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

February 7, 2008

Mr. William Levis
President and Chief Nuclear Officer
PSEG Nuclear LLC
80 Park Plaza, T4B
Newark, NJ 07102

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 – NRC INTEGRATED INSPECTION REPORT 05000272/2007005 and 05000311/2007005

Dear Mr. Levis:

On December 31, 2007, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Salem Nuclear Generating Station, Units 1 and 2. The enclosed integrated inspection report documents the inspection results discussed on January 4, 2008, with Mr. George Gellrich and other members of your staff.

The report documents one NRC-identified finding of very low safety significance (Green). This finding was determined to involve violations of NRC requirements. If you contest any NCV 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 the 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 Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

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

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

Enclosure: Inspection Report 05000272/2007005 and 05000311/2007005
w/Attachment: Supplemental Information

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NRC INTEGRATED INSPECTION REPORT 05000272/2007005 and 05000311/2007005

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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:	05000272/2007005 and 05000311/2007005
Licensee:	PSEG Nuclear LLC
Facility:	Salem Nuclear Generating Station, Unit Nos. 1 and 2
Location:	P.O. Box 236 Hancocks Bridge, NJ 08038
Dates:	October 1, 2007 through December 31, 2007
Inspectors:	D. Schroeder, Senior Resident Inspector H. Balian, Resident Inspector J. Orr, Senior Project Engineer J. Schoppy, Senior Reactor Inspector D. Silk, Senior Operations Engineer J. Furia, Senior Health Physicist P. Frechette, Physical Security Inspector
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SUMMARY OF FINDINGS

IR 05000272/2007005, 05000311/2007005; 10/01/2007 – 12/31/2007; Salem Nuclear Generating Station Units 1 and 2; Maintenance Effectiveness.

The report covered a 13-week period of inspection by resident inspectors and announced inspections by regional specialist inspectors. One Green non-cited violation (NCV) was identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. 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.

A. NRC-Identified and Self-Revealing Findings

Green. The inspectors identified a non-cited violation of Technical Specification 6.8.1, "Procedures and Programs," on July 25, 2007, because PSEG did not conduct adequate troubleshooting and corrective maintenance following a repeat failure of the 13 containment fan coil unit (CFCU) to start in slow speed. The finding was greater than minor because it was associated with the structures, systems, and components and barrier performance attribute of the Barrier Integrity cornerstone and adversely affected the objective to provide reasonable assurance that containment barriers protect the public from radionuclide releases caused by accidents or events. Specifically, because PSEG did not perform adequate troubleshooting following the July 25, 2007, 13 CFCU failure to start in slow speed, the 13 CFCU failed to start in slow speed again on November 6, 2007. This impacted the availability and reliability of a system designed to provide containment pressure control during an accident. In accordance with IMC 0609, Appendix H, "Containment Integrity SDP," table 6.1 "Phase 1 Screening-Type B Findings at Full Power", the finding was determined to be of very low safety significance (Green) because the containment type is large dry and the CFCU failures do not significantly contribute to large early release frequency.

This finding has a cross-cutting aspect of procedure compliance in the area of human performance (H.4(b)). Specifically, PSEG personnel did not follow troubleshooting procedure MA-AA-716-004 following a repeat failure of the 13 CFCU to start in slow speed on July 25, 2007. (Section 1R12)

B. Licensee Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Salem Nuclear Generating Station Unit 1 (Unit 1) began the period at full power. On October 10, 2007, Unit 1 power level was reduced to 90% in response to a failure of a feedwater heater level controller. Following repairs, Unit 1 was returned to full power on October 11, 2007. On November 30, 2007, Unit 1 power level was reduced to 60% to support planned maintenance activities on a steam generator feedwater pump and main turbine valve testing. Unit 1 was returned to full power on December 2, 2007. Unit 1 tripped on December 28, 2007, following a transformer malfunction that caused the electric power supply for two reactor coolant pumps to de-energize. Unit 1 remained in hot standby (Mode 3) for the remainder of the inspection period.

