cross-cutting area of Human Performance, Work Practices, because PSEG did not ensure that personnel work practices support human performance. Specifically, PSEG personnel did not follow scaffold installation procedures when they routinely installed scaffold within the allowable clearance of safety-related equipment without an engineering evaluation. [H.4(b)]

Enforcement. 10 CFR 50, Appendix B, Criterion V, requires, in part, that activities affecting quality shall be prescribed by documented procedures and shall be accomplished in accordance with those procedures. PSEG administrative procedure, MA-AA-796-024, "Safety-Related Area Scaffold Bracing and Attachment Criteria," Attachment 4, Revision 11, states that scaffolding shall not be supported by, in contact with, or connected to safety-related equipment. Contrary to this requirement, between April 12, 2013, and April 15, 2013, the inspectors identified that certain activities affecting quality at Salem were not accomplished in accordance with documented

procedures. Specifically, PSEG personnel installed scaffold without the separation required with safety-related equipment and did not request an engineering evaluation as required by procedures. The installation of this temporary scaffold in the vicinity of safety-related equipment has the potential to adversely affect that equipment's performance during a seismic event because it was installed with insufficient standoff distance. After the issue was identified by the inspectors, PSEG performed independent walkdowns of all scaffolding and all identified discrepancies were corrected or evaluated as adequate.

Because this violation is of very low safety significance (Green) and PSEG entered this into their CAP as Notification 70152874, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. (**NCV 05000272/2013003-04, Scaffold Installed with Insufficient Separation to Safety-Related Equipment**)

1R22 Surveillance Testing (71111.22 – 8 samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied TSs, the UFSAR, and PSEG procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- S2.OP-ST.AF-0001, 21 AFW Pump Surveillance Test on April 3, 2013 (IST)
- VC.MD-ST.MS-0001, Revision 4, Main Steam Safety In-Place Testing on April 10, 2013 (IST)
- S2.OP-ST.CVC-0010, Revision 9, Borated Water Sources on April 11, 2013 (ST)
- S1.OP-ST.SSP-0004, Safeguard Equipment Cabinet Mode Ops Testing 1 'C' Vital Bus on April 15, 2013 (ST)
- S2.OP-ST.SW-0016, 21 SW Accumulator Discharge Valve Test on May 21-22 (IST)
- Unit 1, Local Leak Rate Testing (LLRT) for valve 1CC215 on April 20, 2013
- Unit 1, LLRT for valve 1WL16 on May 2, 2013
- LRT-VOL1-MAN, 1-25 Electrical Penetration 10 year 'As-Found' LLRT for Type B Penetrations

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Public Radiation Safety and Occupational Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 – 1 sample)

During the weeks of April 8, April 22, and June 6, 2013, the inspectors reviewed and assessed PSEG's performance in assessing and controlling radiological hazards in the workplace.

The review was against criteria contained in 10 CFR Part 20, TSs, applicable Regulatory Guides (RGs), and PSEG procedures.

a. Inspection Scope

Inspection Planning

The inspectors reviewed 2013 performance indicators for the occupational exposure cornerstone for Salem Units 1 and 2, available RP program audits, and available reports of operational occurrences in occupational radiation safety since the last inspection.

Radiological Hazard Assessment

The inspectors determined if there have been changes in radiological hazards for onsite workers or members of the public. The inspectors assessed the potential impact of these changes and periodic monitoring, as appropriate, to detect and quantify the radiological hazard.

The inspectors conducted walk-downs and made independent radiation measurements in the facility, including radioactive waste processing, storage, and handling areas to evaluate material and radiological conditions. In addition, the inspectors reviewed various radiological surveys from the reactor containment, auxiliary buildings, and the fuel handling building, to determine thoroughness and frequency of the surveys for the radiological hazard.

The inspectors reviewed risk-significant work activities (e.g., reactor cavity work, refueling and inspection activities, scaffolding, primary system piping work, and steam generator work) that involved exposure to radiation. The inspectors assessed whether the radiological surveys performed were appropriate to identify and quantify the radiological hazard and to establish adequate protective measures.

The inspectors evaluated the radiological survey program to determine if radiological hazards were properly identified (e.g., discrete radioactive hot particles, transuranics and hard to detect nuclides in air samples, transient dose rates and large gradients in radiation dose rates).

The inspectors observed work in potential airborne radioactivity areas and evaluated whether the air samples were representative of the breathing air zone and properly evaluated. The inspectors evaluated whether continuous air monitors (CAMs) were located in areas with low background radiation to minimize false alarms and was representative of actual work areas. The inspectors evaluated the program for monitoring levels of loose surface contamination in areas of the plant with the potential for the contamination to become airborne.

Instructions to Workers

The inspectors selected various containers holding non-exempt licensed radioactive materials that may cause unplanned or inadvertent exposure of workers. The inspectors assessed whether the containers were labeled and controlled in accordance with 10 CFR Part 20 requirements.

The inspectors reviewed various radiation work permits (RWP) used to access high radiation areas (HRA) and evaluated if the specified work control instructions and control barriers were consistent with TS requirements for HRA. These activities included primary system work, refueling activities, steam generator work, and reactor cavity work. The inspectors' assessed whether allowable stays times or permissible dose for radiologically significant work under each RWP were clearly identified. The inspectors evaluated adequacy of electronic personal dosimeter (EPD) alarm set-points.

The inspectors reviewed available occurrences where a worker's EPD noticeably malfunctioned or alarmed. The inspectors evaluated whether workers responded appropriately to the off-normal condition. The inspectors assessed whether the issue was included in the corrective action program and whether compensatory dose evaluations were conducted as appropriate.

For work activities that could suddenly and severely increase radiological conditions, the inspectors assessed the means to inform workers of these changes that could significantly impact their occupational dose.

Contamination and Radioactive Material Control

The inspectors selectively observed various locations where potentially contaminated material is monitored before leaving the radiological control area and inspected the methods used for control, survey, and release of these materials from these areas. The inspectors observed the performance of personnel surveying and releasing material for unrestricted use and evaluated whether the work was performed in accordance with plant procedures. The inspectors assessed whether the radiation monitoring instrumentation used for equipment release and personnel contamination surveys had appropriate sensitivity for the type(s) of radiation present.

The inspectors reviewed criteria for the survey and release of potentially contaminated material. The inspectors evaluated whether there was guidance on how to respond to an alarm that indicates the presence of licensed radioactive material.

The inspectors reviewed procedures and records to verify that the radiation detection instrumentation was used at its typical sensitivity level based on appropriate counting parameters. The inspectors selected sealed sources from the inventory records and assessed whether the sources were accounted for and were tested for loose surface contamination.

The inspectors evaluated whether any recent transactions involving nationally tracked sources were reported in accordance with 10 CFR Part 20 requirements.

Radiological Hazards Control and Work Coverage

The inspectors evaluated ambient radiological conditions and performed independent radiation measurements during walkdowns of the facility. The inspectors assessed

whether the conditions were consistent with applicable posted surveys, RWPs, and associated worker briefings.

The inspectors evaluated the adequacy of radiological controls, such as required surveys, radiation protection job coverage and contamination controls. The inspectors evaluated use of EPDs in high noise areas that were also HRAs or LHRAs.

The inspectors assessed whether radiation monitoring devices were placed on the individual's body consistent with procedures. The inspectors assessed whether the dosimeter was placed in the location of highest expected dose or that an NRC-approved method of determining effective dose equivalent was implemented.

The inspectors reviewed the application of dosimetry to monitor personnel in high-radiation work areas with significant dose rate gradients.

The inspectors reviewed various RWPs for work within airborne radioactivity areas with the potential for individual worker internal exposures. The inspectors evaluated airborne radioactive controls and monitoring, including potential for significant airborne levels. The inspectors assessed applicable containment barrier integrity and the operation of temporary high-efficiency particulate air ventilation systems.

The inspectors examined physical and programmatic controls for highly activated or contaminated materials stored within spent fuel and other storage pools. The inspectors assessed whether appropriate controls were in place to preclude inadvertent removal of these materials from the pool.

The inspectors examined the posting and physical controls for selected HRAs, LHRAs and very high radiation areas (VHRA) to verify conformance with the occupational performance indicator (PI).

Risk-Significant HRA and VHRA Controls

The inspectors discussed with the RPM the controls and procedures for high-risk HRAs and VHRAs. The inspectors assessed whether any changes to relevant procedures substantially reduce the effectiveness and level of worker protection.

The inspectors discussed with first-line health physics supervisors the controls in place for special areas that have the potential to become VHRAs during certain plant operations. The inspectors assessed whether these plant operations require communication beforehand with the health physics group, so as to allow corresponding timely actions to properly post, control, and monitor the radiation hazards including re-access authorization.

The inspectors evaluated controls for VHRAs and areas with the potential to become a VHRA to ensure that an individual was not able to gain unauthorized access to these VHRAs.

Radiation Worker Performance and RP Technician Proficiency

The inspectors observed the performance of radiation workers and RP technicians with respect to stated RP work requirements and procedures. The inspectors determined if these individuals were aware of radiological conditions and RWP controls/limits and that

their behavior reflected the level of radiological hazards present, including training and/or qualifications with respect to the radiological hazards and work activities.

The inspectors reviewed available radiological problem reports since the last inspection that attributed the cause of the event to human performance errors. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by PSEG to resolve the reported problems.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with radiation monitoring and exposure control were being identified by at an appropriate threshold and were properly addressed for resolution in the licensee's CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented that involve radiation monitoring and exposure controls. The inspectors assessed the process for applying operating experience to their plant.

b. Findings

Introduction. A self-revealing finding (Green) of very low safety significance was identified associated with failure to implement TS 6.8 required radiation protection procedures. Specifically, the inspectors identified that PSEG did not establish and implement adequate radiological controls, including radiological surveys and associated procedures, to provide for prompt identification and access control to a TS 6.12, "LHRA," and associated radiation dose rates, caused by discrete radioactive particles on November 7, 2013, in the Unit 2 reactor cavity. PSEG entered this issue into their CAP (Notification 20582871).

Description. On the morning of November 7, 2012, PSEG completed drain-down of the Unit 2 reactor cavity and established TS 6.12, "LHRA Controls," for personnel entry to the cavity pending reactor vessel head set, decontamination, and conduct of radiological surveys. The reactor vessel head was set at about 2:00 pm. Maximum personnel radiation dose rates encountered were about 900 mR/hr. Following vessel head set, RP technicians subsequently conducted gross decontamination as well as discrete radioactive particle surveys. As a result, the radiological surveys indicated general area dose rates of between 20 and 60 mR/hr with no discrete particles detected. These surveys were completed independently by two RP technicians with no abnormal radiation dose rates noted.

Subsequently, four workers entered the Unit 2 reactor cavity at various times to begin preparations for, and removal of the reactor cavity mechanical seals. Based on the results of the previous radiological surveys, the reactor cavity was "down-posted" from a LHRA (i.e., radiation dose rates >1 rem/hr at 30 centimeters) to a High Radiation Area (i.e., dose rates less than 1 rem/hr at 30 centimeters). During the work to remove the mechanical seals, a second work crew entered the Unit 2 reactor cavity to begin installation of guardrails for the upper cavity. The second work crew remained in the cavity while the first work crew exited the cavity upon completing removal and packing of the mechanical seals into a packing box. Shorty thereafter, the two workers installing the guardrails experienced radiation dose rate alarms on their electronic dosimeters. The two workers promptly exited the cavity and logged out with maximum radiation dose rates indicated on their EPDs of 215 mR/hr and 344mR/hr respectively. Subsequent

PSEG radiation surveys detected the presence of a discrete radioactive particle causing radiation dose rates of 30 rem/hr on contact and 2 rem/hr at 30 centimeters. The particle was described as a small piece of metal less than one inch long and millimeters thin. PSEG estimated the particle caused a radiation dose rate of about 360 mR/hr at the knee level, with chest level dose rates of 150 mR/hr. The workers' chest EPDs alarmed at 344 mR/hr and 215 mR/hr respectively. The dosimeters were set to alarm at 200 mR/hr. The higher dose rate experienced was due to one of the workers bending over near the particle during the work causing the dosimeters to enter an elevated radiation dose rate due to the dose rate gradient caused by the discrete particle. The dose rates identified were well above that indicated by the two independent surveys following cavity decontamination (i.e., 20-60 mR/hr general area) and prior to worker entry.

PSEG promptly restricted access to the area and re-posted the area as a LHRA area. PSEG initiated discrete particle recovery plans and subsequently conducted additional radiation surveys. The additional surveys identified a second particle, also with contact dose rates of 30 rem/hr, but about 1200 mR/hr at 30 centimeters, located under the box placed in the cavity for the mechanical seal following the initial drain down and independent surveys. In addition, an elevated dose rate area near reactor studhole 23 was found indicating 3 rem/hr on contact and 300 mR/hr at 30 centimeters.

