



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

February 3, 2012

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

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 -
NRC INTEGRATED INSPECTION REPORT 05000272/2011005 and
05000311/2011005

Dear Mr. Joyce:

On December 31, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Salem Nuclear Generating Station, Unit Nos. 1 and 2. The enclosed inspection report documents the inspection results which were discussed on January 12, 2012, with Mr. Carl Fricker 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.

No findings were identified during this inspection.

In accordance with 10 Code of Federal Regulation (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 Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

Arthur L. Burritt, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Docket Nos: 50-272; 50-311
License Nos: DPR-70; DPR-75

Enclosure: Inspection Report 05000272/2011005 and 05000311/2011005
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

T. Joyce

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/RA/

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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: 05000272/2011005 and 05000311/2011005

Licensee: PSEG Nuclear LLC (PSEG)

Facility: Salem Nuclear Generating Station, Unit Nos. 1 and 2

Location: P.O. Box 236
Hancocks Bridge, NJ 08038

Dates: October 1, 2011 through December 31, 2011

Inspectors: D. Schroeder, Senior Resident Inspector
P. McKenna, Resident Inspector
T. Fish, Senior Operations Engineer
J. Furia, Senior Health Physicist
S. Hammann, Senior Health Physicist
T. Hedigan, Operations Engineer
M. Modes, Senior Reactor Inspector
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S. Pindale, Senior Reactor Inspector
J. Schoppy, Senior Reactor Inspector

Approved By: Arthur L. Burritt, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

IR 05000272/2011005, 05000311/2011005; 10/01/2011 - 12/31/2011; Salem Nuclear Generating Station Unit Nos. 1 and 2; Routine Integrated Inspection Report.

The report covered a three-month period of inspection by resident inspectors, and announced inspections by a regional radiation specialists and reactor engineers. 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.

No findings were identified.

REPORT DETAILS

Summary of Plant Status

Salem Nuclear Generating Station Unit 1 (Unit 1) began the period at 100 percent power. On October 2, 2011, plant operators reduced power to 55 percent due to heavy river detritus, and increased power to 90 percent on October 4. Operators returned Unit 1 to full power on October 10, after river conditions stabilized. Unit 1 was shutdown for a refueling outage on October 23. The refueling outage ended on November 22 when Unit 1 was synchronized to the grid. Unit 1 reached 100 percent power on November 28. On December 5, operators reduced power to 82 percent because of a main condenser tube leak. Operators returned Unit 1 to 100 percent power on December 7. Unit 1 remained at 100 percent power for the remainder of the period.

Salem Nuclear Generating Station Unit 2 (Unit 2) began the period at 100 percent power. On November 15, 2011, plant operators reduced power to 73 percent due to a planned 500 KV line outage. Operators returned Unit 2 to full power on November 16 after the 500 KV line was restored. Unit 2 remained at 100 percent power for the remainder of the period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 - 1 sample)

.1 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors performed a review of PSEG's readiness for the onset of seasonal low temperatures. The review focused on the service water (SW) intake structure and the auxiliary feedwater (AFW) and primary water storage tanks. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), technical specifications (TSs), control room logs, and the corrective action program (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 cold weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment.1 Partial Walkdown (71111.04Q - 3 samples)a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 1 (Mode 5) and Unit 2 (Mode 1), 1B, 1C, 2A, 2B, and 2C emergency diesel generators (EDGs) while on a single source of offsite electrical power on October 26
- Unit 2, 2A, 2B, and 2C EDGs while on a single source of offsite electrical power on November 9
- Unit 1 and Unit 2, redundant SW trains when 15 and 26 SW pumps were out of service (OOS) on November 28

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, work orders, notifications, and the impact of ongoing work activities on redundant trains or 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

No findings were identified.

1R05 Fire ProtectionResident Inspector Quarterly Walkdowns (71111.05Q - 6 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 OOS, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Unit 1, Auxiliary equipment area, 45' and 55' elevations
- Unit 1, Containment, 78', 100' & 130' elevations

- Unit 1, Relay and battery rooms and corridor, 100' elevation
- Unit 2, Relay and battery rooms and corridor, 100' elevation
- Unit 1, Electrical penetration area, 78' elevation
- Unit 2, Electrical penetration area, 78' elevation

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07A - 1 sample)

a. Inspection Scope

The inspectors reviewed the 12A component cooling water (CCW) heat exchanger (HX) to determine its readiness and availability to perform its safety functions. The inspectors reviewed the design basis for the component and verified PSEG's commitments to NRC Generic Letter 89-13. The inspectors reviewed the results of previous inspections of the 12A CCW and similar HXs. 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 Inservice Inspection (71111.08 - 1 sample)

a. Inspection Scope

Inservice inspection activities detect precursors to pressure boundary failures in reactor coolant systems, emergency core cooling systems, risk-significant piping and components, and containment systems. Degradation of pressure retaining components in these systems would result in a significant increase in risk. This inspection is intended to assess the effectiveness of PSEG's program for monitoring degradation of vital system boundaries.

Non-destructive Examination and Welding Activities

The inspectors observed the physical impediments to implementing the ultrasonic inspection of the 14 hot leg nozzle safe-end located in the "sandbox" enclosure. The inspectors observed the calibration of the Phased-Array Ultrasonic Equipment prior to the examination of the nozzle and reviewed the final report, including disposition of an indication discovered during a prior examination of the nozzle. The inspectors reviewed the qualification of the personnel performing the examination.

The inspectors observed the expanded area of inspection of the containment liner boundary and the containment liner in the area of the containment liner to floor intersection. PSEG was implementing an inspection program in conformance with the

American Society of Mechanical Engineers Code Section XI Subsection IWE. As previously reported, inspectors observed the areas subjected to ultrasonic examination of the containment liner after removal of interior surface insulating panels. The inspectors observed the prior inspection areas which had been remediated and recoated. The additional panels removed during this outage allowed the inspectors to observe an additional area of the as-found condition of the liner surface and compare it to the previous results.

For component replacement work, the inspectors reviewed the replacement of a feedwater elbow due to flow-assisted-corrosion. The inspectors observed the location of the feedwater elbow in containment, and reviewed the replacement program and acceptance radiographs. The inspectors also reviewed the pre-service examination by Phased Array Ultrasonic Testing, including the calibration record and qualification of personnel performing the examination.

Pressurized-Water Reactor Vessel Upper Head Penetration Inspection Activities

No inspections were performed by PSEG.

Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed the photographic evidence of boric acid leaks and compared the evidence with the engineering evaluations. Also, the inspectors verified that degraded or non-conforming conditions are identified properly in PSEG's CAP.

The inspectors observed the condition of pressurized components during a walk-down of containment, interviewed the program manager, and independently reviewed the resolution of corrective actions taken as a consequence of the initial boric acid program walkdowns.

Steam Generator Tube Inspection Activities

No inspections were performed by PSEG.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program

.1 Requalification Activities Review by Resident Staff (71111.11Q - 1 sample)

a. Inspection Scope

The inspectors observed licensed operator simulator training on November 30, 2011, which included a fire in the turbine building that caused a loss of 125VDC control power to a vital bus, a loss of all circulating water, and a loss of secondary heat sink. 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 control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the technical specification 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 In-Office Review by Regional Specialist (71111.11B - 1 sample)

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1, Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program," Appendix A, "Checklist for Evaluating Facility Testing Material," and Appendix B, "Suggested Interview Topics."

A review was conducted of recent operating history documentation found in inspection reports, PSEG's CAP, and the most recent NRC plant issues matrix. The inspectors also reviewed specific events from PSEG's CAP that indicated possible training deficiencies, to verify that they had been appropriately addressed. The senior resident inspector was also consulted for insights regarding licensed operators' performance. These reviews did not detect any operational events that were indicative of possible training deficiencies.