Salem Nuclear Generating Station Unit 2 (Unit 2) began the period at full power. On October 22, 2007, Unit 2 power level was reduced to 95% to support planned maintenance activities on a transmission line. Unit 2 was returned to full power on the same day. On December 15, 2007, Unit 2 power level was reduced to 88% to support main turbine valve testing. Unit 2 was returned to full power on December 16, 2007. Unit 2 remained at full 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 - 1 sample)

a. Inspection Scope

The inspectors completed one seasonal weather preparation sample for the onset of cold weather. The inspectors reviewed cold weather preparations to verify PSEG adequately prepared equipment to operate reliably in extreme cold weather conditions. Specifically, the inspectors interviewed engineering and operations personnel, and walked down the service water intake structure and the switchyard. The inspectors verified that design features used to maintain these systems functional during cold weather conditions were adequately maintained. The documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04 - 3 samples, 71111.04S – 1 sample)

.1 Partial Walkdown

a. Inspection Scope

The inspectors completed three partial system walkdown inspection samples. The inspectors walked down the selected systems to verify the operability of redundant or diverse trains and components when safety equipment was unavailable. The inspectors focused their review on potential discrepancies that could impact the function of the system and increase plant risk. The inspectors reviewed applicable operating procedures, walked down control systems components, and verified that selected breakers, valves, and support equipment were in the correct position to support system operation. The inspectors also verified that PSEG properly utilized its corrective action program to identify and resolve equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers. Documents reviewed are listed in the Attachment. The inspectors walked down the systems listed below:

- Unit 1 and 2 control area ventilation after shifting to normal mode of operation from the maintenance mode to support planned work activities on the unit 2 control room emergency air conditioning system (EACS);
- Unit 1 and 2 yard area control air and station blackout (SBO) air compressor during emergent unavailability of the 2 emergency air compressor; and
- Unit 1 service water during maintenance on the 14 service water pump (SWP).

b. Findings

No findings of significance were identified.

.2 Complete Walkdown

a. Inspection Scope

The inspectors conducted one complete walkdown of accessible portions of the Unit 1 auxiliary feedwater (AFW) system to verify that the system was properly configured, hangers and supports were correctly installed and functional, pump oil reservoir levels were normal, and to identify any discrepancies between the existing valve lineup and the prescribed lineup. The inspectors used PSEG procedures and other documents to verify proper system alignment and functional capability. The inspectors reviewed corrective action evaluations associated with the system to determine whether equipment alignment problems were identified and appropriately resolved. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05 - 10 samples)

Fire Protection - Tours

a. Inspection Scope

The inspectors completed ten fire protection quarterly inspection samples. The inspectors performed walkdowns to assess the material condition and operational status of fire protection features. The inspectors verified that combustibles and ignition sources were controlled in accordance with PSEG's administrative procedures; fire detection and suppression equipment was available for use; that passive fire barriers were maintained in good material condition; and that compensatory measures for out-of-service, degraded, or inoperable fire protection equipment were implemented in accordance with PSEG's fire plan. Documents reviewed are listed in the Attachment. The inspectors evaluated the fire protection areas listed below.

- Unit 1 and Unit 2 CVCS Hold-up Tank Area
- Unit 1 and Unit 2 Spent Fuel / Component Cooling Heat Exchanger & Pump Area
- Unit 1 and Unit 2 Mechanical Piping Penetration Area
- Unit 1 and Unit 2 Electrical Penetration Area
- Unit 1 and Unit 2 Inner Piping Penetration Area & Chiller Rooms, Elev 100' – 0"

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

.1 (Update) Unresolved Item 05000272, 05000311/2007002-01

a. Inspection Scope

In March 2007, the inspectors identified several potential vulnerabilities to internal flooding that called into question PSEG's design control as described in the updated final safety analysis report (UFSAR). The inspectors had treated potential vulnerabilities to internal flooding as an unresolved item (URI), pending completion of a technical evaluation by PSEG (see NRC Inspection Report No. 05000272, 05000311/2007002). During the week of October 15, 2007, inspectors independently assessed PSEG's technical evaluation of the five concerns relative to PSEG's design and licensing bases. Specifically, the inspectors evaluated whether PSEG adequately implemented design control measures to ensure the capability for operation of Class I (seismic) equipment in the event of a failure of non-Class I equipment in the auxiliary building. The inspectors walked down the 4kV vital switchgear rooms, diesel fuel oil transfer pump (DFOTP) rooms, and other safety-related areas in the auxiliary building for both units to assess operational readiness of various features to protect redundant safety-related components and vital electric power systems from internal flooding.