PSEG did not implement TS 6.8 required radiation protection procedures for conduct of radiation surveys and access control to ensure conformance with TS 6.12, "LHRAs Access Control Requirements." Specifically, discrete LHRAadioactive particles, measuring 30 rem/hr on contact and up to 2 rem/hr at 30 centimeters, were not identified and effectively controlled, including access thereto, resulting in failure to identify and control access to the TS 6.12, "LHRA" caused by the particles. The performance of such surveys was reasonable in that PSEG had cleaned up debris from an irradiated broken incore detector prior to the cavity drain down. Further, radioactive debris may be dislodged during cavity mechanical seal removal. No radiological surveys were conducted while workers removed and packaged the mechanical seals. The initial discrete particle was determined to be a piece of metal. PSEG's review determined that the particles likely came from inadequate radiological surveys following reactor cavity drain down and decontamination or during reactor cavity mechanical seal removal. However, PSEG determined the most probable origin of the particles was that they were dislodged from the reactor cavity mechanical seals during removal. PSEG's Job Guide for Reactor Assembly required that an RP technician be present for the mechanical seal removal. The ALARA plan (2012-35) for the RWP (RWP 1) required RP technicians to adhere to the Job Guide. The Job Guide did not provide specific survey guidance.

PSEG's apparent cause evaluation indicated two apparent causal factors. The first was RP's survey weakness during decontamination and the second being the lack of RP support for the mechanical seal removal as a weakness in both work group coordination and communication.

Analysis. The failure to implement TS 6.8 procedures is a PD. The PD was determined to be more than minor because, if left uncorrected, the PD had the potential to lead to a more significant safety concern if personnel were exposed to elevated radiation dose rates. Further, the PD was related to the Programs and Process attribute of the occupational radiation safety cornerstone, and adversely affected the cornerstone objective to ensure adequate protection of worker health and safety from exposure to radiation from radioactive material during routine reactor operation. PSEG did not

establish and implement adequate radiological controls, including radiological surveys and associated procedures, to provide for prompt identification and access control to the high radiation area and dose rates caused by the discrete particles.

The finding was not subject to traditional enforcement because it was not associated with a violation that impacted the regulatory process and did not contribute to actual safety consequences. The finding was assessed using IMC 0609, Appendix C, 2 Enclosure "Occupational Radiation Safety SDP," dated August 19, 2008, and was determined to be of very low safety significance (Green) because: it was not related to ALARA; did not result in an overexposure or a substantial potential for overexposure; and did not compromise the licensee's ability to assess dose. The workers promptly exited the area upon alarm of their electronic dosimeters (EDs), the licensee determined the workers did not sustain significant radiation exposure, the area was re-posted and controlled, and the licensee determined no additional individuals entered the area in that during the entire period, RP technicians maintained positive control of the cavity entrance from the refueling floor. No personnel gained unauthorized access.

This finding was associated with a Work Control aspect of the Human Performance cross-cutting component. Specifically, PSEG did not effectively coordinate this work activity by incorporating actions to address the impact of the work on different job activities, and the need for work groups to maintain interfaces and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance. [H.3(b)].

Enforcement. TS 6.8 requires that the licensee establish, implement, and maintain the applicable procedures recommended in Appendix A, of RG 1.33, Revision 2, February 1978. Appendix A, of RG 1.33, recommends procedures for radiation surveys, a RWP system, and access control to radiation areas. Contrary to this requirement, PSEG did not establish and implement adequate radiological controls, including radiological surveys and associated procedures, to provide for prompt identification of and access control to the high radiation dose rates emanating from discrete radioactive particles. Specifically, on November 7, 2012, PSEG did not identify and did not implement the controls required by TS 6.13 to: 1) post the area as a LHRA, 2) effectively control access and exposure thereto, and 3) inform workers of the presence of the high radiation area and associated radiation dose rates due to discrete radioactive particles. PSEG became aware of the elevated radiation fields when workers dosimeters alarmed. The workers promptly evacuated the area. PSEG controlled the area and initiated additional radiation surveys and controls for the sources of the radiation. The violation did not have any actual or potential safety consequence since the workers evacuated the area and no significant radiation exposure was sustained by the workers. This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the licensee's CAP (20582871). **(NCV 05000311/2013003-05; Failure to Follow Radiation Protection Procedures to Identify and Control Access to a LHRA)**

2RS2 Occupational ALARA Planning and Controls (71124.02)

During the weeks of April 8 and 22, 2013, the inspectors assessed performance with respect to maintaining occupational individual and collective radiation exposures ALARA. The inspectors used the criteria in 10 CFR 20, applicable RGs, TSs, and PSEG procedures, for determining compliance.

a. Inspection Scope

Inspection Planning

The inspectors reviewed pertinent information regarding collective dose history, current exposure trends, and ongoing or planned activities in order to assess current performance and exposure challenges. The inspectors reviewed the plant's three year rolling average collective exposure.

The inspectors compared the site-specific trends in collective exposures against the industry average values and those values from similar vintage reactors, reviewed any changes in the radioactive source term, and reviewed site-specific procedures associated with maintaining occupational exposures ALARA.

Radiological Work Planning

The inspectors selected various work activities that had the highest exposure significance (e.g., reactor disassembly, transfer canal work, insulation, valve maintenance, shielding). The inspectors reviewed the ALARA work activity evaluations, exposure estimates, and exposure reduction requirements. The inspectors determined whether PSEG reasonably grouped the radiological work into work activities.

The inspectors assessed whether planning identified appropriate dose reduction techniques; considered alternate dose reduction features; and estimated reasonable dose goals. The inspectors evaluated potential decreased worker efficiency from use of respiratory protective devices and/or heat stress mitigation equipment and determined whether work planning considered the use of remote technologies as a means to reduce dose and the use of dose reduction insights from industry operating experience and plant-specific lessons learned. The inspectors assessed the integration of ALARA requirements into work procedure and RWP documents.

The inspectors compared the results achieved (dose rate reductions, actual dose) with the intended dose established in ALARA planning for these work activities. The inspectors reviewed work-in-progress reviews (i.e., pressurizer inspection, reactor disassembly, reactor sump work) and compared the person-hour estimates provided by maintenance planning and other groups to the RP group actual person-hours for the work activity, and evaluated the accuracy of these time estimates. The inspectors assessed the reasons for any inconsistencies between intended and actual work activity doses.

The inspectors determined whether post-job reviews were conducted to identify lessons learned. If problems were identified, verified that worker suggestions for improving dose and contamination reduction techniques were entered into the CAP.

Verification of Dose Estimates and Exposure Tracking Systems

The inspectors selectively reviewed assumptions and bases for the current annual collective dose and reviewed applicable procedures to determine the methodology for estimating exposures for specific work activities and department and station collective dose goals.

The inspectors reviewed implementation of measures to track, trend, and reduce occupational doses for ongoing work activities. The inspectors also reviewed the

method of adjusting exposure estimates, or re-planning work, when changes in scope or emergent work were encountered.

Source Term Reduction and Control

The inspectors discussed source term reduction and reviewed records to determine the historical trends and current status of the plant source term. The inspectors assessed whether the licensee had made allowances or developed contingency plans for expected changes in the source term as the result of changes in plant fuel performance issues or changes in plant primary chemistry. The inspectors evaluated the current 10 CFR 61 waste stream source term data.

Radiation Worker and RP Technician Performance

The inspectors observed radiation worker and RP technician performance during work activities performed in radiation areas, airborne radioactivity areas, and HRAs. The inspectors evaluated whether workers demonstrated the ALARA philosophy in practice and whether there were any procedure or RWP compliance issues.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with ALARA planning and controls are being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's CAP. The inspectors assessed the process for applying operating experience to their plant.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03)

During the weeks of April 8 and April 22, 2013, the inspectors reviewed controls for potential in-plant airborne radioactivity work and the use of respiratory protection devices. The inspectors used the criteria in 10 CFR Part 20, the guidance in applicable RGs, TSs, and PSEG procedures for determining compliance.

a. Inspection Scope

Inspection Planning

The inspectors selectively reviewed the UFSAR to identify areas of the plant designated as potential airborne radiation areas and any associated ventilation systems or airborne monitoring instrumentation. This review included instruments used to identify changing airborne radiological conditions. The review included an overview of the respiratory protection program and a description of the types of devices used. The inspectors reviewed the location and quantity of respiratory protection devices stored for emergency use. The inspectors reviewed the procedures for maintenance, inspection, and use of respiratory protection equipment, including self-contained breathing apparatus (SCBA) as well as procedures for air quality maintenance.

The inspectors reviewed reported performance indicators to identify any related to unintended dose resulting from intakes of radioactive material.

Engineering Controls

The inspectors reviewed the use of permanent and temporary ventilation used as engineering controls to control airborne radioactivity. The inspectors reviewed procedural guidance for use of installed plant systems to reduce dose and assessed whether the systems are used, to the extent practicable, during high-risk activities.

The inspectors selected installed ventilation systems used to mitigate the potential for airborne radioactivity, and evaluated whether the ventilation system operating parameters were consistent with maintaining concentrations of airborne radioactivity, in work areas, below the concentrations of an airborne radioactivity area.

The inspectors selected two temporary ventilation system setups used to support work in contaminated areas. The inspectors assessed whether the use of these systems was consistent with procedural guidance.

The inspectors reviewed airborne monitoring protocols for installed systems used to monitor and warn of changing airborne concentrations in the plant. The inspectors evaluated whether the alarms and set-points were sufficient to prompt licensee/worker action to ensure that doses are maintained within the limits of 10 CFR Part 20 and ALARA. The inspectors also reviewed use and control of vacuum cleaners used in the radiological controlled area (RCA).

The inspectors assessed whether the licensee had established threshold criteria for evaluating levels of airborne beta-emitting and alpha-emitting radionuclides.

Use of Respiratory Protection Devices

The inspectors selected work activities where respiratory protection devices were used to limit the intake of radioactive materials, and assessed whether the licensee performed an evaluation concluding that further engineering controls were not practical and that the use of respirators is ALARA. The inspectors also evaluated whether the licensee had established means (such as routine bioassay) to determine if the level of protection (protection factor) provided by the respiratory protection devices during use was at least as good as that assumed in the licensee's work controls and dose assessment.

The inspectors assessed use of certified respiratory protection devices (Hoods, SCBAs). The inspectors selected available work activities where respiratory protection devices were used and evaluated whether the devices were used consistent with their certification.

The inspectors reviewed records of air testing for supplied-air devices and SCBA bottles to assess whether the air used in these devices meets or exceeds Grade D quality. The inspectors reviewed plant breathing air supply systems to determine whether they meet the minimum pressure and airflow requirements for the devices in use.

The inspectors selected various individuals qualified to use respiratory protection devices, and assessed whether they were qualified to use the devices by successfully passing an annual medical examination, respirator fit-test and relevant respiratory protection training.

The inspectors discussed donning, doffing, and functionally checking respiratory devices as appropriate. As no observations of workers using respiratory protection devices were available during the inspection period, the inspectors reviewed training curricula for users of respiratory protection devices.

The inspectors chose various respiratory protection devices staged and ready for use in the plant and assessed the storage and physical condition of the device components and reviewed records of equipment inspection for each type of equipment. The inspectors selected several of the devices and reviewed records of maintenance on the vital components. The inspectors verified that onsite personnel assigned to repair respiratory protection equipment have received vendor-provided training.

SCBA for Emergency Use

The inspectors reviewed the status and surveillance records of selected SCBAs staged in-plant for use during emergencies. The inspectors reviewed the licensee's capability for refilling and transporting SCBA air bottles to and from the CR and the operations support center during emergency conditions.

The inspectors selected various individuals on different CR shift crews and from designated departments currently assigned emergency duties to assess whether control room operators and other emergency response and RP personnel were trained and qualified in the use of SCBA. The inspectors evaluated whether personnel assigned to refill bottles were trained and qualified for that task.

The inspectors determined whether appropriate mask sizes and types are available for use. The inspectors determined whether on-shift operators and radiation workers had no facial hair that would interfere with the sealing of the mask to the face and whether vision correction mask inserts were available, as appropriate.

The inspectors reviewed the past two years of maintenance records for various SCBA units to assess whether maintenance and repairs on any SCBA units were performed by an individual, or individuals, certified by the manufacturer of the device to perform the work. For those SCBAs that were ready for use, the inspectors verified that the required, periodic air cylinder hydrostatic testing was documented and up-to-date.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with the control and mitigation of in-plant airborne radioactivity were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's CAP. The inspectors assessed whether the corrective actions were appropriate for a selected sample of problems involving airborne radioactivity and were appropriately documented by the licensee.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04)

During the weeks of April 8 and 22, 2013, the inspectors selectively reviewed the monitoring, assessment, and reporting of occupational dose. The inspectors used the criteria in 10 CFR 20, applicable RGs, TSs, and procedures for determining compliance.

a. Inspection Scope

Inspection Planning

The inspectors reviewed available RP program audits related to internal and external dosimetry and reviewed the most recent National Voluntary Laboratory Accreditation Program (NVLAP) report on the principal dosimetry.