The operating tests for the week of August 22, 2011, were reviewed for quality and performance.

On October 31, 2011, the results of the annual operating tests for 2011 were reviewed to determine if pass/fail rates were consistent with the guidance of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1, and NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process." (The comprehensive written examinations were not administered this year.) The review verified the following:

- Crew pass rate was greater than 80 percent. (Pass rate was 100 percent.)
- Individual pass rate on the dynamic simulator test was greater than 80 percent. (Pass rate was 100 percent.)
- Individual pass rate on the job performance measures (JPMs) of the operating exam was greater than 80 percent. (Pass rate was 97 percent.)
- More than 75 percent of the individuals passed all portions of the exam. (97 percent of the individuals passed all portions of the operating examination.)

Observations were made of the dynamic simulator exams and JPMs administered during the week of August 22, 2011. These observations included facility evaluations of crew

and individual performance during the dynamic simulator exams and individual performance of five JPMS.

A sample of records for requalification training attendance, license renewal, license reactivation, maintenance of license proficiency, and medical examinations were reviewed for compliance with license conditions and NRC regulations.

The remediation plan for an operator who failed the 2010 comprehensive written exam was reviewed to assess the effectiveness of the remedial training.

Operators, instructors, and training/operations management were interviewed for feedback on their training program and the quality of training received.

Simulator performance and fidelity were reviewed for conformance to the reference plant control room.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12 - 2 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, and component (SSC) performance and reliability. The inspectors reviewed system health reports, CAP notifications, maintenance work orders, and maintenance rule basis documents to ensure that PSEG was identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the SSC was properly scoped into the maintenance rule 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 maintenance rule system boundaries.

- Units 1 and 2 EDG reliability and unavailability
- 2011 PSEG A(3) maintenance rule periodic assessment

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 - 4 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 60.65(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.

- Unit 1 and Unit 2, Control air ventilation in maintenance mode on October 17
- Unit 2, Single source of offsite power during switchyard maintenance on October 26
- Unit 2, Planned maintenance on 21 residual heat removal (RHR) pump, 21 component cooling water (CCW) pump, 23 charging pump and 21 chiller with an extended maintenance period on 26 SW pump on December 1
- Unit 2, 4 SW bay, 25 containment fan cooler unit (CFCU), 22 chiller, 22 component cooling heat exchanger (CCHX), and 22 CCW pump out of service for planned maintenance on December 12

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 - 8 samples)

a. Inspection Scope

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

- 23 Chiller condenser recirculation pump not rotating
- 1B EDG manual voltage regulator degraded
- SW system during 2011 grassing season
- 1A EDG secondary fuel oil filter alignment concern
- SW motor operated butterfly valves high bearing friction
- CFCU motor cooler access plate non-conforming bolting
- 28 VDC battery chargers non-conforming high voltage cards
- 22 AFW steam generator inlet check valve (22AF23) required mechanical agitation to seat

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. 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

No findings were identified.

1R18 Plant Modifications (71111.18 - 1 sample)

.1 Permanent Modifications

a. Inspection Scope

The inspectors evaluated a modification to install the 13 AFW pump turbine latch status alarm, implemented by design change package 80102588, Auxiliary Feedwater Pump Steam Turbine Latch Status Alarm. The inspectors verified that the design bases, licensing bases, and performance capability of the affected system was not degraded by the modification. In addition, the inspectors reviewed modification documents associated with the upgrade and design change, including the design change package, the control room alarm response procedure, and the 50.59 screening review.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 - 7 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.

- WO 30193555, 11SW127 outlet valve for 11 CCHX following planned maintenance and inspections on October 31, 2011
- WO 30195333, 1B EDG following planned maintenance and inspections on November 3, 2011
- WO 30193149, 1A EDG following planned maintenance and inspections on November 8, 2011
- WO 30105272, 13 turbine-driven AFW pump following planned maintenance on November 18, 2011
- WO 50133444, Rod drop timing test following refueling activities on November 18, 2011

- WO 60082194, 21CC16, outlet valve for 21 RHR HX following thermal overload maintenance on December 2, 2011
- WO 30177738, 11MS46 supply line check valve for 13 turbine-driven AFW pump following replacement of valve internals on November 29, 2011

The inspectors also witnessed the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions.

b. 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 (1R21), which was conducted October 23 through November 22, 2011. 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
- 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
- Reactor start-up and plant heat-up activities
- Identification and resolution of problems related to refueling outage activities

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 - 3 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 TSSs, 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:

- S1.OP-ST.SSP-006, Engineered Safety Features Containment Isolation Valves Phase "B" (Main Steam and Core Spray) Test on October 27, 2011
- S1.OP-ST.SJ-0020, Periodic Leakage Test-Reactor Coolant Isolation Valves on November 17, 2011
- S1.OP-ST.AF-0003, Inservice Testing - 13 AFW Pump on December 21

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Radiation Safety - Public and Occupational

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)a. Inspection Scope

During the period of October 31, 2011, through November 4, 2011, the inspectors reviewed PSEG performance indicators (PIs) for the Occupation Exposure cornerstone for follow-up. The inspectors reviewed the results of radiation protection program audits. The inspectors reviewed reports of operational occurrences related to occupational radiation safety since the last inspection.

The inspectors reviewed PSEG's 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 two sealed sources from PSEG's inventory records that presented the greatest radiological risk. The inspectors verified that sources are accounted for and had been verified to be intact.

The inspectors verified that any transactions involving nationally tracked sources were reported in accordance with 10 CFR 20.2207.

During tours of the facility and review of ongoing work, the inspectors evaluated ambient radiological conditions and verified that existing conditions were consistent with posted surveys, radiation work permits (RWPs), and worker briefings, as applicable.

During job performance observations, the inspectors verified the adequacy of radiological controls, such as required surveys, radiation protection job coverage, and contamination controls. The inspectors evaluated PSEG's means of using electronic personnel dosimeters in high noise areas as high radiation area (HRA) monitoring devices.

The inspectors verified that radiation monitoring devices were placed on the individual's body consistent with the method that PSEG was employing to monitor dose from external radiation sources. The inspectors verified that the dosimeter was placed in the location of highest expected dose or that PSEG was properly employing an NRC-approved method of determining effective dose equivalent.

For high-radiation work areas with significant dose rate gradients (a factor of five or more), the inspectors reviewed the application of dosimetry to effectively monitor exposure to personnel.

The inspectors reviewed RWPs for work within airborne radioactivity areas with the potential for individual worker internal exposures. The inspectors evaluated airborne radioactive controls and monitoring, including potentials for significant airborne contamination. For these selected airborne radioactive material areas, the inspectors verified barrier integrity and temporary high-efficiency particulate air ventilation system operation.

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

The inspectors conducted selective inspections of posting and physical controls for HRAs and very HRAs, to the extent necessary to verify conformance with the Occupational Safety PIs.

b. Findings

No findings were identified.

2RS2 Occupational As Low as Reasonably Achievable (ALARA) Planning and Controls (71124.02)

a. Inspection Scope

The inspectors verified that problems associated with ALARA planning and controls were being identified by PSEG at an appropriate threshold and were properly addressed for resolution in their CAP.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors verified that PSEG provided respiratory protective devices such that occupational doses are ALARA. As available, the inspectors selected work activities where respiratory protection devices were used to limit the intake of radioactive materials, and verified that PSEG performed an evaluation concluding that further engineering controls were not practical and that the use of respirators was ALARA. The inspectors verified that PSEG had established means to verify that the level of protection provided by the respiratory protection devices during use was at least as good as that assumed in PSEG's work controls and dose assessment.