Many of PSEG's associated corrective actions were incomplete or still in progress in October 2007. Therefore, the inspectors also discussed the status of PSEG's progress with engineering staff on December 18, 2007, at the station. The inspectors incorporated the results of this status update in the summary of each concern documented below. (The problem identification and resolution aspects of this issue are discussed in Section 4OA2). Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

Based on plant walkdowns and documentation review in October 2007, the inspectors concluded that PSEG did not provide adequate engineering justification to support closure of any of the five original concerns. On December 18, 2007, PSEG completed a detailed operability evaluation (OpEval No. 07-046) for the degraded and nonconforming conditions identified during their resolution of the five concerns. Engineering determined that the associated structures, systems, and components (SSCs) remained operable and capable of performing their respective safety functions and initiated corrective actions to restore full qualification. The inspectors updated the status of each concern, including the open aspects of each, in the paragraphs below.

The first concern was that inspectors found no apparent high energy line break (HELB) barriers and/or engineering evaluation for the high energy piping (i.e. heating steam & heating water systems) in the auxiliary building 84' corridor adjacent to the Unit 1 and 2 460V vital switchgear rooms. PSEG actions to evaluate and/or address this concern included: (1) a thorough review and update, where applicable, of UFSAR Sections 3.6 and 3.7 (70066205-410); (2) design engineering completed a seismic qualification utility group (SQUG) review (seismic evaluation) of the heating steam and heating water systems in the area of the relay rooms (70066205-360); and (3) engineering verified the vent path (70066205-110) and the structural adequacy of installed flexatallic hoses in the encapsulation piping (70066205-130). The remaining NRC open aspects for this concern include: (1) NRC review of SQUG analysis (70066205-360); and (2) NRC review of flex hose evaluation (70066205-130).

The second concern was that there appeared to be several non-seismic piping systems in the auxiliary building 84' corridor adjacent to the Unit 1 & and 460 Vac vital switchgear rooms and no engineering evaluation (flooding analysis) to ensure that the rupture of these non-seismic piping systems during a seismic event would not prevent Class I (seismic) safety-related equipment from operating satisfactorily. PSEG actions to evaluate and/or address this concern included: (1) Design engineering evaluated (70066205-090) the seismic adequacy of the four large undiked chemical and volume control system (CVCS) monitoring tanks on 64' elevation of the auxiliary building (two tanks for each Salem Unit). Engineering concluded that the tanks were capable of withstanding a seismic event and were not an internal flooding concern. (2) Design engineering completed a SQUG evaluation of the heating steam and heating water

systems in the area of the relay rooms (70066205-360). The one remaining NRC open aspect for this concern was for the NRC to complete its review of the SQUG analysis (70066205-360).

The third concern was that no equipment drain check valves were installed in the 64' 4160V vital switchgear rooms and no flooding analysis was completed to ensure that a rupture of non-seismic tanks and/or piping systems (located at and above 64' elevation in the auxiliary building) during a seismic event would not prevent Class I (seismic) safety-related equipment in the switchgear rooms from operating satisfactorily. PSEG actions to resolve this concern included: (1) engineering initiated a corrective action to evaluate the adequacy of existing drain system preventive maintenance (PM) activities (70066205-380); and (2) engineering initiated a corrective action to complete the reconciliation of their internal flooding design analysis (70066205-390). The remaining NRC open aspects for this concern include: (1) NRC review of engineering's drain system PM adequacy evaluation (70066205-380); and (2) NRC review of PSEG's internal flooding design reconciliation analysis (70066205-390).

The fourth concern was that no check valves were installed in the drain lines to the residual heat removal (RHR) pump room sumps, and the drain system appeared to be interconnected, which would allow drain water above the 45' elevation to flow to both RHR pump room sumps. PSEG actions to resolve this concern included: (1) engineering initiated a corrective action to evaluate the adequacy of existing drain system PM activities (70066205-380); and (2) engineering investigated and evaluated the auxiliary building drain system to ensure that both units were not vulnerable to concurrent flooding in both RHR pump rooms (70066205-320). The remaining NRC open aspects for this concern include: (1) NRC review of engineering's drain system PM adequacy evaluation (70066205-380); and (2) NRC review of engineering's RHR pump room drain cross-connect evaluation (70066205-320).