The inspectors reviewed procedures associated with dosimetry operations, including issuance/use of external dosimetry, and assessments of external and internal dose for radiological incidents. The inspectors evaluated procedure requirements for determining when external dosimetry and internal dose assessments were required.

External Dosimetry

The inspectors evaluated primary dosimetry NVLAP accreditation including irradiation test categories.

The inspectors evaluated the onsite storage of dosimeters before issuance, during use, and before processing/reading. The inspectors also reviewed the guidance provided to radiation workers with respect to care and storage of dosimeters.

The inspectors assessed the use of EPDs to determine if a “correction factor” is used (EPD as compared to the dosimeter of legal record) for situations when the EPD is used to assign dose and whether the correction factor is based on sound RP principles.

The inspectors reviewed available dosimetry occurrence reports and corrective action program documents for adverse trends related to EPDs.

Internal Dosimetry

Routine Bioassay (In Vivo)

The inspectors selectively reviewed procedures to assess the dose from internally deposited radionuclides, including methods for differentiating between internal and external contamination, the release of contaminated individuals, and determining the route of intake and the assignment of dose.

The inspectors reviewed the whole body count process to determine if the frequency of measurements was consistent with the biological half-life of the radionuclides available for intake.

The inspectors reviewed the use of portal radiation monitors as a passive monitoring system. The inspectors assessed if instrument minimum detectable activities (sensitivity) were adequate to determine the potential for internally deposited radionuclides.

The inspectors selected available worker WBCs and evaluated whether the counting system used had sufficient counting time/low background to ensure appropriate sensitivity for the potential radionuclides of interest, an appropriate radionuclide library, and provided for assessment of hard-to-detect radionuclides.

Special Bioassay (In Vitro)

The inspectors selectively reviewed internal dosimetry procedures and available WBC count data. The inspectors reviewed and assessed the adequacy of the program for urinalysis and fecal analysis of radionuclides, including collection and storage of samples.

The inspectors reviewed the vendor laboratory quality assurance program and assessed whether the laboratory participated in an industry recognized cross-check program including whether out-of-tolerance results were reviewed, evaluated and resolved appropriately.

Internal Dose Assessment – Airborne Monitoring

The inspectors selectively reviewed the program for dose assessment based on airborne monitoring and calculations of derived air concentration internal dose. The inspectors determined whether flow rates and collection times for air sampling equipment were adequate to allow appropriate lower limits of detection to be obtained. The inspectors also reviewed the adequacy of procedural guidance to assess internal dose if respiratory protection was used.

Internal Dose Assessment – WBC Analyses

The inspectors reviewed several dose assessments performed using the results of WBC analyses. The inspectors determined whether affected personnel were properly monitored with calibrated equipment and that internal exposures were assessed consistent with the licensee's procedures.

Special Dosimetric Situations

Declared Pregnant Workers

The inspectors assessed whether PSEG informs workers, as appropriate, of the risks of radiation exposure to the embryo/fetus, the regulatory aspects of declaring a pregnancy, and the specific process to be used for (voluntarily) declaring a pregnancy.

Dosimeter Placement and Assessment of Effective Dose Equivalent for External Exposures

The inspectors reviewed the methodology for monitoring external dose in non-uniform radiation fields or where large dose gradients exist. The inspectors evaluated the criteria for determining when alternate monitoring, such as use of multi-badging, is to be implemented.

The inspectors reviewed use of multi-badging to evaluate whether the use was consistent with procedures and dosimetric standards.

Shallow Dose Equivalent

The inspectors selectively reviewed dose assessments for shallow dose equivalent for adequacy. The inspectors evaluated the method (e.g., VARSKIN or similar code) for calculating shallow dose equivalent from distributed skin contamination or discrete radioactive particles.

Neutron Dose Assessment

The inspectors evaluated the neutron dosimetry program, including dosimeter types and/or radiation survey instrumentation.

The inspectors reviewed neutron exposure occurrences and assessed whether (a) dosimetry and/or instrumentation was appropriate for the expected neutron spectra, (b) there was sufficient sensitivity for low dose and/or dose rate measurement, and (c) neutron dosimetry and/or neutron detection instruments were properly calibrated. The inspectors also assessed whether interference by gamma radiation had been accounted for in the calibration and whether time and motion evaluations were representative of actual neutron exposure events, as applicable.

Problem Identification and Resolution

The inspectors assessed whether problems associated with occupational dose assessment are being identified by PSEG at an appropriate threshold and are properly addressed for resolution in the licensee CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee involving occupational dose assessment.

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation (71124.05)

During the weeks of April 8, 22, and June 10, 2013, the inspectors selectively reviewed the accuracy and operability of radiation monitoring instruments that were used to protect occupational workers and the public. The review was against criteria contained in 10 CFR Part 20, 10 CFR Part 50, 40 CFR 190, applicable RGs and industry standards, TSs/Offsite Dose Calculation Manual (ODCM), and PSEG station procedures for determining compliance.

a. Inspection Scope

Inspection Planning

The inspectors reviewed the Updated FSAR to identify radiation instruments associated with monitoring area radiation, airborne radioactivity, process streams, effluents, materials/articles, and workers. Additionally, the inspectors selectively reviewed the associated TS requirements for post-accident monitoring instrumentation. The inspectors reviewed a listing of in-service survey instrumentation including: air samplers, small article monitors (SAM), radiation monitoring instruments, personnel contamination monitors, portal monitors, and whole-body counters. The inspectors

assessed whether an adequate number and type of instruments were available to support operations.

The inspectors reviewed available third-party evaluation reports of the radiation monitoring program since the last inspection, including evaluations of offsite calibration facilities or services, if applicable.

The inspectors reviewed procedures that govern instrument source checks and calibrations, focusing on instruments used for monitoring transient high radiological conditions, including instruments used for underwater surveys. The inspectors reviewed the area radiation monitor (ARM) alarm set-point values and bases as provided in the TSs and the FSAR.

The inspectors reviewed effluent monitor alarm set-point bases and the calculation methods provided in the ODCM.

Walkdowns and Observations

The inspectors walked down two gaseous effluent radiation monitoring systems and sampling points for gaseous and liquid effluent samples. Focus was placed on flow measurement devices and all accessible point-of-discharge effluent monitors. The inspectors assessed whether the effluent/process monitor configurations align with what is described in the FSAR and/or ODCM.

The inspectors selected various portable survey instruments in use or available for issuance and assessed calibration and source check stickers for currency as well as instrument material condition and operability.

The inspectors observed source checks for various types of portable survey instruments. The inspectors assessed whether high-range instruments are source checked on all appropriate scales.

The inspectors walked down various ARMs and CAMs to determine whether they are appropriately positioned relative to the radiation sources or areas they were intended to monitor. Selectively, the inspectors compared monitor response (via local readout or remote control room indications) with actual area radiological conditions for consistency.

The inspectors selected various personnel contamination monitors, portal monitors, and SAMs and evaluated whether the periodic source checks were performed in accordance with the manufacturer's recommendations and procedures.

Calibration and Testing Program

Portal Monitors, Personnel Contamination Monitors, and SAMs

The inspectors selected two of each type of these instruments and verified that the alarm set-point values were reasonable under the circumstances to ensure that licensed material is not released from the site.

The inspectors reviewed calibration documentation for each instrument selected and reviewed the calibration methods to determine consistency with the manufacturer's recommendations.

Portable Survey Instruments, ARMs, Electronic Dosimetry, and Air Samplers/CAMs

The inspectors reviewed calibration documentation and source checks for various portable instruments in use.

Instrument Calibrator

The inspectors reviewed the current radiation output values for the licensee's portable survey and ARM instrument calibrator unit(s). The inspectors assessed whether the licensee periodically verifies calibrator output over the range of the exposure rates/dose rates using an ion chamber/electrometer.

The inspectors assessed whether the measuring devices had been calibrated by a facility using NIST traceable sources and whether decay corrective factors for these measuring devices were properly applied by the licensee in its output verification.

Calibration and Check Sources

The inspectors reviewed the licensee's source term or waste stream characterization per 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," to assess whether calibration sources used were representative of the types and energies of radiation encountered in the plant.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with radiation monitoring instrumentation were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involve radiation monitoring instrumentation.

b. Findings

No findings were identified.

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

During the week of June 10-14, 2013, the inspectors verified that gaseous and liquid effluent processing systems were maintained so radiological discharges were properly reduced, monitored, and released. The inspectors also verified the accuracy of calculations for effluent releases and public doses.

The inspectors used the requirements in 10 CFR Part 20; 10 CFR 50.35(a); 10 CFR Part 50 Appendix A - Criterion 60 Control of Release of Radioactivity to the Environment and Criterion 64 Monitoring Radioactive Releases; 10 CFR 50 Appendix I Numerical Guides for Design Objectives and Limiting Conditions for Operations to Meet the Criterion "ALARA" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents; 10 CFR 50.75(g) Reporting and Recordkeeping for Decommissioning Planning; 40 CFR Part 141 Maximum Contaminant Levels for Radionuclides; 40 CFR Part 190 Environmental Radiation Protection Standards for Nuclear Power Operations; RG 1.109 Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents; RG 1.21 Measuring, Evaluating, Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste; RG 4.1 Radiological Environmental Monitoring for Nuclear

Power Plants; RG 4.15 Quality Assurance for Radiological Monitoring Programs; NUREG 1301, ODCM Guidance: Standard Radiological Effluent Controls;TSs; applicable Industry standards; and licensee procedures required by TSs/ODCM as criteria for determining compliance.

a. Inspection Scope

Inspection Planning and Program Reviews

Event Report and Effluent Report Reviews

The inspectors reviewed the Salem Station 2012 Radioactive Effluent Release Report to determine if the reports were submitted as required. The inspectors reviewed anomalous results, unexpected trends, and abnormal releases that were identified. The inspectors determined if these abnormal effluent results were evaluated, were entered in the CAP, and were adequately resolved.

The inspectors identified and reviewed radioactive effluent monitor operability issues to determine if the issues were entered into the CAP and were adequately resolved.

ODCM) and Final Safety Analysis Report (FSAR) Review

The inspectors reviewed UFSAR descriptions of the radioactive effluent monitoring systems, treatment systems, and effluent flow paths.

The inspectors reviewed changes to the ODCM made since the last inspection. The inspectors reviewed the technical basis or evaluations of any changes and determined whether they were technically justified and maintained effluent releases ALARA.

The inspectors reviewed documentation to determine if any non-radioactive systems that have become contaminated were disclosed either through an event report or the ODCM.

The inspectors reviewed pertinent 10 CFR 50.59 evaluations and made a determination if any newly contaminated systems had an unmonitored effluent discharge path to the environment. The inspectors also reviewed whether it required revisions to the ODCM to incorporate these new pathways and whether the associated effluents were reported as required.

Groundwater Protection Initiative (GPI) Program

The inspectors reviewed groundwater monitoring results and changes to the GPI program for identifying and controlling contaminated spills/leaks to groundwater.

Procedures, Special Reports, and Other Documents

The inspectors reviewed Licensee Event Reports (LERs), event reports and/or special reports related to the effluent program issued since the previous inspection.

The inspectors reviewed effluent procedures associated with effluent sampling, effluent monitor set-point determinations, and dose calculations.

The inspectors reviewed Salem Station and independent third party evaluation reports of the effluent monitoring program since the last inspection.

Walkdowns and Observations

The inspectors walked down components of the gaseous and liquid discharge systems to verify that equipment configuration and flow paths align with the descriptions in the FSAR and to assess equipment material condition.

The inspectors reviewed effluent system material condition surveillance records for equipment or areas associated with the systems that were not readily accessible due to radiological conditions. The inspectors walked down the Unit 1 and 2 plant vent monitors and various sampling systems and sample points for liquid sampling.

The inspectors walked down filtered ventilation systems to verify their material condition. The inspectors observed portions of the routine processing and discharge of radioactive gaseous effluent systems to verify that appropriate treatment equipment was used and the processing activities align with discharge permits. The inspectors verified calculations of gaseous and liquid dose projections.

The inspectors reviewed any changes to the Salem effluent release paths. The inspectors verified that radioactive liquid waste was being processed and discharged in accordance with procedures.

Sampling and Analyses

The inspectors selected three effluent sampling (two gaseous, one liquid) activities, and assessed whether adequate controls have been implemented.

The inspectors reviewed effluent discharges with inoperable effluent radiation monitors to verify that controls were in place to ensure compensatory sampling was performed consistent with the TSs/ODCM and that those controls were adequate.

The inspectors determined whether the facility is routinely relying on the use of compensatory sampling in lieu of adequate system maintenance, based on the frequency of compensatory sampling since the last inspection.

The inspectors reviewed the results of the inter-laboratory and intra-laboratory comparison program to verify the quality of the radioactive effluent sample analyses. The inspectors also assessed whether the intra- and inter-laboratory comparison program includes hard-to-detect isotopes.

Instrumentation and Equipment

Effluent Flow Measuring Instruments

The inspectors reviewed the methodology that PSEG uses to determine the effluent stack and vent flow rates to verify that the flow rates are consistent with TSs/ODCM and FSAR values. The inspectors reviewed the differences between assumed and actual stack and vent flow rates.