The inspectors verified that respiratory protection devices used to limit the intake of radioactive materials were certified by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA) or had been approved by the NRC. The inspectors selected work activities where respiratory protection devices were used and verified that the devices were used consistent with their NIOSH/MSHA certification.

The inspectors reviewed records of air testing for supplied-air devices and self-contained breathing apparatus (SCBA) bottles. The inspectors verified that air used in these devices met or exceeded Grade D quality. The inspectors verified that plant breathing air supply systems met the minimum pressure and airflow requirements for the devices in use.

The inspectors selected individuals qualified to use respiratory protection devices, and verified that they had been deemed fit to use the device(s) by a physician.

The inspectors selected individuals assigned to wear a respiratory protection device and observed them donning, removing, and functionally checking the device as appropriate. The inspectors verified that these individuals knew how to safely use the device and how to properly respond to any device malfunction or unusual occurrence. The inspectors reviewed training curricula for users of the devices.

The inspectors chose respiratory protection devices staged and ready for use in the plant or stocked for issuance for use. The inspectors observed the physical condition of the device components and reviewed records of routine inspection for each. The inspectors selected a sampling of the devices and reviewed records of maintenance on the vital components. The inspectors verified that onsite personnel assigned to repair vital components had received vendor-provided training.

Based on the FSAR, TSs, and emergency operating procedure requirements, the inspectors reviewed the status and surveillance records of SCBAs staged in-plant for use during emergencies. The inspectors observed PSEG's capability for refilling and

transporting SCBA air bottles to and from the control room and operations support center during emergency conditions.

The inspectors selected individuals on control room shift crews and individuals from designated departments currently assigned emergency duties and determined that control room operators and other emergency response and radiation protection personnel were trained and qualified in the use of SCBAs. The inspectors determined that personnel assigned to refill bottles were trained and qualified for that task.

The inspectors verified that appropriate mask sizes and types were available for use. The inspectors selected on-shift operators and verified that they had no facial hair that would interfere with the sealing of the mask to the face. The inspectors also verified that vision correction did not penetrate the face seal.

The inspectors reviewed the past two years of maintenance records for SCBA units used to support operator activities during accident conditions and designated as "ready for service." The inspectors verified that any maintenance or repairs on an SCBA unit's vital components were performed by an individual, or individuals, certified by the manufacturer of the device to perform the work. The inspectors reviewed the onsite maintenance procedures governing vital component work, and identified any inconsistencies with the SCBA manufacturer's recommended practices. For those SCBAs designated as "ready for service," the inspectors ensured that the required, periodic air cylinder hydrostatic testing was documented and up to date, and the retest air cylinder markings required by the U.S. Department of Transportation were in place.

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation (71124.05)

a. Inspection Scope

The inspectors observed PSEG staff performance as they demonstrated source checks for various types of portable survey instruments. The inspectors determined that high-range instruments are source checked on all appropriate scales.

The inspectors walked down area radiation monitors and continuous air monitors to determine whether they are appropriately positioned relative to the radiation source(s) or area(s) they are intended to monitor.

The inspectors selected personnel contamination monitors, portal monitors, and small article monitors and verified that the periodic source checks were performed in accordance with the manufacturer's recommendations and PSEG procedures.

The inspectors reviewed the methods and sources used to perform whole body counter (WBC) functional checks before daily use of the instrument. The inspectors determined that check sources were appropriate and align with the plant's isotopic mix.

The inspectors reviewed WBC calibration reports completed since the last inspection to verify that calibration sources were representative of the plant source term and that appropriate calibration phantoms were used.

The inspectors selected samples of each type of instruments used on site, and verified that the alarm setpoint 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 above and discussed the calibration methods with PSEG to determine consistency with the manufacturer's recommendations.

The inspectors reviewed calibration documentation for at least one of each type of instrument. For portable survey instruments and area radiation monitors, the inspectors reviewed detector measurement geometry and calibration methods, and had PSEG demonstrate use of its instrument calibrator.

The inspectors selected portable survey instruments that did not meet acceptance criteria during calibration or source checks and verified that PSEG had taken appropriate corrective action for instruments found significantly out of calibration. The inspectors verified that PSEG had evaluated the possible consequences of instrument use since the last successful calibration or source check.

The inspectors reviewed the current output values for PSEG's portable survey and ambient air monitor instrument calibrator units. The inspectors verified that PSEG periodically measured calibrator output over the range of the instruments used through measurements by ion chamber/electrometer.

The inspectors verified that the measuring devices had been calibrated by a facility using National Institute of Standards and Technology traceable sources and that correction factors for these measuring devices were properly applied by PSEG in its output verification.

The inspectors reviewed PSEG's 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," source term to determine if the calibration sources used were representative of the types and energies of radiation encountered in the plant.

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)

a. Inspection Scope

The inspectors reviewed the solid radioactive waste system description in the FSAR, the Process Control Program (PCP), and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed.

The inspectors reviewed the scope of any quality assurance (QA) audits in this area since the last inspection to gain insights into PSEG's performance and inform the "smart sampling" inspection planning.

The inspectors selected areas where containers of radioactive waste were stored, and verified that the containers were labeled in accordance with 10 CFR 20.1904, "Labeling Containers," or controlled in accordance with 10 CFR 20.1905, "Exemptions to Labeling Requirements," as appropriate.

The inspectors verified that the radioactive materials storage areas were controlled and posted in accordance with the requirements of 10 CFR Part 20, "Standards for Protection against Radiation." For materials stored or used in the controlled or unrestricted areas, the inspectors verified that they were secured against unauthorized removal and controlled in accordance with 10 CFR 20.1801, "Security of Stored Material," and 10 CFR 20.1802, "Control of Material Not in Storage," as appropriate.

The inspectors verified that PSEG had established a process for monitoring the impact of long-term storage (e.g., buildup of any gases produced by waste decomposition, chemical reactions, container deformation, loss of container integrity, or re-release of free-flowing water) sufficient to identify potential unmonitored, unplanned releases or non-conformance with waste disposal requirements. The inspectors selected containers of stored radioactive materials and verified that there were no signs of swelling, leakage, and deformation.

The inspectors selected liquid and solid radioactive waste processing systems, and walked down accessible portions of systems to verify and assess that the current system configuration and operation agreed with the descriptions in the FSAR, offsite dose calculation manual (ODCM), and the PCP.

The inspectors selected radioactive waste processing equipment that was not operational and/or was abandoned in place, and verified that PSEG had established administrative and/or physical controls to ensure that the equipment would not contribute to an unmonitored release path and/or affect operating systems or be a source of unnecessary personnel exposure. The inspectors verified that PSEG had reviewed the safety significance of systems and equipment abandoned in place in accordance with 10 CFR 50.59, "Changes, Tests, and Experiments."

The inspectors reviewed the adequacy of any changes made to the radioactive waste processing systems since the last inspection. The inspectors verified that changes from what is described in the FSAR were reviewed and documented in accordance with 10 CFR 50.59, as appropriate.

The inspectors selected processes for transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers. The inspectors verified that the waste stream mixing, sampling procedures, and methodology for waste concentration averaging were consistent with the PCP, and provided representative samples of the waste product for the purposes of waste classification as described in 10 CFR 61.55, "Waste Classification."

For those systems that provide tank recirculation, the inspectors verified that the tank recirculation procedure provides sufficient mixing.

The inspectors verified that PSEG's PCP correctly described the current methods and procedures for dewatering and waste.

The inspectors selected radioactive waste streams, and verified that PSEG's radiochemical sample analysis results were sufficient to support radioactive waste characterization as required by 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." The inspectors verified that PSEG's use of scaling factors and calculations, to account for difficult-to-measure radionuclides, was technically sound and based on current 10 CFR Part 61 analyses.