The fifth concern was that were no equipment drains, no flood detection, and no watertight doors in the 84' area containing the two redundant safety-related emergency diesel generator fuel oil transfer pumps (DFOTP) and no engineering evaluation (flooding analysis) for potential non-seismic flooding sources. PSEG actions to resolve this concern included: (1) Design engineering inspected the fire protection piping adjacent to the DFOTP rooms. Based on the pipe support spacing and rigidity, engineering determined that the pipe supports have adequate strength to withstand a postulated design-basis earthquake (7066205-060). (2) Engineering determined that the fire protection piping in the DFOTP area was not susceptible to water hammer failure (see also Section 4OA2). The one remaining NRC open aspect for this concern was NRC review of engineering's fire protection piping water hammer analysis for the DFOTP area (NOTF 20231837/CR 70046310).

1R11 Licensed Operator Requalification Program (71111.11Q – 1 sample, 71111.11B – 1 sample)

.1 Requalification Activities Review by Resident Staff. The inspectors completed one quarterly licensed operator requalification program sample. Specifically, the inspectors

observed two identical simulator training scenarios administered to two different control room teams on October 30, 2007, to assess operator performance and training effectiveness. The scenarios were identical and involved a failed open turbine bypass valve, a main turbine lube oil leak and a faulted steam generator. The inspectors verified operator actions were consistent with operating, alarm response, abnormal, and emergency procedures. The inspectors assessed simulator fidelity and verified that evaluators identified deficient operator performance where appropriate. The inspectors also observed the simulator instructors' critique of operator performance. Documents reviewed are listed in the Attachment.

.2 Biennial Review by Regional Staff. The following inspection activities were performed using NUREG-1021, Revision 9, "Operator Licensing Examination Standards for Power Reactors," Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program," and NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)," and 10 CFR 55.46 Simulator Rule as acceptance criteria.

The inspectors reviewed documentation of operating history since the last requalification program inspection. The inspectors also discussed facility operating events with the resident staff. Documents reviewed included NRC inspection reports, NRC performance indicators, licensee event reports (LERs) and licensee specific notifications that involved human performance issues for licensed operators to ensure that operational events were not indicative of possible training deficiencies.

The inspectors reviewed a sample of questions from the comprehensive biennial written exams (2006), scenarios and job performance measures (JPMs) used during this current exam cycle (i.e., weeks 1 and 5) to ensure the quality of these exams met or exceeded the criteria established in the Examination Standards and 10 CFR 55.59.

During this inspection, the inspectors observed the administration of operating examinations (scenarios and JPMs) to "E" crew. The operating examinations consisted of two crew simulator scenarios and one set of five JPMs administered to each individual. The inspectors also assessed the administration of two scenarios to "C:" crew.

For the site specific simulator, the inspectors observed simulator performance during the conduct of the examinations and discrepancy reports to verify compliance with the requirements of 10 CFR 55.46. The inspectors reviewed a sample of simulator tests, including transients, normal, steady state, malfunction and core performance tests. The inspectors also verified that a sample of completed simulator work requests (SWRs) from the past two-year period effectively addressed described issues. A listing of the specific simulator tests and other documents reviewed is provided in the Attachment.

The inspectors verified conformance with operator license conditions by reviewing the following records:

- Six medical records;

- Proficiency watch-standing documentation; and
- Remediation training records for three cyclic quiz failures and one annual written examination failure.

The inspectors reviewed student, evaluator and management feedback forms from training and evaluations to assess comments. The inspectors also reviewed curriculum review committee minutes for recent plant events. These comments and minutes were assessed by the inspectors to determine appropriate disposition regarding inclusion in the training program.