Air Cleaning Systems

The inspectors assessed whether surveillance test results for ventilation effluent discharge systems meet acceptance criteria.

Dose Calculations

The inspectors reviewed all significant changes in reported dose values compared to the previous radioactive effluent release report to evaluate the factors which may have resulted in the change.

The inspectors reviewed one radioactive liquid and one gaseous waste discharge permits.

The inspectors evaluated the methods used to ensure that principal radionuclides in the effluent stream source term were included.

The inspectors reviewed changes in PSEG methodology for offsite dose calculations since the last inspection. The inspectors reviewed meteorological dispersion and deposition factors used in the ODCM and effluent dose calculations.

The inspectors reviewed the latest Land Use Census to verify changes have been incorporated into the effluent release and environmental programs.

The inspectors evaluated whether the calculated effluent doses were within regulatory requirements.

The inspectors reviewed records of any abnormal gaseous or liquid tank discharges to ensure the abnormal discharge was monitored by the discharge point effluent monitor. Discharges made with inoperable effluent radiation monitors, or unmonitored leakages were reviewed.

GPI Implementation

The inspectors reviewed monitoring results of the voluntary Nuclear Energy Institute (NEI) GPI to determine if PSEG implemented the Groundwater Protection Initiative as intended. For anomalous results or missed samples, the inspectors assessed whether PSEG has identified and addressed deficiencies through its CAP.

The inspectors reviewed any identified leakage or spill events and entries made into PSEG decommissioning files. The inspectors assessed whether the source of the leak or spill was identified and isolated/terminated evaluations of leaks or spills, and the effectiveness of remediation actions. The inspectors reviewed whether PSEG completed offsite notifications as provided in its GPI implementing procedures.

The inspectors reviewed any discharges from onsite surface water bodies that contain radioactivity, and the potential for ground water leakage from these onsite surface water bodies. The inspectors assessed whether PSEG was properly accounting for discharges from these surface water bodies as part of their effluent release reports.

The inspectors assessed whether on-site ground water sample results and a description of any significant on-site leaks/spills into ground water for each calendar year were documented in applicable reports.

For any new effluent discharges due to continuing leakage to ground water that impacts the environment, the inspectors evaluated whether the licensee's ODCM was updated as required.

Problem Identification and Resolution

Inspectors assessed whether problems associated with the effluent monitoring and control program are being identified by the licensee at an appropriate threshold and are properly addressed for resolution in the licensee CAP. In addition, the inspectors evaluated the appropriateness of the corrective actions for a selected sample of problems documented

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Unplanned Scrams, Unplanned Power Changes, and Unplanned Scrams with Complications (6 samples)

a. Inspection Scope

The inspectors reviewed PSEG's submittals for the following Initiating Events cornerstone performance indicators (PIs) for the period of July 1, 2012, through June 30, 2013.

- Unit 1 Unplanned Scrams
- Unit 2 Unplanned Scrams
- Unit 1 Unplanned Power Changes
- Unit 2 Unplanned Power Changes
- Unit 1 Unplanned Scrams with Complications
- Unit 2 Unplanned Scrams with Complications

To determine the accuracy of the PI data reported during those periods, inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment PI Guideline," Revision 6. The inspectors reviewed PSEG's operator narrative logs, maintenance planning schedules, condition reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.2 Occupational Exposure Control Effectiveness

a. Inspection Scope

During the weeks of April 8, April 22 and June 10, 2013, the inspectors selectively reviewed and sampled various corrective action documents to determine if the issues discussed therein met a reportability threshold for the occupational exposure control effectiveness PI. The inspectors used PI definitions and guidance contained in the

Nuclear Energy Institute Document 99-02, "Regulatory Assessment PI Guideline," Revision 6, dated October 2009, to determine the accuracy of the PI data reported.

To assess the adequacy of the licensee's PI data collection and analyses, the inspectors discussed with radiation protection staff, the scope and breadth of its data review and the results of those reviews. The inspectors independently reviewed electronic personal dosimetry accumulated dose alarms, dose reports, and dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized PI occurrences. The inspectors also conducted walkdowns, as available, of locked high and very high radiation area entrances to determine the adequacy of the controls in place for these areas.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 2 samples)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by IP 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that PSEG entered issues into the CAP at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the CAP and periodically attended condition report screening meetings.

b. Findings

No findings were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a semi-annual review of site issues, as required by IP 71152, "Problem Identification and Resolution," to identify trends that might indicate the existence of more significant safety issues. In this review, the inspectors included repetitive or closely-related issues that may have been documented by PSEG outside of the CAP, such as trend reports, PIs, major equipment problem lists, system health reports, MR assessments, and maintenance or CAP backlogs.

The inspectors also reviewed PSEG's CAP database for the first and second quarters of 2013 to assess condition reports written in various subject areas (equipment problems, human performance issues, etc.), as well as individual issues identified during the NRCs daily condition report review (Section 4OA2.1). The inspectors reviewed the PSEG quarterly trend report for the first quarter of 2013, conducted under procedures for the CAP, LS-AA-125, and Coding and Analysis Manual, LS-AA-125-1005, to verify that

PSEG personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

b. Findings and Observations

The inspectors evaluated a sample of recent site issues within maintenance and engineering. This review included a sample of issues and events that occurred over the course of the past two quarters to objectively determine whether issues were appropriately considered and addressed within the scope of the CAP.

The inspectors noted some instances where PSEG's trending and evaluation was not utilized or was ineffective at detecting adverse trends, including the following:

1. Ineffective corrective actions associated with CREACS radiation monitor detector channels spiking due to failed detector foil.

   During the review of this issue, the inspectors determined that failures of individual radiation monitor channels in the CREACS system is a frequent occurrence documented in the CAP and has multiple evaluations performed to determine the appropriate corrective actions. Of the four radiation monitors in the CREACS system, the 2R1B-2 radiation monitor is the only one not to have been replaced since original installation in 1996. The inspectors also noted that the frequency of the foil replacement on 2R1B-2 has been approximately every 6 months due to foil failures even though the PM frequency to replace the foil on the detector remains unchanged at an interval of 18 months.

   Section 1R04 of this report documents a Green NCV for PSEG failing to adequately trend an adverse condition and initiate effective correct actions to address declining performance in radiation monitor channel spiking caused by defective detector foil.

2. Ineffective issue identification and trending of low nitrogen pressures on medium voltage electrical penetrations.

   The inspectors noted that initial notifications had been written by PSEG documenting low nitrogen pressures on electrical penetrations as far back as 2008, but that no follow-up notifications or corrective actions had been taken to correct the identified issues. PSEG's evaluation of this issue determined that the PM plan for these electrical penetrations directed the operator to only write a notification for low nitrogen pressure if there is no existing notification already documenting the condition. PSEG has completed a procedure change to write notifications when any penetration is found to have low nitrogen pressure so that deficiencies can be trended.

   Section 4OA7 of this report documents a Licensee identified violation for failing to trend and correct electrical penetration low nitrogen pressure which contributed to a reasonable doubt of the operability and functionality of multiple containment electrical penetrations.

3. Inadequate evaluation of the 12BF22 bladder failure on April 30, 2013

   PSEG failed to adequately evaluate the failure of the 12BF22 bladder on April 30, 2013, prior to installing the same type of bladder 3 days later, that subsequently

failed, as a substitution component for establishing adequate containment closure during refueling operations. After the second failure of the bladder, PSEG determined that the incorrect bladder was installed in both instances and failed due to over-pressurization.

Section 1R13 of this report documents a Green NCV for PSEG failing to prevent the installation and use of incorrect components that were serving as credited containment boundaries during refueling operations.

The inspectors verified that all the issues above regarding trending and evaluation have been entered into PSEG's CAP.

During the review maintenance and engineering issues, the inspectors noted a trend with recent deficiencies in PSEG's procurement and maintenance process. These issues included multiple findings involving the failure to install the correct size zinc anode in the 11 SW strainer resulting in a strainer trip (NCV 0500272/2013002-02) and the incorrect substitution component, 12BF22 bladder, installed for containment closure (NCV 05000272/2013003-02). These issues highlight less than adequate procurement standards and control of installed materials. The inspectors verified that PSEG has entered these issues into their CAP.

The inspectors also noted an adverse trend in the reliability of specific safety-related equipment, including the EDG control area supply fan breakers, safety injection relief valves, SWGR and penetration area ventilation system fan motors, the chemical and volume control positive displacement pumps and safeguards emergency cabinet relays.

The inspectors verified that all of these issues with safety related components have been addressed within the scope of the CAP and in system health reports, and that appropriate evaluations and corrective actions have been initiated by PSEG to prevent reoccurrence.

.3 Annual Sample: Unit 2 Turbine Inadvertent Overspeed Trip Signal Resulted in Reactor Trip

a. Inspection Scope

The inspectors performed an in-depth review of PSEG's root cause evaluation and corrective actions associated with a March 23, 2012, inadvertent Unit 2 main turbine trip signal while at 100 percent power. PSEG's event response team (ERT) performed an initial evaluation of the event and concluded that the overspeed trip signal was not indicative of an actual turbine overspeed condition as the generator was synchronized to the grid when the turbine trip signal occurred. PSEG subsequently formed a root cause investigation team, which performed an evaluation of the cause of the turbine trip, the effectiveness of previous corrective actions for a Unit 1 turbine trip caused by indicated overspeed in 2006, and applicable operating experience. PSEG developed interim and long term corrective actions to address the identified causes of the event.

The inspectors assessed PSEG's root cause evaluation, extent of condition review, completed and proposed corrective actions, along with the prioritization and timeliness of actions to determine whether the corrective actions were appropriate. The inspectors reviewed PSEG's evaluation of the issue and corrective actions taken to ensure they met the requirements of PSEG's CAP. Specifically, the inspectors reviewed the

technical adequacy of increases made to the Unit 1 and Unit 2 digital electrohydraulic control (DEHC) turbine overspeed protection setpoints from 103 percent to 108 percent of synchronous speed. The setpoint change was made to decrease the system's sensitivity to spurious overspeed trips and reduce the probability of unexpected initiating events. The inspectors reviewed the change to ensure the increase in the setpoint did not adversely affect design basis assumptions with respect to the potential for generation of turbine missile hazards. The inspectors also reviewed work recommended by the DEHC vendor to add circuit wire jumpers across all the proximity speed input terminals for both units. The work was completed for Unit 2 and planned for installation on Unit 1 to improve the turbine speed sensing modules resistance to high levels of electro-magnetic noise. The inspectors also reviewed system software DEHC program changes to add a data logger to provide high speed resolution recording of turbine speed signals along with incorporation of annunciation of a data logging event. This function was designed to capture any unexpected sensor overspeed signal data to assist in troubleshooting as needed.

b. Findings and Observations

No findings were identified.

PSEG determined that the most likely cause of the inadvertent overspeed signal was electromagnetic interference (EMI) or radio frequency interference (RFI). The inspectors determined that PSEG's root cause evaluation was thorough and the failure mode cause evaluations addressed all possible conditions which could have caused the inadvertent overspeed trip. The inspectors independently concluded that the overspeed trip signal was not indicative of an actual condition and the spurious signal spikes were caused by an unknown effect. The inspectors determined that the interim corrective actions and design change to raise the overspeed protection controller setpoint from 103 percent to 108 percent was technically reasonable and the associated 50.59 screening evaluations appropriately evaluated the change. The inspectors determined that the increase in the setpoint will reduce the probability of minor concurrent channel spurious speed signal spikes from causing an unexpected turbine trip and initiating event. Notwithstanding, the inspectors noted that PSEG, at the time of the inspection, still had an open action within their corrective action program to evaluate and determine if additional actions are warranted to prevent overspeed trip recurrence. Potential enhancements were still being evaluated, such as design changes to the locations of the speed signal cables or interlocks, including time delays in the overspeed trip signals.

The inspectors determined that PSEG's evaluations also appropriately considered external operating experience during their review of the issue. The inspectors determined that the modification performed to the Unit 2 system software and planned for the Unit 1 system to add a data logger to provide high speed resolution of any future spikes will enhance evaluation of any transient speed signal spikes in the future. Based on the documents reviewed, plant walkdowns, and discussions with engineering and instrumentation and controls (I&C) personnel, the inspectors noted that PSEG personnel had appropriately identified the problem and evaluated the condition in accordance with their CAP program.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 1 sample)

.1 (Closed) LER 05000272/2012-004-00: Loss of Circulating Water and Manual Reactor Trip Due to Hurricane Sandy

a. Inspection Scope

On October 30, 2012, Salem Unit 1 was manually tripped due to the loss of four of six CW pumps during Hurricane Sandy. The circulating water traveling screens experienced high differential pressures due to heavy river detritus, and were secured at eight feet of differential pressure. All six CW pumps were secured due to high differential pressure or motor overcurrent. The inspectors identified one issue during the review of the LER and it is discussed below. This LER is closed.

b. Findings

Introduction: A self-revealing, Green, NCV of TS 6.8.1 "Procedure and Programs," resulted from operators' failure to implement the loss of condenser vacuum procedure. Specifically, operators failed to follow S1.OP-AB.COND-0001, "Loss of Main Condenser Vacuum" which directed closure of the MSIVs. This resulted in the inability to potentially recover the condenser as a heat sink, after the loss of CW pumps initiator was recovered, due to the actuation of the 11 LP turbine shell rupture disk.