For the waste streams selected above, the inspectors verified that changes to plant operational parameters were taken into account to (1) maintain the validity of the waste stream composition data between the annual or biennial sample analysis update, and (2) verify that waste shipments continued to meet the requirements of 10 CFR Part 61.

The inspectors verified that PSEG had established and maintained an adequate QA program to ensure compliance with the waste classification and characterization requirements of 10 CFR 61.55 and 10 CFR 61.56, "Waste Characteristics."

The inspectors observed shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and PSEG verification of shipment readiness. The inspectors verified that the requirements of any applicable transport cask certificate of compliance had been met. The inspectors verified that the receiving licensee was authorized to receive the shipment packages.

The inspectors observed radiation workers during the conduct of radioactive waste processing and radioactive material shipment preparation and receipt activities. The inspectors determined that the shippers were knowledgeable of the shipping regulations and that shipping personnel demonstrated adequate skills to accomplish the package preparation requirements for public transport with respect to PSEG's response to NRC Bulletin 79-19, "Packaging of Low-Level Radioactive Waste for Transport and Burial," dated August 10, 1979, and 49 CFR Part 172, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communication, Emergency Response Information, Training Requirements, and Security Plans," Subpart H, "Training." The inspectors verified that PSEG's training program provided training to personnel responsible for the conduct of radioactive waste processing and radioactive material shipment preparation activities.

The inspectors selected non-excepted package shipment records and verified that the shipping documents indicated the proper shipper name; emergency response information and a 24-hour contact telephone number; accurate curie content and volume of material; and appropriate waste classification, transport index, and UN number. The inspectors verified that the shipment placarding was consistent with the information in the shipping documentation.

The inspectors verified that problems associated with radioactive waste processing, handling, storage, and transportation were being identified by PSEG at an appropriate threshold, were properly characterized, and were properly addressed for resolution in their CAP. The inspectors verified the appropriateness of the corrective actions for a selected sample of problems documented by PSEG that involved radioactive waste processing, handling, storage, and transportation.

The inspectors reviewed the results of selected audits performed since the last inspection of this program and evaluated the adequacy of PSEG's corrective actions for issues identified during those audits.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification (71151)

.1 Mitigating Systems Performance Index (4 samples)

a. Inspection Scope

The inspectors reviewed PSEG submittals of the Mitigating Systems Performance Index for the following systems for the period of October 1, 2010 through September 30, 2011:

- Unit 1 High pressure injection systems
- Unit 2 High pressure injection systems
- Unit 1 Emergency AC power
- Unit 2 Emergency AC power

To determine the accuracy of the PI data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors also reviewed PSEG CAP records, control room operators' logs, the site operating history database, and key PI records to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.2 Occupational Radiation Safety Cornerstone (1 sample)

a. Inspection Scope

The inspectors reviewed a listing of PSEG action reports for issues related to the occupational radiation safety PI, which measures non-conformances with HRAs greater than one Roentgen/hour (R/hr) and unplanned personnel exposures greater than 100 millirem (mrem) total effective dose equivalent (TEDE), 5 rem skin dose equivalent (SDE), 1.5 rem lens dose equivalent (LDE), or 100 mrem to the unborn child.

The inspectors determined if any of these PI events involved dose rates >25 R/hr at 30 centimeters or >500 R/hr at one meter. If so, the inspectors determined what barriers had failed and if there were any barriers left to prevent personnel access. For unintended exposures >100 mrem TEDE (or >5 rem SDE or >1.5 rem LDE), the inspectors determined if there were any overexposures or substantial potential for overexposure. The inspectors determined that no PI events for the occupational radiation safety cornerstone had occurred during the assessment period.

b. Findings

No findings were identified.

.3 Public Radiation Safety Cornerstone (1 sample)

a. Inspection Scope

The inspectors reviewed a listing of PSEG action reports for the issues related to the public radiation safety PI, which measures radiological effluent release occurrences per site that exceed 1.5 mrem/quarter (qtr) whole body or 5 mrem/qtr organ dose for liquid effluents; or 5 millirads (mrads)/qtr gamma air dose, 10 mrads/qtr beta air dose; or 7.5 mrems/qtr organ doses from Iodine-131, Iodine-133, Hydrogen-3, and particulates for gaseous effluents. The inspectors determined that no PI events for the public radiation safety cornerstone had occurred during the assessment period.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 - 2 annual samples; 1 trend sample)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 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 daily management review committee meetings.

b. Findings

No findings were identified.

.2 Semi-annual Trend Sample

a. Inspection Scope

The inspectors performed a semi-annual review of site issues, as required by Inspection Procedure 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, maintenance rule assessments, and maintenance or CAP backlogs. The inspectors also reviewed PSEG's CAP database for the six month period of June 1, 2011 through November 30, 2011 to assess condition reports written on equipment problems, and human performance issues, as well as individual issues identified during the NRCs daily condition report review (Section 40A2.1). The inspectors reviewed the quarterly trend report for the third quarter of 2011 to verify that PSEG personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

b. Findings and Observations

No findings were identified.

The inspectors noted a negative trend in the reliability and availability of the circulating water pumps and traveling screens. During the review period, there have been multiple instances of entries by the plant operators into abnormal procedures following the removal of two or more circulating water pumps from service. Reactor power was reduced several times to comply with procedure requirements that prevent excessive heat load on the main condenser while operating with reduced cooling capacity associated with reduced circulating water flow. River detritus levels were elevated following Hurricane Irene, increasing the wear and challenging the reliability of the traveling water screens.

During the fall refuel outage of Unit 1, a design change was enacted in an effort to improve the circulating water screen differential level indication, by installing radar type of level indicators. The design change that installed the new level indicators caused an issue that affected the circulating water screens, which depend on the differential level circuitry for speed control and protection. There was degradation of circulating water screen baskets caused by slow reaction of the new differential level monitors, which contributed to unavailability of circulating water screens. PSEG has a team dedicated to the improvement of the circulating water system and associated traveling water screens. Installation of extended screen wash discharge piping is being installed to reduce the recirculation of detritus on the circulating water screens. Upgrades to this system will be monitored during and after the completion of these projects.

.3 Annual Sample: Review of the Operator Workaround Program

a. Inspection Scope

The inspectors reviewed the cumulative effects of the existing operator workarounds, operator burdens, existing operator aids and disabled alarms, and open main control room deficiencies to identify any effect on emergency operating procedure operator actions, and any impact on possible initiating events and mitigating systems. The inspectors evaluated whether station personnel had identified, assessed, and reviewed operator workarounds as specified in Salem procedure OP-AA-102-103, "Operator Workaround Program."

The inspectors reviewed PSEG's process to identify, prioritize, and resolve main control room distractions to minimize operator burdens. The inspectors reviewed the system used to track these operator workarounds and recent PSEG self-assessments of the program. The inspectors also toured the control room and discussed the current operator workarounds with the operators to ensure the items were being addressed on a schedule consistent with their relative safety significance.

b. Findings and Observations

No findings were identified.

The inspectors identified some minor inconsistencies between the operators burden program and operator workaround program procedures. These included inconsistencies in the use of terms such as "burdens," "challenges," and "concerns." In addition, the codes used to identify operator burdens in the computerized work management system were not consistent with the codes identified in procedure OP-AA-102-103-1001, "Operator Burdens Program." Finally, although there were no open workarounds for either unit, the operator burdens list generated from the work management system incorrectly characterized one of the items as an operator workaround. The inspectors confirmed that the identified tracking deficiencies in the operator burden and work around programs did not affect emergency operating procedure operator actions, or adversely affect the objectives of the initiating events and mitigating systems cornerstones; and therefore determined that the issues were minor. The inspectors discussed these items with Operations management, who informed the inspectors of the status of an ongoing self-assessment/improvement effort associated with the operator burdens program. The minor discrepancies identified by the inspectors are planned to be considered in PSEG's ongoing self-assessment effort.