On October 17, 2007, the inspectors conducted an in-office review of PSEG requalification exam results. These results included the annual operating tests. (The comprehensive written examinations are administered in alternate years.) The inspection assessed whether pass rates were consistent with the guidance of NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The inspectors verified that:

- Crew failure rate on the dynamic simulator was less than 20%. (Failure rate was 9.1%)
- Individual failure rate on the dynamic simulator test was less than or equal to 20%. (Failure rate was 2.9%)
- Individual failure rate on the walkthrough test (JPMs) was less than or equal to 20%. (Failure rate was 0.0%)
- Individual failure rate on the comprehensive 2006 biennial written exam was less than or equal to 20%. (Failure rate was 1.5%) (Note: Salem's requalification written examinations and operating examinations occur in alternate years.)
- More than 75% of the individuals passed all portions of the exam (95.6% of the individuals passed all portions of the exam).

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12 - 3 samples)

a. Inspection Scope

The inspectors completed three quarterly maintenance effectiveness inspection samples. The inspectors reviewed performance monitoring and maintenance effectiveness issues for three systems. The inspectors reviewed PSEG's process for monitoring equipment performance and assessing preventive maintenance effectiveness. The inspectors verified that systems and components were monitored in accordance with maintenance rule program requirements. The inspectors compared documented functional failure determinations and unavailability hours to those being tracked by PSEG to evaluate the effectiveness of PSEG's condition monitoring activities and to determine whether performance goals were being met. The inspectors reviewed

applicable work orders, corrective action notifications, and preventive maintenance tasks. The documents reviewed are listed in the Attachment. The inspectors evaluated the systems listed below:

- Repetitive failures of the 13 containment fan coil unit (CFCU) to start in slow speed;
- Unit 1 and 2 chilled water systems; and
- Unit 1 and 2 service water heat exchangers ability to meet associated pump mission times.

b. Findings

Introduction. The NRC identified a Green non-cited violation of Technical Specification 6.8.1, "Procedures and Programs," on July 25, 2007, because PSEG did not conduct adequate troubleshooting and corrective maintenance following a repeat failure of the 13 containment fan coil unit (CFCU) to start in slow speed.

Description. On July 25, 2007, the 13 CFCU failed to start in slow speed during the weekly high flow flush of the service water cooling system. This was the second failure of the 13 CFCU to start in slow speed in 2007. Following the failure to start, PSEG did not quarantine the 13 CFCU for troubleshooting. Operators instead attempted to start the 13 CFCU in slow speed a second time and were successful.

Following the 13 CFCU failure to start on July 25, 2007, PSEG did not implement an adequate troubleshooting plan as specified by procedure MA-AA-716-04, "Conduct of Troubleshooting." Several system components could have caused 13 CFCU to fail to start on July 25. The limit switch for service water valve 13 SW 57 was one of the susceptible components so PSEG stroked that valve after the July 25 failure and verified that the limit switch was not degraded and did not cause the failure. PSEG took no additional action to repair, replace or monitor the remaining susceptible system components in an attempt to identify and correct the cause of the July 25 failure. As a result on November 6, 2007, the 13 CFCU again failed to start in slow speed during the weekly high flow flush of the service water cooling system. After the November failure to start, PSEG replaced two components that most likely caused the failure and implemented an adverse condition monitoring plan to closely monitor the next four slow speed starts of the 13 CFCU with additional instrumentation.

MA-AA-716-004, "Conduct of Troubleshooting," Revision 7 established a standard systematic approach to troubleshooting new and long-standing equipment problems. MA-AA-716-004, Attachment 4, indicated that because the failure of the 13 CFCU posed a medium risk, troubleshooting in accordance with either a simple or a complex troubleshooting plan was required. After the July 2007 13 CFCU failure to start, PSEG did not perform or document the completion of simple or complex troubleshooting. The inspectors determined that not conducting troubleshooting for the 13 CFCU failure to start on July 25, 2007, in accordance with procedure MA-AA-716-004, was a performance deficiency. Specifically, because PSEG did not perform adequate troubleshooting following the July 25, 2007, failure to start in slow speed, the 13 CFCU

failed to start in slow speed on November 6, 2007. The cause was within PSEG's ability to foresee and correct because based on the risk of the 13 CFCU failure, MA-AA-716-004 specified that simple or complex troubleshooting was required.