Description: At 1:09 a.m. on October 30, 2012, Unit 1 was at 94 percent reactor power and reducing power at 2 percent / min when a loss of four CW pumps required a manual reactor trip in accordance with Sl.OP-AB.CW-0001, "CW System Malfunction". Subsequent to the reactor trip, the remaining two CW pumps were also removed from service, resulting in condensate system heat-up and pressurization causing actuation of the rupture disk on 11 LP turbine shell. The CW pumps were being removed from service due to a combination of elevated river level with high wind and waves from Hurricane Sandy, resulting in the heavy detritus and debris loading on the traveling screens.

Just prior to the reactor trip, as Hurricane Sandy passed over the station, the wind direction reversed, tide level increased rapidly and large waves were striking the CW structure. The first CW pump tripped by the CR crew was 13B at 12:49 a.m.; this pump was emergency tripped when a report was received from the CW operator stating "bay level was lowering and the screen had tripped." At 1:01 a.m., a CW operator reported that 11B screen had "stopped turning" but was not tripped. The differential level on 11B reached 8 feet at 1:02 a.m.; the 11 B CW pump was emergency tripped, and Sl.OP-AB.CW-0001 was entered. At 1:03 a.m., a CW operator reported that 11A CW pump had stopped turning and the differential level was approaching 8 feet. The control room crew initiated an emergency trip of 11A CW pump. At this point, a load reduction to 83 percent power at 2%/min was initiated lAW S1.0P-AB.CW-0001.

At 1:09 a.m., with the differential level on 12A reported as approaching 8 feet, a reactor trip and emergency trip of 12A CW pump were directed lAW S1.OP-AB.CW-0001. As the crew was implementing l-EOP-TRIP-2, "Reactor Trip Response," 12B CW pump tripped and 13A CW differential level increased to 8 feet and 13A CW pump was emergency tripped. At this time all CW pumps were OOS. The crew completed actions of EOP-TRIP-2 and transitioned to S1.OP-IO.ZZ-0008, "Maintaining Hot Standby." The crew continued with plant stabilization actions, which included investigation of the conditions at the CW intake structure for the possible restoration of a CW pump.

With all CW pumps OOS, condenser vacuum degraded and the condensate system heated up due to heat input to the condenser with no cooling in service. Over the next several hours, the condensate system temperature rose to >200°F and condenser

pressure rose until a rupture disk on 11 LP turbine shell relieved. Operators failed to follow S1.OP-AB.COND-0001, “Loss of Main Condenser Vacuum,” Continuous Action Step (CAS) which required the closure of MSIVs (MS167 valves) when reactor power is <5 percent and backpressure is not stabilized. With the rupture disk actuated, this resulted in the main condenser no longer available for short term heat removal capability to respond to initiating events and prevent undesirable consequences.

Following the event, PSEG completed a cause evaluation on the performance of the operations crew (CR 20581308 / 70145548). The evaluation identified that the inadequate response of the operating crew was related to the continued degradation of condenser vacuum when all CW pumps were OOS and the subsequent heating of the condensate system. The evaluation further states that the crew understood that the loss of condenser vacuum was due to a known condition associated with the loss of the six CW pumps and, therefore, the crew did not initially implement S1.OP-AB.COND-0001. Upon stabilization of the plant, subsequent review of the CAS in S1.OP-AB.COND-0001 was eventually performed by the operations crew. The last step of the CAS states, "If Reactor power is <5 percent and backpressure is not stabilized, then close MSIVs (MS167s)". The crew did not use this guidance to shut the MS167s with the reactor already tripped because they interpreted the wording of the CAS applied when the reactor is being held at low power.

Corrective actions from the cause evaluation include developing additional abnormal operating procedure guidance to address a loss of all CW pumps, and designing simulator training scenarios to focus on secondary plant stabilization following reactor and turbine trips.

Analysis: It was determined that not following the procedure on October 31, 2012, was a PD that, based on the existence of PSEG procedure S1.OP-AB.COND-0001 “Loss of Main Condenser Vacuum,” was within the capability of PSEG to foresee and correct, and should have been prevented. Specifically, PSEG personnel did not implement the requirements of procedure, S1.OP-AB.COND-0001, and, as a result, the 11 Low Pressure Turbine shell rupture disk was actuated and the main condenser was no longer available for short term heat removal capability to respond to initiating events and prevent undesirable consequences. The PD was determined to be more than minor because it was associated with the human performance attribute of the initiating events cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The finding was considered associated with the initiating events cornerstone since it occurred during recovery actions after the reactor trip. The finding was determined to screen as very low safety significance (Green) per Inspection Manual Chapter 0609, Significance Determination Process, Appendix A, Exhibit 1 “Initiating Events”, Section B “Transient Initiators” because the PD did not cause both a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. Specifically, the PD occurred after the reactor trip and resulted in the loss of one system (main condenser) of a number of available mitigation systems used to transition the plant to a stable shutdown condition. The PD did not cause the initiating event of a loss of condenser heat sink, but instead it only affected the ability to potentially recover the heat sink after circulating water was restored.

This finding has a cross-cutting aspect in the area of Human Performance, Resources, in that PSEG did not ensure that the crew was skilled in secondary plant stabilization

and recovery. Specifically, PSEG did not ensure that the training program previously focused on the secondary plant stabilization and / or recovery post trip. [H.2(b)].

Enforcement: TS 6.8.1 requires that written procedures be established, implemented, and maintained covering the applicable procedures recommended in RG 1.33, Revision 2, Appendix A, February 1978. Section 6.e of RG 1.33, Revision 2, Appendix A requires that written procedures be established, implemented, and maintained for activities associated with Loss of Condenser Vacuum. S1.OP-AB.COND-0001 “Loss of Main Condenser Vacuum,” Continuous Action Step (CAS) states "If Reactor power is <5 percent and backpressure is not stabilized, then close MSIVs (MS167s).” Contrary to the above, on October 30, 2012, Operators failed to close MSIVs (MS167s) as directed by S1.OP-AB.COND-0001 CAS. This resulted in continued degradation of condenser vacuum when all circulators were out of service and the subsequent heating of the condensate system and actuation of 11 LP Turbine shell rupture disk and subsequent unavailability of short term heat removal capability to respond to initiating events and prevent undesirable consequences. However, because this violation is of very low safety significance (Green) and was entered into your CAP as CR: 20581308 / 70145548, it was treated as an NCV consistent with Section 2.3.2 of the Enforcement Policy. **(NCV 05000272/2013003-06, Failure to Follow the Loss of Main Condenser Vacuum Procedure)**

4OA6 Meetings, Including Exit

On July 18, 2013, the inspectors presented the inspection results to Mr. Wagner, Plant Manager of Salem Operations, and other members of the PSEG staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by PSEG and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as a NCV.

- Title 10 of CFR Part 50, Appendix B, Criterion XVI, “Corrective Action,” requires, in part, that “measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected.” Contrary to this, PSEG failed to trend and correct electrical penetration low nitrogen pressure deficiencies which contributed to a reasonable doubt of the operability and functionality of multiple containment electrical penetrations, including electrical penetration 1-25 (NOTF 20393673). The inspectors noted that initial notifications had been written by PSEG documenting low nitrogen pressures on electrical penetrations as far back as 2008, but that no follow-up notifications or corrective actions had been taken to correct the identified issues. PSEG’s evaluation of this issue determined that the PM plan for these electrical penetrations directed the operator to only write a notification for low nitrogen pressure if there is no existing notification already documenting the condition. PSEG determined that no trending of electrical penetration low nitrogen pressure had been conducted and that corrective actions to prevent and correct low nitrogen pressure had not been completed, contributing to a reasonable doubt of the operability and functionality of multiple containment penetrations. This was identified during licensee review of a separate issue regarding LLRT. The inspector determined this was license identified since it

was identified through a licensee program (CAP) and was not readably detectable or apparent.

PSEG entered this issue into the CAP under notifications on May 7, 2013, to address Unit 1 (20607055) and Unit 2 (20607016) containment electrical penetrations that were documented to have low nitrogen pressure since 2008 (a total of 13 on Unit 1 and 18 on Unit 2). Other corrective actions initiated by PSEG include changing the PM frequency (PMCR 70153464-0050) for verifying the nitrogen charge of all electrical penetrations from 92 days to 31 days and 14 days for penetration 1-25. PSEG also initiated a procedure change to write notifications when any penetration is found to have low nitrogen pressure so that deficiencies can be trended. The inspectors determined that the finding was of very low safety significance (Green) in accordance with NRC IMC 0609, Attachment 4, “Initial Screening and Characterization of Findings,” Barrier Integrity, because the finding did not represent an actual open pathway in the physical integrity of reactor containment.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

J. Perry, Site Vice President
C. Fricker, Former Site Vice-President
L. Wagner, Plant Manager
M. Adair, Fire Protection System Engineer
C. Beeson, System Engineer
D. Best, System Engineer
P. Bonnett, Senior Engineer
T. Cachaza, Regulatory Assurance
K. Chambliss, Regulatory Affairs Manager
L. Clark, Instrument Supervisor
B. Daly, Manager, Nuclear Environmental Affairs
J. Denight, Operations Director
J. Garecht, Director Work Management
J. Gibley, Salem Fire Marshal
J. Giunta, System Engineer
W. Gropp, Radiation Protection Supervisor
J. Heavener, Chemistry Supervisor
K. King, Regulatory Assurance
W. Kittle, IST Engineer
D. Lafleur, Senior Regulatory Compliance Engineer
F. Leeser, Chemistry Manager
J. Melchionna, Corporate Underground Piping Supervisor
M. Mog, Operations Supervisor
R. Montgomery, Lead Engineer - Buried Piping Program
C. Neely, Director, Regulatory Affairs
T. Neufang, Radiation Protection Superintendent
R. Page, Design Engineering
J. Pantazes, Manager, Nuclear Environmental Affairs
M. Pyle, Chemistry Manager
G. Rich, Principal Engineer-Chemistry
J. Ridgeway, Engineer, Cathodic Protection
J. Russell, Nuclear Environmental Specialist
G. Sosson, Engineering Director
S. Taylor, Radiation Protection Manager
R. Wegner, Maintenance Director
R. Werline, Chemistry Supervisor

Others

J. Vouglitois, Nuclear Engineer, New Jersey Department of Environmental Protection, Bureau of Nuclear Engineering

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened/Closed

05000272/2013003-01	NCV	Inadequate Corrective Actions to Address an Adverse Trend in the 2R1B-2 Radiation Monitor (Section 1R04)
05000272/2013003-02	NCV	Incorrect Component Installed for Containment Closure (Section 1R13)
05000311/2013003-03	NCV	Failure to Evaluate Unit 2 Service Water Accumulator Discharge Valve IST Not Meeting Acceptance Criteria (Section 1R15.1)
05000272/2013003-04	NCV	Scaffold Installed with Insufficient Separation to Safety-Related Equipment (Section 1R20)
05000311/2013003-05	NCV	Failure to Follow Radiation Protection Procedures to Identify and Control Access to a Locked High Radiation Area (Section 2RS1)
05000272/2013003-06	NCV	Failure to Follow the Loss of Main Condenser Vacuum Procedure (Section 4OA3.2)

Closed

05000311/2012-004-0	LER	Loss of Circulating Water and Manual Reactor Trip Due to Hurricane Sandy (Section 4OA3.3)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 9
SC.OP-AB.ZZ-0001, Adverse Environmental Conditions, Revision 16
SC.OP-PT.ZZ-0002, Station Preparations for Seasonal Conditions, Revision 11
WC-AA-107, Seasonal Readiness, Revision 12

Notifications
20584969 20609261 20610712 20611641 20611836

Maintenance Orders/Work Orders
30229720 30228626 60109751 80108250

Other Documents
2013 Salem Seasonal Readiness Affirmation, 04/30/2013

Section 1R04: Equipment Alignment

Procedures
1-EOP-TRIP-1, Reactor Trip or Safety Injection, Revision 27
CY-AP-120-150, Boric Acid Storage Tank Chemistry, Revision 5
CY-AP-120-170, Refueling Water Storage Tank Chemistry, Revision 7
LS-AA-125, CAP, Revision 16
LS-AA-125-1005, Coding and Analysis Manual, Revision 6
OP-AA-108-110, Evaluation of Special Tests or Evolutions, Revision 2
S1.OP-SO.AF-0001, AFW System Operation, Revision 30
S1.OP-SO.CAV-0001, Control Area Ventilation Operation, Revision 36
S1.OP-SO.CVC-0005, Boric Acid Solution Preparation and Transfer, Revision 26
S1.OP-SO.SW-0002, 11 Nuclear SW Header Outage, Revision 28
S1.OP-SO.SW-0005, Service Water System Operation, Revision 39
S2.OP-AR.ZZ-0001, Overhead Annunciators – Window A (OHA A-6, RMS RAD HI OR TROUBLE), Revision 55
S2.OP-ST.CVC-0010, Borated Water Sources, Revision 9
S2.OP-TM.ZZ-0002, Tank Capacity Data, Revision 8