.4 Annual Sample: Process Radiation Monitoring System Reliability

a. Inspection Scope

The inspectors performed an in-depth review of PSEG's review, analysis, and corrective actions associated with several notifications regarding reliability issues of the process radiation monitors (PRMs) installed in Salem Units 1 and 2. The inspection specifically included a review of all TS or ODCM limiting condition for operation entries beginning with October 2010 and in-depth evaluations of the following issues:

- Repetitive Unit 1 containment air particulate detector (APD) paper drive failures
- Repetitive Unit 2 steam generator blowdown (SGBD) PRM scintillation detector failures
- Unit 1 and Unit 2 SW PRM reliability issues with corrosion, fouling, and air entrainment
- Unit 1 and Unit 2 main steam line (MSL) post accident PRM spiking issue

The inspectors assessed PSEG's problem identification threshold, cause analyses, extent of condition reviews, compensatory actions, and the prioritization and timeliness of corrective actions to determine whether PSEG was appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of PSEG's CAP and 10 CFR Part 50, Appendix B. In addition, the inspectors performed field walkdowns and interviewed engineering personnel to assess the effectiveness of the implemented corrective actions.

b. Findings

No findings were identified.

PSEG determined the apparent cause of each specific PRM issue listed above and appropriately implemented the maintenance rule program evaluation criteria as well as timely and long term corrective actions:

- The Unit 1 containment APD issues were related to poor maintenance practices and procedure quality issues. PSEG trained maintenance technicians, revised maintenance procedures to address the specific paper drive failure, and initiated a design change modification to a paper drive model that was less susceptible to the specific failure mechanism.
- The Unit 2 SGBD PRM detector failures were identified through laboratory testing to be related to corrosion of the detector. Specifically, the internal nickel coating of the aluminum casing was damaged during shipment and the aluminum reacted with the internal elements of the scintillation detector. PSEG contacted the vendor and they committed to removing the detector from its casing and packing it separately prior to shipment. PSEG also accelerated surveillance testing of the Unit 2 SGBD PRMs to verify the issue was resolved and no further corrosion issues existed.
- The Unit 1 and Unit 2 SW PRM long term reliability issues were caused by improper selection of materials for the SW environment, air entrainment introduced from circulating water at the main condenser water boxes, and SW detritus and silt. PSEG was not successful at resolving each of these issues for the installed PRMs and the long term solution intended is a PRM that that uses a proximity radiation monitor inserted into the SW outfall. Interim compensatory sampling is performed until the permanent plant modification is installed and operational. The inspectors verified PSEG intended to install the SW PRM modification in the near future.
- The Unit 1 and Unit 2 MSL PRM spiking issues were caused by calibration methodology and procedure instructions. During calibrations, maintenance technicians measured the background to offset or subtract from the instrument alarm setpoint using a reading from the installed MSL PRM. This reading was susceptible to instrument drift affected by ambient temperature. As ambient temperature increased, the instrument reading could increase as much as 3 mrem/hr for the

temperature swings within the installed plant areas. If the nominal 10 mrem/hr alarm setpoint was established during the winter months, a small background would be determined and a low offset would be subtracted from the alarm setpoint during calibration. Subsequently during the summer months, the PRM may spike above its established setpoint as the instrument drifts due to the temperature effects. Likewise, if the instrument were calibrated in the summer, a nonconservative large background offset would be subtracted from the instrument alarm setpoint. PSEG verified with the vendor that background measurement using an external radiation monitoring instrument was an acceptable calibration methodology and would eliminate the temperature error introduced during calibration. PSEG revised its calibration procedures. PSEG also completed a technical evaluation of the MSL PRM operability and determined that all MSL PRMs remained operable as calibrated with the previous methodology and for the temperatures at which they were calibrated.

The inspectors determined PSEG's response to all reviewed PRM issues were commensurate with the safety significance, timely, and included appropriate compensatory and corrective actions. The inspectors determined that the actions taken to improve reliability of the PRM system were appropriate.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 - 2 samples)

.1 (Closed) Licensee Event Report (LER) 05000272/2011-004-0, 11 Component Cooling Water Pump Inoperable For Greater Than Allowed By Technical Specifications

On August 22, 2011, during the performance of rounds, an equipment operator found one of the two outboard pedestal mounting bolts for the 11 CCW pump dislodged and the other outboard mounting bolt was backed out approximately 1 inch. At 0217, the 11 CCW pump was declared inoperable and Technical Specification Action Statement (TSAS) 3.7.3.1 was entered. The 11 CCW pump was in service at the time of discovery. The pump was stopped and the 12 CCW pump placed in service. The 11 CCW pump pedestal bolts were replaced and torqued. The 11 CCW pump was retested satisfactory. The pump was returned to operable status on August 23, 2011, at 0057 hours and TSAS 3.7.3.1 exited.

The cause of the loose bolting was the original vendor supplied pedestal bolting was not adequately torqued during factory assembly of the 11 CCW pump and pedestal. Once torqued properly the bolts should have remained captured due to adequate bolt stretch and preload. Corrective actions include replacement and torque of the 11 CCW pump pedestal bolts, a walkdown of the similar type pumps (CCW, Containment Spray, and Spent Fuel Cooling), and the validation of pedestal bolts torque values for the Containment Spray, Spent Fuel Cooling, and the remaining CCW pumps. The inspectors completed a review of this LER and verified a violation of TS 3.7.3.1, Component Cooling Water System. The inspectors determined that this was a minor violation because a single pump of a three pump system was inoperable for seismic qualification only, and did not impact the availability of the pump for non-seismic events. This LER is closed.

.2 (Closed) LER 05000311/2011-005-1, Completion of Plant Shutdown in Accordance with Technical Specification 3.0.3

At 8:38 PM on July 14, 2011, during the performance of the Salem Unit 2 Emergency Core Cooling System fill and vent monthly surveillance test, a leakage path was identified from the Boron Injection Tank (BIT) relief valve 2SJ10 piping. Investigation determined that the leakage was approximately 15 gallons per minute due to lifting of the 2SJ10 relief valve. Upon closure of the BIT inlet valve 2SJ4 to isolate the flow through the relief valve, a through wall socket weld crack developed on the 2SJ10 relief valve inlet piping. The BIT is part of the flow path of the high head safety injection system. Without the high head safety injection flow path operable, TS 3.0.3 was entered.

The 2SJ10 relief valve lifting was the result of missed opportunities to correct a component design application deficiency. The socket weld cracking was determined by laboratory analysis to be caused by a combination of fatigue and transgranular stress corrosion cracking. The affected 2SJ10 piping has been replaced with a new straight run of pipe and the relief valve internals were replaced. PSEG plans to issue a design change to resolve 1/2SJ10 operating margin, eliminate unnecessary non-isolatable socket welds in the BIT system and replace the remaining non-isolatable socket welds in the BIT system with low carbon weld filler and install a stiffener on the 2SJ10 relief valve piping. The inspectors completed a review of this LER and identified no additional violations of regulatory requirements. Two violations associated with this issue were previously documented in NRC Inspection Report 05000311/2011004 as Green findings. This LER is closed.

4OA5 Other Activities

.1 Temporary Instruction 2515/179, "Verification of Licensee Response to NRC Requirement for Inventories of Materials Tracked in the National Source Tracking System (NSTS) Pursuant to 10 CFR 20.2207"

a. Inspection Scope

The inspectors verified the information listed on PSEG's inventory record by performing a physical inventory, at PSEG's facility, and visually identified each item listed on their inventory.