Analysis. The finding was greater than minor because it was associated with the SSC and barrier performance attribute of the Barrier Integrity cornerstone and adversely affected the objective to provide reasonable assurance that containment barriers protect the public from radionuclide releases caused by accidents or events. Specifically, because PSEG did not perform adequate troubleshooting following the July 25, 2007, 13 CFCU failure to start in slow speed, the 13 CFCU failed to start in slow speed again on November 6, 2007. This impacted the availability and reliability of a system designed to provide containment pressure control during an accident. Per Inspection Manual Chapter (IMC) 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," the inspectors used IMC 0609, Appendix H, "Containment Integrity Significance Determination Process." In accordance with IMC 0609, Appendix H, table 6.1 "Phase 1 Screening-Type B Findings at Full Power", the finding was determined to be of very low safety significance (Green) because the containment type is large dry and the CFCU failures do not significantly contribute to large early release frequency.

This performance deficiency had a cross-cutting aspect of procedure compliance in the area of human performance (H.4(b)). Specifically, PSEG personnel did not follow troubleshooting procedure MA-AA-716-004 following a repeat failure of the 13 CFCU to start in slow speed on July 25, 2007. This resulted in the November 6, 2007 13 CFCU failure to start in slow speed.

Enforcement. Technical Specification 6.8.1, "Procedures and Programs," requires that written procedures be established implemented and maintained per the recommendations of Regulatory Guide (RG) 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2, February 1978. Item 9.a. of RG 1.33, Appendix A recommends procedures for maintenance that can affect the performance of safety-related equipment and that such maintenance be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. PSEG procedure MA-AA-716-004, "Conduct of Troubleshooting," Revision 7 establishes a systematic approach to troubleshoot and repair long-standing problems, including recurring events, with safety-related equipment. Contrary to the above, PSEG did not conduct and document troubleshooting and corrective maintenance per PSEG procedure MA-AA-716-004 following the 13 CFCU failure to start in slow speed in July 2007 which resulted in the 13 CFCU failure to start in slow speed again on November 8, 2007, the third such failure in 2007. Because this finding was of very low safety significance and was entered into the corrective action program as notification 20343985, this violation is being treated as a NCV, consistent with section VI.A of the NRC Enforcement Policy. **(NCV 05000272/2007005-01, Inadequate Troubleshooting for a Failure of 13 CFCU to Start in Slow Speed))**

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 - 6 samples)

a. Inspection Scope

The inspectors completed six maintenance effectiveness and emergent work control inspection samples. The inspectors reviewed the maintenance activities to verify that the appropriate risk assessments were performed as specified by 10 CFR 50.65(a)(4) prior to removing equipment for work. The inspectors reviewed the applicable risk evaluations, work schedules and control room logs for these configurations. PSEG's risk management actions were reviewed during shift turnover meetings, control room tours, and plant walkdowns. The inspectors also used PSEG's on-line risk monitor (Equipment Out-Of-Service workstation) to gain insights into the risk associated with these plant configurations. The inspectors reviewed NOTFs documenting problems associated with risk assessments and emergent work evaluations. Documents reviewed are listed in the Attachment. The inspectors assessed the plant configurations listed below:

- Unit 2 planned unavailability of the 22 component cooling heat exchanger (CCHX) concurrent with isolation of pressurizer pilot operated relief valve (PORV) 2PR2;
- Emergent unavailability of Salem Unit 3 (combustion gas turbine generator) concurrent with planned unavailability of 14 service water pump and isolation of pressurizer PORV 2PR2 (Unit 3 affects on-line risk of both nuclear units);
- Planned unavailability of the Unit 2 control area emergency air conditioning system (EACS) concurrent with unavailability of the 14 service water pump (SWP), the 11 switchgear supply fan and isolation of pressurizer PORV 2PR2 (either unit EACS affects on-line risk of both nuclear units);
- Emergent unavailability of the 2C emergency diesel generator concurrent with planned unavailability of the 23 component cooling water (CCW) pump, 23 CFCU, 26 SWP and isolation of pressurizer PORV 2PR2;
- Planned unavailability of the Salem demineralized (DM) water supply concurrent with planned unavailability of the 16 service water pump (SWP), 13 charging (CVCS) pump, 21 containment spray (CS) sodium hydroxide injection, Unit 2 isolation of pressurizer PORV 2PR2, and inadvertent unavailability of the 3 station air compressor (SAC) (DM water and the 3 SAC affect on-line risk of both nuclear units); and
- Emergent unavailability of the 12 chiller, 14 CFCU and 15 CFCU concurrent with planned unavailability of the 13 SWP and 12 residual heat removal (RHR) pump and planned inoperability of the 13 AFW pump.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 6 samples)