Notifications

20107411	20204163	20204201	20601727	20604397	20604397

Maintenance Orders/Work Orders

70026072	70042513	70083806	70109270	70123023	70146306
70152756	80056907	80097105			

Drawings

205236	205242	205328	205334

Other Documents
LAR S12-02, Revision to TS 3.7.6.1 (Unit 1) and 3.7.6 (Unit 2) Control Room Emergency Air Conditioning System, July 12, 2012
LCR S95-21, Revision of Control Room Ventilation Specification, June 10, 1996
NFS-0193, Single Failures in Salem UFSAR Chapter 15 Transients, Revision 0
NOS05CAVENT-09, Control Area Ventilation System (Operator Training Lesson, 6/28/11)
NRC Safety Evaluation for Alternate Source Term (AST) Implementation at Salem Unit 1 and 2
Regulatory Guide 1.183, Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors, July 2000
Salem Unit 2 – 21 BAST Sampling Results 8/1/12 – 4/9/13
S-C-ZZ-MDC-1945, Post-LOCA EAB, LPZ, and CR Doses – Alternative Source Term (AST), Revision 0
SGS-UFSAR, Section 9.4 – Heating, Ventilation, and Air Conditioning Systems, Revision 24, May 11, 2009

Section 1R05: Fire Protection

Procedures
FP-SA-003, Actions for Inoperable Fire Protection – Salem Station, Revision 1
FRS-II-421, Salem Pre-Fire Plan: 4160 V Switchgear Rooms & Battery Rooms, Elevation 64', Revision 6
FRS-II-423, Salem Pre-Fire Plan: Unit 1, (Unit 2) Waste Holdup Tank Area Elevation 64', Revision 2

FRS-II-424, Salem Pre-Fire Plan: CVCS Holdup Tank Area Elevation 64', Revision 2
FRS-II-431, Salem Pre-Fire Plan: 460 V Switchgear Rooms & Corridor, Elevation 84', Revision 8
FRS-II-521, Salem Pre-Fire Plan: Inner Piping Penetration Area & Chiller Room, Elevation 100', Revision 3
FRS-II-611, Salem Pre-Fire Plan: Reactor Containment Elevation 78', 100', Generator Area Elevation 100', Revision 5

Notifications
20602026 20602393 20602511 20607230 20608409 20612344

Other Documents
Salem and Hope Creek Fire Impairment Log Book, dated 5/5/2013

Section 1R06: Flood Protection Measures

Procedures
S2.OP-AB.ZZ-0002, Flooding, Revision 3
S2.OP-LR.AF-0001, AFW Piping Pressure Drop Test, Revision 0
S2.OP-SO.AF-0001, AFW System Operation, Revision 36
SC.FP-SV.FBR-0026, Flood and Fire Barrier Penetration Seal Inspection, Revision 5

Other Documents
S-C-ZZ-SDC-1203, Moderate Energy Break Analysis, Revision 3

Section 1R07: Heat Sink Performance

Procedures
S2.OP-ST.SW-0014, IST Room Cooler Valves Modes 1-6, Revision 10
S2.RA-ST.SW-0014, IST Room Cooler Valves Modes 1-6 Acceptance Criteria, Revision 30

Notifications
20602826

Other Documents
50153439 50155588 60020346

Section 1R11: Licensed Operator Requalification Program

Procedures
2-EOP-TRIP-1, Reactor Trip or Safety Injection, Revision 28
2-EOP-TRIP-2, Reactor Trip Response, Revision 28
2-EOP-TRIP-4, Natural Circulation Cooldown, Revision 23
S1.OP-SO.RC-0005, Draining the RCS to >/= 101 Foot Elevation, Revision 36
S2.OP-AB.CC-0001, Component Cooling Abnormality, Revision 14
S2.OP-AB.ROD-0004, Rod Position Indication Failure, Revision 9
S2.OP-SO.CN-0007, Prompt Recovery from SGFP Trip, Revision 3
S2.OP-SO.CVC-0023, CVCS Cross-Connect Alignment to Unit 1, Revision 9

Other Documents
HLA/IPA Briefing Worksheet for RCS Draindown from 25% PZR Level to 103 ft Elevation in

Preparation for Reactor Vessel Head Removal
TQ-AA-106-0204, Simulator Training Scenario (SG1322) – IRPI Malfunction, Loss of CCW, TRIP-1, 2, 4, Revision 2

Section 1R12: Maintenance Effectiveness

Procedures
ER-AA-310, Implementation of the MR, Revision 11
ER-AA-310-1004, MR – Performance Monitoring, Revision 9
ER-AA-310-1009, Condition Monitoring of Structures, Revision 2
LS-AA-120, Issue Identification and Screening Process, Revision 11
MA-AA-716-230, Predictive Maintenance Program, Revision 6
MA-AA-716-230-1009, Revision 2
S1.OP-SO.PC-0001, SWGR and Penetration Areas Ventilation Operation, Revision 19
S-2-DGV-MDC-1228, D/G Area Heat Gain and Heat Loss, Revision 1
SC.MD-PM.ZZ-0005, Molded Case Circuit Breaker Maintenance, Revision 10
SC.MD-PM.ZZ-0014, 230/460 ITE SWGR and Breaker Enclosure Maintenance, Revision 12
S-C-VAR-EEE-1057, Tabulation of Molded-Case Circuit Breakers and Parameters, Revision 3
WC-AA-101, Online Work Management, Revision 21

Notifications

20481560	20487033	20493043	20594299	20594424	20596577
20596578	20609858	70115207	70117165	70118474	70149975

Maintenance Orders/Work Orders

30125324	60094492	80027843	80097747	80103269	PM016001
PM025170					

Other Documents
A-O-VAR-EDS-0373, Motor Repair Specification
LER 272/95-008-00
PSEG Maintenance Strategy: S1230-1AY1DA3G, 4/23/13

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
FP-AA-015, Compensatory Measure Firewatch Program, Revision 3
FP-SA-003, Actions for Inoperable Fire Protection – Salem Station, Revision 1
MA-AA-716-210-1005, Predefine Change Process, Revision 3
MA-AA-724-113, Meggering of Electrical Equipment (Non-Rotating), Revision 7
S1.OP-ST.CAN-0007, Refueling Operations – Containment Closure, Revision 24
S1.OP-ST.DG-0002, 1 'B' DG Surveillance Test, Revision 45
S1.OP-ST.DG-0013, 1 'B' DG Endurance Run, Revision 18
S1.OP-ST.MS-0002, IST Main Steam and Main Feedwater Valves, Revision 14
SC.MD-PM.4KV-0007, 4KV-Non-Segregated Bus Duct Maintenance, Revision 3
SH.MD-GP.ZZ-0240, System Pressure Test at Normal Operating Pressure and Temperature, Revision 10
SM-AA-300, Procurement Engineering Support Activities, Revision 6
SM-AA-300-1001, Procurement Activities and Responsibilities, Revision 9
SM-AA-300-1002, Right Parts Selection, Development and Maintenance of SAP Bills of Materials, Revision 4

WC-AA-106, Work Screening and Processing, Revision 12

Notifications

20603200	20604948	20606295	20606325	20606402	20607598
20607605	20608267				

Maintenance Orders/Work Orders

30151651	50143810	50155496	50156812	60059176	60107633
60109957	60110490	60110696	70114373	70153490	

Other Documents

Loss of Salem #11 or #21 MAC Panel (Breaker 18) Firewatch Post-Order Package, dated 5/2/2013
NE-95-0118, Assessment of Atmospheric Relief Valve (MS10) Erratic Operation, Salem Units 1 and 2
NOS05MSTEAM-09, Salem Operations Training Plan
PM023726
Salem Generating Station, Unit 1 Risk Assessment, dated 04/10/2013
SRGC 88-021, PSEG MS10 Study
VTD 112736, Gen. Layout East Side Turbine – 4KV Non-Seq. Phase, Revision 2
VTD 119397, 4KV Non-Seq. Phase Bus Genl. Layout West Side, Revision 3

Section 1R15: Operability Determinations and Functionality Assessments

Procedures

1-EOP-TRIP-1, Reactor Trip or Safety Injection, Revision 27
ER-AA-321, Administrative Requirements for IST, Revision 11
ER-AA-380, Primary Containment Leak Rate Testing Program, Revision 8
ER-SA-321-1010, Testing of ASME Code 1, 2, and 3 SRV, Revision 0
LRT-VOL1-MAN, Containment Leak Rate Testing Manual, Revision 4
LRT-VOL4-ATT.2, Summarized Listing of Administrative and IST Limits, Type 'C' – Air Tested Valves, Revision 4
LRT-VOL5-ATT.1, Components Not Eligible for Extended Frequency Testing, Revision 2
LRT-VOL5-ATT.32, Electrical Penetration Assemblies, Revision 1
LS-AA-120, Issue Identification and Screening Process, Revision 11
LS-AA-125, Corrective Action Program, Revision 16
MA-AA-176-230-1002, Vibration Analysis/ Acceptance Criteria Guidelines, Revision 3
MA-AA-716-012, Post Maintenance Testing, Revision 18
OP-AA-108-116, Protected Equipment Program, Revision 7
S1.MD-TR.4KV-0011, SW Undervoltage Detection and Valve 11/12SW534 and 11/12SW535 Stroke Times, Revision 1
S1.OP-AB.NIS-0001, Nuclear Instrumentation System Malfunctions, Revision 6
S1.OP-IO.ZZ-0002, Cold Shutdown to Hot Standby, Revision 39
S1.OP-LR.EP-0001(Q), Type B Electrical Penetration Leak Rate Testing, Revision 0
S1.OP-SO.CAV-0001, Control Area Ventilation Operation, Revision 36
S1.OP-ST.SW-0016, IST SW Accumulator Discharge Valves, Revision 5
S1.RA-ST.SW-0016, IST SW Accumulator Discharge Valves Acceptance Criteria, Revisions 11-14
S2.OP-AR.ZZ-0001, Overhead Annunciators – Window A (OHA A-6, RMS RAD HI OR TROUBLE), Revision 55
S2.OP-ST-CVC-0003, IST - 21 Charging Pump, Revision 25

SC.MD-CM.28D-0005, 28 VDC Vital Battery Cell Replacement, Revision 4
SC.MD-FT.28D-0003, 28 Volt Station Batteries Performance Discharge Test, Revision 6

Notifications

20107411	20204163	20204201	20465555	20518249	20523948
20532821	20533555	20534585	20559828	20589698	20602820
20603527	20604397	20605655	20605929	20607055	20607076
20607549	20607562				

Maintenance Orders/Work Order

30150872	30151593	50132714	50157171	50157715	60103002
60107950	60109959	60110640	60110678	70026072	70030997
70042513	70083806	70114186	70128332	70130754	70130829
70131286	70145413	70146306	70148483	70152526	70153532
80056907	901121011	920922017	931109024	950526021	981110036

Other Documents

222701-001-9, Unit 1 Penetration Area Electrical Penetrations Type and System Use, Revision 9
2325-7957, Medium Voltage Penetration Assembly A1 - A9
Calc. No. 1SC-108, ECCS Overpressure Condition Evaluation
DWG DS-C-6477
IST 92 Day Stroke Timing Testing Results for Unit 1 and Unit 2 SW Accumulator Discharge Valves, 01/09 – 04/13
LAR S12-02, Revision to Technical Specification (TS) 3.7.6.1 (Unit 1) and 3.7.6 (Unit 2) Control Room Emergency Air Conditioning System, July 12, 2012
LCR S95-21, Revision of Control Room Ventilation Specification, June 10, 1996
Maintenance Plan 13702
NEI 94-01, Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J, Revision 3
NFS-0193, Single Failures in Salem UFSAR Chapter 15 Transients, Revision 0
NOS05CAVENT-09, Control Area Ventilation System (Operator Training Lesson, 6/28/11)
NRC INFORMATION NOTICE 2013-05: Battery Expected Life and Its Potential Impact on Surveillance Requirements, 3/19/13
NRC Safety Evaluation for Alternate Source Term (AST) Implementation at Salem Unit 1 and 2
Regulatory Guide 1.183, Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors, July 2000
S-C-SW-MDC-2146, SW Storage Tank Process Parameters, Revision 1
S-C-ZZ-MDC-1945, Post-LOCA EAB, LPZ, and CR Doses – Alternative Source Term (AST), Revision 0
S-C-ZZ-SDC-1419, Salem Generating Station Environmental Design Criteria (Calculation), Revision 3
SGS-UFSAR, Section 9.4 – Heating, Ventilation, and Air Conditioning Systems, Revision 24, May 11, 2009
VTD 301603, Installation and Maintenance Manual for Electrical Penetration Assemblies, Revision 3
VTD 315874, Design Qualification Report for Electric Penetration Assemblies, Revision 1