During the physical inventory, the inspectors examined the physical condition of devices and/or containers containing nationally tracked sources; evaluated the effectiveness of PSEG's procedures for secure storage and handling of nationally tracked sources; discussed PSEG maintenance of devices containing nationally tracked sources, including leak rate tests and verified that PSEG is performing maintenance as required; and determined that the posting and labeling of nationally tracked sources was adequate.

The inspectors reviewed PSEG records documenting transactions of subject sources, and compared these records with the data from PSEG's NSTS inventory. The inspectors evaluated the effectiveness of PSEG procedures for updating inventory records.

b. Findings

No findings were identified.

.2 Seismic Restraints in an Independent Spent Fuel Storage Installation (ISFSI) Campaign (60855.1)

a. Inspection Scope

The inspection scope was limited to Salem's use of seismic restraints in an independent spent fuel storage installation (ISFSI) campaign. During July and August 2011, Salem conducted a campaign loading spent fuel assemblies into casks for their ISFSI. During this loading campaign, Salem used seismic restraints, which had not been used in prior loading campaigns. The seismic restraints were used during the stack-up evolution in which the HI-TRAC, with the multi-purpose canister (MPC) inside, is placed on top of the HI-STORM and the MPC is lowered from the HI-TRAC into the HI-STORM. The inspectors interviewed the ISFSI project manager, cask vendor representative, members of the radiation protection staff, and contract employees performing the stack-up evolution. The inspectors attended the pre-job briefing and observed the use of the seismic restraints during the stack-up evolution. The inspectors also observed members of the radiation protection staff providing job coverage for the dry cask loading campaign. The inspectors reviewed the procedure, which includes the use of seismic restraints, as well as the 10 CFR 72.48 screening determination for the seismic restraints. NRC engineers reviewed the seismic calculations and Holtec International drawings that were submitted August 1, August 22, September 21, and October 29, 2011.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

The inspectors presented the inspection results to Mr. C. Fricker and other members of PSEG management at the conclusion of the inspection on January 12, 2012. The inspectors asked PSEG whether any materials examined during the inspection were proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION**KEY POINTS OF CONTACT**Licensee personnel:

C. Fricker, Site Vice President
 L. Wagner, Plant Manager
 J. Kandasamy, Regulatory Affairs Manager
 R. Wegner, Maintenance Director
 L. Rajkowski, Engineering Director
 J. Garecht, Operations Director
 H. Berrick, Regulatory Assurance
 B. Thomas, Regulatory Assurance
 T. Giles, ISI Program Manager
 S. Taylor, Radiation Protection Manager
 M. Straubmuller, Outage Manager
 J. Sears, Work Management Director
 M. Oliveri, NDE Manager
 C. Covik, Boric Acid Program Manager
 J. Carney, Operations Training Manager
 E. Powell, Operations Services Manager
 D. Boyle, Salem Maintenance Rule Coordinator
 A. Johnson, Senior Manager Design Engineering

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSEDClosed

05000272/2011-004-0	LER	11 Component Cooling Water Pump Inoperable for Greater Than Allowed By Technical Specifications (Section 4OA3.1)
05000311/2011-005-1	LER	Completion of Plant Shutdown in Accordance with Technical Specification 3.0.3 (Section 4OA3.2)

LIST OF DOCUMENTS REVIEWED

In addition to the documents identified in the body of this report, the inspectors reviewed the following documents and records:

Section 1R01: Adverse Weather ProtectionProcedures

SC.MD-GP.ZZ-0001, Station Preparations for Winter – Mechanical, Revision 7
 SC.MD-GP.ZZ-0178, Station Preparation for Winter – Electrical, Revision 19
 SC.OP-AB.ZZ-0001, Adverse Environmental Conditions, Revision 14

SC.OP-PT.ZZ-0002, Station Preparations for Seasonal Conditions, Revision 11
SH.FP-TI.FP-0001, Freeze Prevention and Winter Readiness of Fire Protection Systems,
Revision 4
WC-AA-107, Seasonal Readiness, Revision 11

Notifications (NRC identified)

20463019	20529311	20529409	20529415	20529624	20529642
20529726	20530597	20531988	20532150	20534447	20533592
20533596	20539069*				

Orders

30203121	70105856	70125429
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Other Documents

SVP-2011-012, Salem Winter Seasonal Readiness Affirmation, dated 11/01/10

Section 1R04: Equipment Alignment

Procedures

S1.OP-ST.SW-0001, Service Water Pump Operation, Revision 26
S1.OP-ST.SW-0005, Service Water System Operation, Revision 38
S1.OP-ST.SW-0013, Service Water Valve Verification Modes 1-4, Revision 1

Drawings

205242

Notifications

20361858	20520716	20524882	20536478	20536484	20536495
20537003	20537161	20537164	20537223		

Orders

30079324	30193555
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Other Documents

Work Clearance Documents 4302350, 4305861, 4306754, 4306759, & 4307563

Section 1R05: Fire Protection

Procedures

FRS-II-411, Salem Unit 1 (Unit 2) Pre-Fire Plan, Reactor Plant Auxiliary Equipment Area,
Elevations: 45' & 55', Revision 2
FRS-II-441, Salem Unit 1 (Unit 2) Pre-Fire Plan, Relay and Battery Rooms, and Corridor,
Elevation: 100', Revision 7
FRS-II-511, Salem Unit 1 (Unit 2) Pre-Fire Plan, Electrical Penetration Area, Elevation: 78',
Revision 5
FRS-II-611, Salem Unit 1 (Unit 2) Pre-Fire Plan, Reactor Containment, Elevations: 78', 100'
& 130', Revision 5

Section 1R07: Heat Sink Performance

Procedures

S1.OP-PT.SW-0017, 12 Component Cooling Heat Exchanger Heat Transfer Performance Data Collection, Revision 17

Orders

30171368

Section 1R08: Inservice Inspection

Procedures

ER-AR-331, Boric Acid Corrosion Control (BACC) Program, Revision 5
ER-AP-331-1002, Boric Acid Corrosion Control Identification, Screening, and Evaluation, Revision 6

Notifications

20530740 20531523 20529905

Orders

80104802 80092195

Other Documents

Document 51-9139945-000, Salem Unit 1 SG Condition Monitoring for 1R20 and Final Operational Assessment for Cycles 21 and 22

Section 1R11: Licensed Operator Regualification Program

Procedures

2-EOP-FRHS-1, Loss of Secondary Heat Sink, Revision 24
2-EOP-TRIP-1, Reactor Trip or Safety Injection, Revision 28
S2.OP-AB.FIRE-0001, Control Room Fire Response, Revision 7
S2.OP-AB.STM-0001, Excessive Steam Flow, Revision 9
TQ-AA-106, Licensed Operator Regualification Program, Revision 20

Notifications

20435850 20450171 20501518 20444054 20474548 20488212

Other Documents

ESG-1103, Simulator Training Scenario – Segment 4 OBE, Revision 0
Licensed Operator Regualification Training Program
Licensed Operator Training Simulator Training Practices
Simulator Scenario Based Testing and Documentation

Section 1R12: Maintenance Effectiveness

Procedures

S1.OP-SO.DG-0001, 1A Diesel Generator Operation, Revision 34
S2.OP-SO.DG-0001, 2A Diesel Generator Operation, Revision 36
S1.OP-ST.DG-0001, 1A Diesel Generator Surveillance Test, Revision 43