Section 1R18: Plant Modifications

Procedures
S1.OP-ST.MS-0002, IST Main Steam & Main Feedwater Valves, Revision 13
SC.IC-PM.CN-0001, BF-19 Actuator/Positioner Maintenance, Revision 12
SC.IC-PM.CN-0002, BF-19 Actuator/Positioner Maintenance, Revision 10
SC.RA-AP.ZZ-0051, Leakage Monitoring and Reduction Program, Revision 3
S-C-MPOO-MGS-0001-SPS49G, Piping Schedule SPS49 Safety Injection, Revision 5
SH.MD-GP.ZZ-0240, System Pressure Test at Normal Operating Pressure and Temperature, Revision 10

Maintenance Orders/Work Orders
60103574 70126272 80106053

Drawings
DS-C-86477

Other Documents
50.59 Screening No. S2013-032
DCP 80106100, Salem Unit 1 SG FW Control Valves (BF19/40s) Digital Positioner Installation, Revision 0
MM1098226
S-C-CN-NDC-2152, Unit 1 Feed Regulating Bypass Valves, Revision 1
S-C-CN-NDC-2158, Unit 1 BF19 Valves (Pre-DCP Spring Change Condition), Revision 0
Test Pan 80106612, Unit 1 BF19 and BF40 Positioner Replacement, Revision 3
VTD 902525(001), Fieldvue HF300 Series HART Filters, Revision 0
VTD 902525(001), SV1 11 AP Advanced Performance Digital Valve Positioner, Revision 0
VTD 902525(003), Valve Digital Software, Revision 0

Section 1R19: Post-Maintenance Testing

Procedures
ER-SA-321-1010, Testing of ASME Code 1, 2, and 3 SRV, Revision 0
MA-AA-716-012, Post Maintenance Testing, Revision 18
S1.OP-LR.CC-0001, Type C Leak Rate Test 1CC113 and 1CC215, Revision 2
S1.OP-PT.AF-0007, No. 13 AF Pump Overspeed Trip Test Using ILD TTOD, Revision 1
S1.OP-PT.SW-0005, Service Water Fouling Monitoring Room Coolers, Revision 6
S1.OP-ST.AF-0001, Inservice Testing – 12 Auxiliary Feedwater Pump, Revision 16
S1.OP-ST.DG-0003, 1C DG Surveillance Test, Revision 47
S1.OP-ST.MS-0002, Inservice Testing Main Steam and Main Feedwater Valves, Revision 14
S1.OP-ST.4KV-0002, Electrical Power Systems AC Distribution, Revision 25
SC.MD-ST.28D-0003, Quarterly Inspection and Preventative Maintenance of 28 Volt Vital Batteries, Revision 15
SC.MD-CM.28D-0005, 28VDC Battery Cell Replacement, Revision 4
SC.MD-ST.28D-0006, 28VDC Batteries 18 Month Service Test Using BLT-200 with Windows Software and Associated Surveillance Testing, Revision 3
SC.MD-PM.DG-0032, Periodic Diesel Engine Inspection Maintenance, Revision 20
SC.MD-PT.DG-0001, Diesel Engine Jacket Water Pressure Test, Revision 2
SH.MD-GP.ZZ-0240, System Pressure Test at Normal Operating Pressure and Temperature, Revision 10

Notifications

20518249	20523948	20532821	20533555	20534585	20603662
20603802	20604095	20604221	20605655	20606265	20606314
20606758	20606767	20607598	20607605	20608267	20495611
20609466	20606080				

Maintenance Orders/Work Orders

30130936	50132714	50157115	60074369	60094448	60102759
60103582	60104141	60104625	60107633	60110069	60110182
60110696	70128332	70130754	70130829	70131286	70153490
60102443	50145272	70152526	60097377	70119080	60110656
60093623	60103662	70153397			

Other Documents

Calc. No. 1SC-108, ECCS Overpressure Condition Evaluation
DWG DS-C-6477
ILD Terry Turbine Overspeed Device (TTOD) Operation Manual, Revision 9
NE-95-0118, Assessment of Atmospheric Relief Valve (MS10) Erratic Operation, Salem Units 1 and 2
NOS05MSTEAM-09, Salem Operations Training Plan
SRGC 88-021, PSEG MS10 Study
VTD 301103, ALCO EDG Model 18-251 Instruction, Operations and Maintenance, Revision 43
VTM 174547, Auxiliary Feed Pump Turbine Vendor Manual, Revision 22

Section 1R20: Refueling and Other Outage Activities

Procedures

1-EOP-TRIP-1, Reactor Trip or Safety Injection, Revision 27
1-EOP-TRIP-2, Reactor Trip Response, Revision 25
FP-AA-005, Fire Protection Surveillance and Periodic Test Program, Revision 0
FRS-II-611, Salem Pre-Fire Plan – Reactor Containment, Revision 5
FRS-III-815, Salem Pre-Fire Plan – Fire / Fresh Water Pump House, Revision 1
LRT-VOL4-ATT.1, Development of New Salem Units 1 & 2 Administrative and IST Limits for Local Leak Rate Tested Containment Penetrations, Revision 0
LS-AA-104-1000, 50.59 Resource Manual, Revision 7
MA-AA-716-025, Scaffold Installation, Modification and Removal Request Process, Revision 6
MA-AA-796-024, Safety-Related Area Scaffold Bracing and Attachment Criteria, Att. 4, Revision 11
OP-AA-108-108, Unit Restart Review, Revision 11 (5/13/13)
OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 9
OU-AA-103, Shutdown Safety Management Program, Revision 21
S1.FP-ST.FD-0029(Q), Functional Test of Class 1 Smoke and Thermal, Revision 14
S1.IC-CC.WD-0012, Containment Sump Level Calibrations, Revision 1
S1.IC-GP.SW-0001, Service Water System Instrument Valve Lineup Verification, Revision 1
S1.MD-FT.4KV-0002, ESFAS Instr Monthly Functional Test of 1B 4KV Vital Bus UV
S1.MD-TR.4KV-0011, Service Water Undervoltage Detection and Valve 11/12SW534 and 11/12SW535 Stroke Times, Revision 2
S1.OP-AB.COND-0001, Loss of Condenser Vacuum, Revision 15
S1.OP-AB.CW-0001, Circulating Water System Malfunction, Revision 35
S1.OP-AR.DG-0003, 1C Diesel Generator Alarm Response Salem Operations Department, Revision 11

S1.OP-AR.ZZ-0007, Overhead Annunciators Window G, Revision 33
S1.OP-IO.ZZ-0008, Maintaining Hot Standby, Revision 14
S1.OP-SO.125-0004, 125VDC Ground Detection, Revision 12
S1.OP-SO.CC-0002, 11 & 12 Component Cooling Heat Exchanger Operation, Revision 28
S1.OP-SO.DG-0005, Preparation for Removing a Diesel Generator from Service, Revision 8
S1.OP-SO.RC-0005, Draining the RCS to >/=10' Elevation, Revision 36
S1.OP-SO.RC-0006, Draining the RCS 101' Elevation with Fuel in the Vessel, Revision 28
S1.OP-ST.AF-0006, Inservice Testing Aux Feed Water Valves, Revision 14
S1.OP-ST.AF-0007, Inservice Testing Auxiliary Feedwater Valves Mode 3, Revision 21
S1.OP-ST.CAN-0007, Refueling Operations – Containment Closure, Revision 24
S1.OP-ST.DG-0003, 1C Diesel Generator Surveillance Test, Revision 47
S1.OP-ST.MS-0003, Steam Isolation and Response Time Testing, Revision 10
S1.OP-ST.SSP-0001, Manual Safety Injection – SSPS, Revision 29
S2.OP-SO.PZR-0003, Pressurizer Relief Tank Operations, Revision 15
S2.OP-SO.SW-0008, Inservice Room Cooler Flushes, Revision 0
SC.IC-TI.SSP-0001, Testing and Repair of SSPS Circuit Boards, Revision 2
SC.MD-PM.ZZ-0005, Molded Case Circuit Breaker Maintenance, Revision 10
SC.OP-AB.ZZ-0001, Adverse Environmental Conditions, Revision 16
VSH.MD-GP.ZZ-0199, Inservice Temporary Leak Repair, Revision 6

Notifications (*NRC Indentified)

20267447	20400217	20430138	20458112	20458660	20496318
20534480	20564792	20573119	20575537	20585276	20593595
20595573	20598218	20601403	20601404	20601766	20601937
20602153	20603184	20603457	20603531*	20603536	20603573
20603596	20603614	20603662	20603722	20603757	20603811
20603820	20603824	20603834	20603910	20603932	20604031
20604036*	20604058*	20604103	20604115*	20604116*	20604154
20604173	20604299	20604405	20604424	20604550	20604564
20604615	20604629	20604667	20605005	20605078	20605124
20605153*	20605186	20605462	20605517	20606224	20606245
20606284	20606295	20606325	20606388	20606407	20606716
20606767	20606787	20606882	20606894	20607098	20607121
20607195	20607344	20607652	20607706	20607786	20607789
20607802	20607842	20607956	20608045	20608413	20608420
20608894	20609074	20609109	20609746	20609336	20609565
20609885	20609891	20609896	20610353	20610830	

Maintenance Orders/Work Orders

30152541	60059955	60060778	60082985	60094701	60108176
70109270	70123023	70140127	70143751	70145548	70150558
70152148	70152419	70153578	80096111	80102809	80106058
80109473	80109477				

Other Documents

VTD 327519, RC/Replacement Reactor Vessel Closure Head for Salem Unit 1 – As Built Dimensions, Revision 1
PM006237
SEN 278, Inadvertent Complete Draining of Pressurizer during RCS Inventory Reduction, 2/20/09
1R22 Outage Risk Assessment Report, Revision 0

S1.OP-ST.CAN-0007, Refueling Operations – Containment Closure, Revision 24, 4/30/13 and 5/6/13
S-C-SW-MDC-2146, SW Storage Tank Process Parameters, Revision 1
S-C-SW-MDC-1700, Service Water Storage Tank Process Parameters, Revision 2
Regulatory Assurance White Paper – Ability to Close Containment for 1R17
S13-01, Emergency Preparedness Training Drill Critique Report, 4/17/13
1R22 ORAM, 3/22/13
Salem Unit 1 Narrative Log 4/3/13
Salem Unit 1 Notification List for 12MS167 from 1/1/10 to 5/23/13

Section 1R22: Surveillance Testing

Procedures
ER-AA-380, Primary Containment Leak Rate Testing Program, Revision 8
LRT-VOL1-MAN, Containment Leak Rate Testing Manual, Revision 4
LRT-VOL4-ATT.2, Summarized Listing of Administrative and IST Limits, Type 'C' – Air Tested Valves. Revision 4
LRT-VOL5-ATT.1, Components Not Eligible for Extended Frequency Testing, Revision 2
LRT-VOL5-ATT.32, Electrical Penetration Assemblies, Revision 1
LS-AA-120, Issue Identification and Screening Process, Revision 11
LS-AA-125, Corrective Action Program, Revision 16
MA-AA-716-012, Post Maintenance Testing, Revision 18
S1.OP-LR.EP-0001, Type B Electrical Penetration Leak Rate Testing, Revision 0
S1.OP-ST.SSP-0004, SEC Mode Ops Testing 1C Vital Bus, Revision 27
S2.OP-ST.AF-0001, IST – 21 AFW Pump, Revision 18
S2.OP-ST.CVC-0010, Borated Water Sources, Revision 9
S2.RA-ST.AF-0001, IST – 21 AFW Pump Acceptance Criteria, Revision 6
SC.MD-GP.SW-0001, Service Water Silt Survey, Revision 14
VSC.MD-ST.MS-0001, Main Steam Safety In-Place Testing, Revision 4

Notifications
20465555 20601727 20602742 20602743 20602820 20607055

Maintenance Orders/Work Orders
50117714 60109959 70030997 901121011 920922017 931109024
950526021 981110036

Other Documents
222701-001-9, Unit 1 Penetration Area Electrical Penetrations Type and System Use, Revision 9
2325-7957, Medium Voltage Penetration Assembly A1 - A9
Drawing 205336, Revision 50
Maintenance Plan 13702
NEI 94-01, Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J, Revision 3
S-C-ZZ-SDC-1419, Salem Generating Station Environmental Design Criteria (Calculation), Revision 3
VTD 301603, Installation and Maintenance Manual for Electrical Penetration Assemblies, Revision 3
VTD 315874, Design Qualification Report for Electric Penetration Assemblies, Revision 1

Section 2RS1: Access Control to Radiologically Significant Areas

Procedures
RP-AA-503, Unconditional Release Survey Method, Revision 7
RP-AA-500, Radioactive Material (RAM) Control, Revision 12
CY-AA-130-3000, Gamma Isotopic Review, Revision 3
RP-AA-302, Determination of Alpha Monitoring Levels, Revision 3
CY-AA-130-3200, Tritium, Gross Alpha, and Gross Beta Sample Preparation for Scintillation Counting, Revision 3
RP-AA-460, Control for High and Very High Radiation Areas, Revision 15 and 16
RP-AA-210, Dosimetry Issue, Usage, and Control, Revision 12
RP-AA-376, Radiological Posting, Labeling and Marking, Revision 6
RP-AA-403, Administration of the Radiation Work Permit Program, Revision 3

Notifications

20603365	20603725	20603726	20603846	20603866	20604203
20604389	20604885	20605021	20605252	20605290	20605422
20605518	20605592	20605594	20630194		

Other Documents
Contamination Control – Personnel Contamination Data
Dosimeter - NVLAP certification data
Gamma Emitting Radionuclides at PSEG
Radiological Survey data (various)
Technical Report No. 2000-01, Evaluation of Portal and Personnel Monitor Sensitivity to Internal

Section 2RS2: Occupational ALARA Planning and Controls

Procedures
CY-AP-120-3000, PWR Shutdown Chemistry for Recirculating Steam Generators, Revision 10
RP-AA-400, ALARA program, Revision 6
RP-AA-401, Operational ALARA Planning and Control, Revision 12
RP-AA-403, Administration of the Radiation Work Permit Program, Revision 3
S1.CH-IO.ZZ-111(Z), Salem Unit 1 Shutdown Chemistry Plan, Revision 7

Other Documents
ALARA Plans (various); reactor disassembly, transfer canal, head lift, steam generator activities, cavity decontamination, scaffolding, shielding
Five year ALARA Plan
SAC Meeting Minutes – Station Goals
Salem 1- 21 RFO Performance Report
Salem Station 2011-2015 Exposure Reduction Plan

Section 2RS3: In-plant Airborne Radioactivity Control and Mitigation

Procedures
NC.RP.-TI.ZZ-0404(Q), Testing and Evaluation of Compressed Breathing Air, Revision 1
NC.RP-TI.ZZ-0504(Q), Control and Use of Portable Vacuum Cleaners, Revision 6
NC.RP-TI.ZZ-0505, Control and Use of Portable ventilation Units, Revision 4
NC.RP-TI.ZZ-403(Q), Operation of Breathing Air System, Revision 3

RP-AA-1013, Operation and Inspection of the 3M Airmate Hood and PAPR Blower Unit, Revision 1
RP-AA-301, Radiological Air Sampling Program, Revision 4
RP-AA-441, Evaluation and Selection Process for Radiological Respirator Use, Revision 4
RP-AA-825, Maintenance, Care and Inspection of Respiratory Protection Equipment, Revision 4
SC.RP-TI.ZZ-0405(Q), Operation of Mako Breathing Air Compressor, Revision 4

Other Documents
Airborne Radioactivity Intake Assessments
Breathing Air Quality Test Data
Corrective Action Documents (various)
Occupational Dose Summary
Radiological Source Term Data – 10 CFR61 waste stream report
SCBA Authorized Functional Certification Vendor

Section 2RS4: Occupational Dose Assessment

Procedures
CY-AA-130-3000, Gamma Isotopic Review, Revision 3
CY-AA-130-3200, Tritium, Gross Alpha, and Gross Beta Sample Preparation for Scintillation Counting, Revision 3
NC.RP-TI.ZZ-0206, Dose Assessment from Airborne Radioactive Material Exposure, Revision 5
RP-AA-210, Dosimetry Issue, Usage, and Control, Revision 12
RP-AA-222, Methods for Estimating Internal Exposure for In-Vivo and In-Vitro Bioassay Data Revision 5
RP-AA-224, Evaluation of Bioassay Data, Revision 1
RP-AA-250, External Dose Assessment from Contamination, Revision 7
RP-AA-302, Determination of Alpha Monitoring Levels, Revision 3

Other Documents
2012 Annual Bioassay Program Review
Corrective Action Documents (various)
Exposure Control and Dose Records (various)
General Source Term Data
NVLAP Scope of Accreditation
Personnel Contamination Event Logs
Personnel Intake Investigations
Radiation Protection Technical Bases Document- Plant Radionuclide Mix Evaluation for Dosimetry Performance
Salem EPD Correction Factors

Section 2RS5: Radiation Monitoring Instrumentation

Procedures
NC.RS-TI.ZZ-0590(Q), Rev.0, Operating Instructions for the MDH 2025 and 9010 radiation Monitors
NC.RS-TI.ZZ-0593(Q), Certification of Gamma Standard Exposure/Dose rate Source, Revision 1
RP-AA-302, Determination of ALPHA Monitoring Levels, Revision 3
RP-AA-503, Unconditional Release Survey Method, Revision 7

Other Documents
Corrective Action Documents (notifications) – various
Instrumentation Calibration and Check Data: Portal Monitors (906099, 906124, 906010), AMS3 (440), SAC-4(743), RO2 (4511), Telepole (6610-23), RAS1(0025), Gillian(101012, 101016)
Salem Equipment in the Field List
Salem Field Instrument Calibration Due List

Section 2RS6: Radioactive Gaseous and Liquid Effluent Treatment

Procedures
SC.CH-TI.ZZ-0603(Q), Rev. 2, LLD Determination
SC.CH-SA.ZZ-0208(Q), Rev. 11, Radiochemical Sample Preparation
CY-AA-130-150, Rev. 0, Chemistry Quality Assurance
CY-AA-130-200, Rev. 9, Chemistry Quality Control
SC.CH-TI.ZZ.0180(Q), Rev. 66, Sample Schedule and Chemistry Specification
EN-AA-170-501, Rev.0, Meteorology Monitoring Program Administration
SC.CH-TI.ZZ-0143(Q), Rev. 3, Radioactive Liquid Effluent Permits by EMS
SC.CH-TI.ZZ-0145(Q), Rev. 5, Radioactive Gaseous Effluents Permits
SC.CH-TI.ZZ-0148(Q), Rev. 2, Secondary Side radioactive Effluent Permit
S1.RA-PT.ABV-002(Q), Rev. 0, Auxiliary Building Exhaust Ventilation System Periodic Testing

Documents
Audit- ODCM Compliance, Common (70145705), January 2013
Teledyne Brown Quality Assurance Reports
RMS System Health Reports
Ground water Monitoring Data
Salem Offsite Dose Calculation Manual, Rev. 26
Evaluation of Salem and Hope Creek Land use census, February 2012

Corrective Action Documents

20611111	20611112	20611430	20611114	20611116	20611117
20611118	20568914	20576340	20596163		

Section 4OA1: Performance Indicator Verification

Other Documents
1Q/2013 Performance Indicators - Salem 1 and 2 - Unplanned Scrams per 7000 Critical Hours, dated 5/28/2013
1Q/2013 Performance Indicators - Salem 1 and 2 - Unplanned Power Changes per 7000 Critical Hours, dated 5/28/2013
1Q/2013 Performance Indicators - Salem 1 and 2 - Unplanned Scrams with Complications, dated 5/28/2013
Unit 1 Control Room Narrative Log, 07/01/2012 – 06/30/2013
Unit 2 Control Room Narrative Log, 07/01/2012 – 06/30/2013
Apparent Cause Evaluation – 20582871/70146167

Section 4OA2: Problem Identification and Resolution

Notifications (*Notification written as a result of this inspection)

20601259*	20233900	20532821	20533555	20534585	20551806
20551880	20552014	20552525	20553166	20588219	20594424
20596577	20596578	20605655	20609858		

Evaluations

70044642	70093883	70111913	70130754	70130829	70135887
70147374	70148452	70149975	80097747	80106209	

Other Documents

1SC-108, ECCS Overpressure Condition Evaluation, Revision 0
70054731, Unit 1 Turbine Trip Evaluation Due to Indicated Overspeed
70136308, Root Cause Evaluation for Unit 2 Turbine Trip, dated 6/8/12
LTAM S-12-016
OTDM S-12-003, Operational Technical Decision Making for the Unit 2 Main Turbine
S2012-050, 50.59 Screen Increase Unit 2 OPC Turbine Overspeed Setpoint, Revision 1
S2012-077, 50.59 Screen Increase Main Turbine Overspeed Setpoint, Revision 0
Service

Procedures

20187-INP-L187004-05670, Installation Procedure for Woodward Data Logger and Functional
ER-SA-321-1010, Testing of ASME Class 1, 2, and 3 Safety/Relief Valves, Revision 1
LS-AA-125, Corrective Action Program, Revision 16
S1.OP-SO.PC-0001, Switchgear and Penetration Areas Ventilation Operation, Revision 19
SC.IC-PM.ZZ-0024, Maintenance of Bettis Actuator (Model 722-SR60)
Test, Revision 0

Maintenance Orders/Work Orders

50003308	50132714	60102128	60102129

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Procedures:

S1.OP-AB.COND-0001, Loss of Main Condenser Vacuum, Rev 15
S1.OP-AB.CW-0001, Circulating Water System Malfunction, Rev 35
S1.OP-SO.CN-0007(Q), Prompt Recovery from SGFP Trip, Rev 1

Notifications

20582699

Maintenance Orders/Work Orders

70146565-0320, NEI 99-02 Unplanned Scrams With Complications (USWC) Evaluation
70146565, Root Cause Evaluation for Salem Unit 1 Trip during Hurricane Sandy, dated 2/22/2013
20581308/70145548, Apparent Cause Evaluation to Review the Performance of the Operations Crew Leading Up to and Subsequent to the Reactor Trip that Occurred at 01:09 on 30 October 2012 During Hurricane Sandy

Other Documents:

LER 05000272/2012-004-00, Loss of Circulating Water and Manual Reactor Trip Due to Hurricane Sandy, event date 10/30/2012

LIST OF ACRONYMS

AC	Alternating Current
ADAMS	Agencywide Documents Access and Management System
AFW	Auxiliary Feedwater
ALARA	As Low As is Reasonably Achievable
APM	Accident Pressurization Mode
ASME	American Society of Mechanical Engineers
BIT	Boron Injection Tank
CAM	Continuous Air Monitors
CAP	Corrective Action Program
CFCU	Containment Fan Cooler Unit
CFR	Code of Federal Regulations
CRE	Control Room Envelope
CREACS	Control Room Emergency Air Cleanup System
CW	Circulating Water
DAC	Derived Air Concentration
DBA	Design Basis Accident
DCP	Design Change Package
DEHC	Digital Electrohydraulic Control
DRS	Division of Reactor Safety
ED	Electronic Dosimeter
EDEX	Effective Dose Equivalent for External Exposure
EDG	Emergency Diesel Generator
EMI	Electromagnetic Interference
EPD	Electronic Personal Dosimeter
EPRI	Electric Power Research Institute
FHA	Fuel Handling Accident
FSAR	Final Safety Analysis Report
GDC	General Design Criteria
HEPA	High Efficiency Particulate Air
HPCI	High Pressure Coolant Injection
HRA	High Radiation Area
HX	Heat Exchanger
I&C	Instrumentation and Controls
IEEE	Institute of Electrical and Electronics Engineers
IMC	Inspection Manual Chapter
INPO	Institute of Nuclear Power Operations
IST	Inservice testing
kV	Kilovolt
LER	Licensee Event Report
LHRA	Locked High Radiation Area
LLD	Lower Limits of Detection
LLRT	Local Leak Rate Test
MDA	Minimum Detectable Activity
MR	Maintenance Rule
MSHA	Mine Safety and Health Administration
NCV	Non-Cited Violation
NDE	Non-Destructive Examination
NEI	Nuclear Energy Institute

NIOSH	National Institute for Occupational Safety and Health
NOS	Nuclear Oversight
NOTF	Notification
NRC	Nuclear Regulatory Commission
NVLAP	National Laboratory Accreditation Program
ODCM	Offsite Dose Calculation Manual
OOS	Out of Service
OTDM	Operational Technical Decision Making
PARS	Publicly Available Records
pCi/g	picocuries per gram
PCM	Personnel Contamination Monitor
PCP	Process Control Program
PD	Performance Deficiency
PDI	Performance Demonstration Initiative
PI	Performance Indicator
PM	Portal Monitor
PSEG	Public Service Enterprise Group Nuclear LLC
PWR	Pressurized Water Reactor
QA	Quality Assurance
RCA	Radiological Controlled Area
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
REMP	Radiological Environmental Monitoring Program
RETS	Radiological Effluents Technical Specification
RFI	Radio Frequency Interference
RHR	Residual Heat Removal
RPM	Radiation Protection Manager
RWP	Radiation Work Permit
SAM	Small Article Monitor
SCBA	Self-contained Breathing Apparatus
SCCM	Standard Cubic Centimeter per Minute
SDP	Significance Determination Process
SG	Steam Generator
SRV	Safety Relief Valve
SSC	Structure, System, or Component
SW	Service Water
SWGR	Switchgear
TE	Technical Evaluation
TLD	Thermoluminescent Dosimeter
TS	Technical Specification
TYRA	Three Year Rolling Average
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
UT	Ultrasonic Test
VHRA	Very High Radiation Area
WBC	Whole Body Count
WO	Work Order