S1.OP-ST.DG-0002, 1B Diesel Generator Surveillance Test, Revision 44
 S1.OP-ST.DG-0003, 1C Diesel Generator Surveillance Test, Revision 45
 S2.OP-ST.DG-0001, 2A Diesel Generator Surveillance Test, Revision 47
 S2.OP-ST.DG-0002, 2B Diesel Generator Surveillance Test, Revision 46
 S2.OP-ST.DG-0003, 2C Diesel Generator Surveillance Test, Revision 49
 S1.RA-ST.DG-0002, 1B Diesel Generator Surveillance Test Acceptance Criteria, Revision 5
 ER-AA-310, Implementation of the Maintenance Rule, Revision 7
 ER-AA-310-1005, Maintenance Rule – Dispositioning Between (a)(1) and (a)(2), Revision 7
 ER-AA-310-1007, Periodic (a)(3) Assessment, Revision 5

Notifications

20337561	20425383	20444345	20449862	20452755	20457302
20457340	20457425	20491696	20492505	20493983	20495534
20496347	20498238	20500748	20504858	20505236	20520738
20529543	20530322	20537053	20537321		

Orders

30123649	30131373	30169829	30173774	30176058	30176818
30182235	30186101	30194465	30194466	30194911	30195257
30194911	30198861	30201699	30201589	30201699	30212614
60073802	60099172	70095498	70100648	70125412	

Other Documents

70095498, Salem Maintenance Rule 2009 (a)(3) Periodic Evaluation, dated 7/29/09
 70125412, Salem Maintenance Rule 2011 (a)(3) Periodic Evaluation, dated 6/30/11
 S1 & S2 Maintenance Rule PSFF Database, dated 4/29/92 - 10/12/11
 S1 & S2 EDG Failures/20 Valid Tests (Cumulative) Trend, dated 7/1/10 - 11/1/11
 S1 & S2 EDG Failures/25 Valid Starts (Cumulative) Trend, dated 7/1/10 - 11/1/11
 S1 & S2 EDG Unavailability (Cumulative) Trend, dated 7/1/10 - 11/1/11
 S1 DG – Diesel Generators MRule Checkbook, November 2011
 S1 DG – Diesel Generators System Health Report, Q3-2011
 S2 DG – Diesel Generators MRule Checkbook, November 2011
 S2 DG – Diesel Generators System Health Report, Q3-2011
 Salem Maintenance Rule Status & Projections, dated 12/1/11
 VTD 301103, Installation, Operation, Maintenance for Diesel Generator Package Model #18-251, Revision 42
 Work Control Documents 4295012, 4306610, 4309165

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Other Documents

Salem Unit 2, Operators Risk Report, dated 10/26/2011 and 12/12/2011
 Salem Generating Station Plan of the Day, dated 12/12/2011
 Salem Unit 1, Operators Risk Report, dated 10/17/2011

Section 1R15: Operability Evaluations

Procedures

S1.OP-SO.DG-0001, 1A Diesel Generator Operation, Revision 34
 S1.OP-SO.SW-0005, Service Water System Operation, Revision 39
 S2.OP-PT.AF-0002, Auxiliary Feedwater Backleakage, Revision 9

S2.OP-ST.AF-0005, Inservice Testing Auxiliary Feedwater Valves Modes 4-6, Revision 18
S2.OP-ST.AF-0006, Inservice Testing Auxiliary Feedwater Valves, Revision 9
S2.OP-SO.28-0001, 2A 28VDC Charger Operation, Revision 7
S2.OP-SO.28-0004, 2A 28VDC Bus Operation, Revision 12
S2.OP-SO.CH-0001, Chilled Water System Operation, Revision 30
SC.MD-ST.28D-0001, Preventative Maintenance and 18 Month Surveillance of 28 Volt Station
Battery Chargers, Revision 17

Drawings
205336

Notifications

20496252	20499971	20500324	20500696	20502127	20502381
20502408	20510374	20510661	20520193	20525560	20529380
20530216	20530865	20535148	20536307	20536802	20536803
20537027					

Orders

70115963	70119793	70120968	70127128	70129717	70130218
70131172	70131517	80101415			

Other Documents

Operability Evaluation # 11-034
S-C-SJ-MEE-1978, Required Mission Times for Salem ECCS Pumps During Recirculation
Phase, Revision 0
S-C-SW-MDC-1350, Service Water Mode Ops Analysis, Revision 8
Technical Evaluation 80105209-0010, Evaluation of High DP Across Tricentric Butterfly Valves
VTD 134262, Chilled Water Pumps, Revision 15
VTD 301103, Installation, Operation, Maintenance for Diesel Generator Package Model #18-
251, Revision 42

Section 1R18: Plant Modifications

Procedures

S1.OP-AR.ZZ-0014, Auxiliary Annunciator - Alarm List, Revision 27

Other Documents

Design Change Package 80102588, No. 13/23 Auxiliary Feedwater Pump Steam Turbine Latch
Status Alarm
50.59 Screening, DCP 80102588

Section 1R19: Post-Maintenance Testing

Procedures

MA-AA-716-012, Post Maintenance Testing, Revision 18
SC.MD-PM.DG-0004, Emergency Diesel Generator Preventative Maintenance, Revision 14
SC.MD-PM.DG-0019, Diesel Engine Overhaul, Revision 38
SC.MD-PM.DG-0032, Periodic Diesel Engine Inspection Maintenance, Revision 18
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

S1.OP-ST.AF-0003, Inservice Testing – 13 Auxiliary Feedwater Pump, Revision 41
 S1.OP-ST.DG-0002, 1B Diesel Generator Surveillance Test, Revision 44
 S1.IC-ST.RCS-0003, Rod Control System and IRPI Integrated Test (No Eprom Burn),
 Revision 8
 S1.RA-ST.AF-0003, Inservice Testing 13 Auxiliary Feedwater Pump Acceptance Criteria,
 Revision 22
 S2.OP-ST.CC-0004, Inservice Testing Component Cooling Valves, Revision 14
 S2.OP-ST.RHR-0003, Inservice Testing Residual Heat Removal Flowpath Valves, Revision 5
 S2.RA-ST.RHR-0003, Inservice Testing Residual Heat Removal Flowpath Valves Acceptance
 Criteria, Revision 7

Drawings

205236 205242

Notifications (*NRC Identified)

20398529 20533363 20532117 20539790*

Orders

30152030	30105272	30177738	30193171	30193149	30193555
60081250	60082226	60090625	60093627	60098360	70130532
30193212	30171820	60094082	30199364	30199373	30193563
30193554	30199371	30195333	60080946	30192749	50133444
70088066					

Other Documents

Operability Evaluation, 1B EDG Manual Voltage Regulator Malfunction

Section 1R20: Refueling and Other Outage ActivitiesNotifications

20531160

Orders

70130222

Other Documents

OP-SA-108-114-1001, Form 2, Sequence of Events Checklist, and Attachment 3, Post Trip
 Review - Planned Reactor Trip, dated 10/23/2011
 1R21 Outage Risk Assessment
 ORAM Contingency Plan (1R21 Refueling Outage), RCS at mid-loop post-refueling

Section 1R22: Surveillance TestingProcedures

S1.OP-ST.SSP-0006, Engineered Safety Features Containment Isolation Phase "B",
 Revision 11
 S1.OP-ST.AF-0003, Inservice Testing – 13 Auxiliary Feedwater Pump, Revision 41
 S1.OP-ST.SJ-0020, Periodic Leakage Test - RCS Pressure Isolation Valves, Revision 20
 S1.OP-ST.SJ-0014, Intermediate Head Cold Leg Throttling Valve Flow Balance Verification,
 Revision 23

S1.RA-ST.AF-0003, Inservice Testing 13 Auxiliary Feedwater Pump Acceptance Criteria,
Revision 22

Notifications

20530322 20476650 20481082 20505378 20486426

Orders

30217004 50131585 50145582

**Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling,
Storage, and Transportation**

Procedures

RW-AA-100, Process Control Program for Radioactive Wastes, Revision 8

Notifications

20397026 20438985 20460855 20471775

Other Documents

Nuclear Training Center Lesson Plan NRP9902RMATC-01, NRC Bulletin 79-19 and 49 CFR
Subpart H Required Periodic Training

Check-In Self-Assessment Report 70123615, Radioactive Waste Shipping

Teledyne Brown Engineering Report of Analysis/Certificate of Conformance for: U-1 spent resin
storage tank; liquid waste processing resin; DAW smear composite; U-2 spent resin
storage tank

Radioactive Material Shipments: 11-09, 11-67, 11-68, 11-85, and 11-115

Section 40A1: Performance Indicator Verification

Notifications

20480587 20493019 20518192 20518856 20520519 20521458
20525079 20525664

Orders

70128332

Other Documents

Salem Units 1 and 2, Mitigating Systems Performance Index, Emergency AC Power System,
3Q/2011

Salem Units 1 and 2, Mitigating Systems Performance Index, High Pressure Injection System,
3Q/2011

Salem 1 Narrative Log, S1EDG, dated 10/1/2010 - 12/13/2011

Salem 1 Narrative Log, S1CVC, dated 10/1/2010 - 12/13/2011

Salem 1 Narrative Log, S1SJ, dated 10/1/2010 - 12/13/2011

Salem 2 Narrative Log, S2EDG, dated 10/1/2010 - 12/13/2011

Salem 2 Narrative Log, S2CVC, dated 10/1/2010 - 12/13/2011

Salem 2 Narrative Log, S2SJ, dated 10/1/2010 - 12/13/2011

Section 40A2: Identification and Resolution of ProblemsProcedures

S1.IC-PM.RM-0002, 1R11A, 1R12A, 1R12B Containment Process Radiation Monitors, Rev. 24
 S1.IC-CC.RM-0078, 1R46A Main Steam Line 12 Process Radiation Monitor, Rev. 13
 S1.IC-CC.RM-0079, 1R46B Main Steam Line 14 Process Radiation Monitor, Rev. 14
 S1.IC-CC.RM-0080, 1R46C Main Steam Line 11 Process Radiation Monitor, Rev. 11
 S1.IC-CC.RM-0081, 1R46D Main Steam Line 13 Process Radiation Monitor, Rev. 12
 S2.IC-CC.RM-0078, 2R46A Main Steam Line 22 Process Radiation Monitor, Rev. 14
 S2.IC-CC.RM-0079, 2R46B Main Steam Line 24 Process Radiation Monitor, Rev. 13
 S2.IC-CC.RM-0080, 2R46C Main Steam Line 21 Process Radiation Monitor, Rev. 14
 S2.IC-CC.RM-0081, 2R46D Main Steam Line 23 Process Radiation Monitor, Rev. 16
 OP-AA-102-103, Operator Workaround Program, Revision 2
 OP-AA-102-103-1001, Operator Burdens Program, Revision 0

Notifications (*NRC Identified)

20256680	20263645	20290445	20393943	20414899	20440145
20449249	20465270	20466849	20482567	20482864	20483950
20486443	20486676	20487207	20487208	20487209	20489416
20490712	20491302	20491382	20491626	20493432	20498902
20499912	20496285	20497008	20498502	20499414	20509785
20511020	20511848	20512889	20524697	20520857	20523417
20535493	20537759	20471692	20495611	20511095	20512069
20520716	20533800	20513862	20513977	20514112	20517421
20517986	20521767	20523746	20524397	20524709	20525519
20526024	20526156	20526533	20527494	20527643	20527668
20527892	20528319	20528320	20530033	20530554	20536139
20536280	20536415	20536596	20537260	20537322	20538648
20539012*					

Orders

30198010	50128385	60073599	60090828	60093102	60093548
60093580	60098144	70106037	70112000	70112749	70117609
70117950	70120411	70124281	70124459	70124724	70128217
70128703	70131733	80057595			

Other Documents

Quarterly Operator Burden Assessment, Salem Unit 1 2011 - Third Quarter
 Quarterly Operator Burden Assessment, Salem Unit 2 2011 - Third Quarter
 Operations Concerns List (Plan of the Day Handout), dated 11/21/2011
 Operator Challenges List, dated 11/21/2011
 Salem Maintenance Rule/EPIX Programs Status Report, Third Quarter 2011
 Salem SG Program, Health Report Evaluation, Third Quarter 2011
 Salem Thermal Performance (TP) Program Status Report, Third Quarter 2011
 Salem Inservice Inspection Program (ISI/CISI/SPT/Snubbers) Status Report, Third Quarter 2011
 Salem IST Program Status Report, Attachment 7, Program Health Reports, Third Quarter 2011
 Salem Top 10 Equipment Issues Report, dated 6/2/2011
 Salem Exception Report, Current Equipment Assessments, dated 12/15/2011
 Unit 1 Radiation Monitoring System Health Reports Q1-2011, Q2-2011, and Q3-2011
 Unit 1 Radiation Monitoring System Health Reports Q1-2011, Q2-2011, and Q3-2011

Maplewood Testing Services Report No. 79776, Failure Analysis of 2R19 Radiation Monitor Detector, Salem Generating Station Unit No. 2, dated 02/23/11

Section 40A5: Other Activities

Procedures

SC.DE-TS.ZZ-4201, PSEG, Salem Structural Design Criteria
SC.MD-FR.DCS-0007, Stack-Up and Transfer of a Loaded MPC
LS-AA-105-1001, 72.48 Review Cover Sheet Form, Revision 0
LS-AA-105-1002, 72.48 Applicability Review Form, Revision 0
LS-AA-105-1003, 72.48 Screening Form, Revision 0

Other Documents

Holtec International Drawing Package I.D.4131
Holtec International, Response to Request for Technical Information, Project Number 2090
Holtec International, Structural Analysis of Salem Seismic Restraint

LIST OF ACRONYMS

ADAMS	Agency-wide Documents Access and Management System
AFW	Auxiliary Feedwater
ALARA	As Low As Reasonably Achievable
APD	Air Particulate Detector
BIT	Boron Injection Tank
CAP	Corrective Action Program
CC	Component Cooling
CCHX	Component Cooling Heat Exchanger
CCW	Component Cooling Water
CFCU	Containment Fan Cooler Unit
CFR	Code of Federal Regulation
EDG	Emergency Diesel Generator
FSAR	Final Safety Analysis Report
HRA	High Radiation Area
HX	Heat Exchanger
ISFSI	Independent Spent Fuel Storage Installation
JPM	Job Performance Measure
LDE	Lens Dose Equivalent
LER	Licensee Event Report
MPC	Multi-Purpose Canister
MSL	Main Steam Line
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
NRC	Nuclear Regulatory Commission
NSTS	National Source Tracking System
ODCM	Offsite Dose Calculation Manual
OOS	Out-of-Service
PARS	Publicly Available Records
PCP	Process Control Program
PI	Performance Indicator
PRM	Process Radiation Monitor
PSEG	Public Service Enterprise Group Nuclear LLC
QA	Quality Assurance
RHR	Residual Heat Removal
RWP	Radiation Work Permit
SCBA	Self-Contained Breathing Apparatus
SDE	Skin Dose Equivalent
SGBD	Steam Generator Blowdown
SSC	Structure, System, and Component
SW	Service Water
TEDE	Total Effective Dose Equivalent
TS	Technical Specifications
TSAS	Technical Specification Action Statement
UFSAR	Updated Final Safety Analysis Report
WBC	Whole Body Counter