a. Inspection Scope

The inspectors completed six operability evaluation inspection samples. The inspectors reviewed the technical adequacy of the operability determinations to verify the conclusions were justified. The inspectors also walked down accessible equipment to corroborate the adequacy of PSEG's operability determinations. Additionally, the inspectors reviewed other PSEG identified safety-related equipment deficiencies during this report period and assessed the adequacy of their operability screenings. Notifications and documents reviewed are listed in the Attachment. The inspectors evaluated the issues listed below:

- Unit 1 and Unit 2 containment sump suction valves (11, 12, 21, 22 SJ44) in light of operating experience that differential pressure under certain postulated accident scenarios could exceed the maximum differential pressure of the associated motor operators;
- Unit 1 and Unit 2 solid state protection systems (SSPS) following unexpected failures of Unit 2 electrical power fuses;
- 22SW286 given water leakage through the valve body attributed to microbiologically induced corrosion (MIC);
- 11 component cooling, 21 charging, 22 charging, & 23 charging given gravitational missile hazards caused by unauthorized storage of lifting beam (monorail) C-clamps (trolleys) above the pumps;
- Unit 1 and Unit 2 control room ventilation systems with chilled water valves 1CH74 and 2CH74 gagged in the full open position; and
- Unit 1 switchgear and penetration area ventilation (SPAV) system given degradation of the outside air intake dampers 1CAV1 and 1CAV2 that required PSEG fail the dampers in the full open position during cold weather.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19 - 6 samples)

a. Inspection Scope

The inspectors completed six post-maintenance testing inspection samples. The inspectors observed portions of and/or reviewed the results of the post-maintenance test activities. The inspectors verified that the effect of testing on the plant was adequately addressed by control room and engineering personnel; testing was adequate for the maintenance performed; acceptance criteria were clear, demonstrated operational readiness and were consistent with design and licensing basis documentation; test instrumentation was calibrated, and the appropriate range and accuracy for the application; tests were performed, as written, with applicable prerequisites satisfied; and equipment was returned to an operational status and ready to perform its safety function. Documents reviewed are listed in the Attachment. The inspectors evaluated the post-maintenance tests for the following maintenance items listed below:

- Work order (WO) 30139696, 22SW127 air operated valve actuator preventive maintenance;
- WO 60070942, 12 containment fan coil unit (CFCU) damper positioners corrective maintenance;
- WO 60064527 & 30135357, repacking of 12SW153;
- WO 60072977, 22 boric acid transfer (BAT) pump replacement;
- WO 60073285, 22SW39 valve and actuator replacement; and
- WO 60071497, 1 emergency control air compressor (ECAC) planned and corrective maintenance.

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Activities (71111.20 - 1 sample)

a. Inspection Scope

Unit 1 Forced Outage. Between December 28, 2007, and the end of the inspection period, the inspectors reviewed the Unit 1 forced outage work scope implemented after an automatic reactor trip on December 28, 2007. The inspectors confirmed that PSEG appropriately considered shutdown plant risk and maintained defense-in-depth systems while Unit 1 remained in Mode 3. The inspectors reviewed procedures and observed portions of activities in the control room during Mode 3 operations. The inspectors walked down the equipment related to the cause of the trip, reviewed PSEG's post reactor trip review and observed portions of the reactor startup.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 6 samples)

a. Inspection Scope

The inspectors completed six surveillance testing inspection samples. The inspectors observed portions of and/or reviewed results for the surveillance tests to verify, as appropriate, whether the applicable system requirements for operability were adequately incorporated into the procedures and that test acceptance criteria were consistent with procedure requirements, the technical specification requirements, the UFSAR, and ASME Section XI for pump and valve testing. Documents reviewed are listed in the Attachment. The inspectors evaluated the surveillance tests listed below.

- SC.RE-ST.ZZ-0001, Daily power range channel calibration by calorimetric;
- S2.OP-ST.DG-0002 & 0020, 2B Diesel generator surveillance test and hot restart;
- S2.OP-ST.RC-0008, Unit 2 reactor coolant system water inventory balance;

- S2.OP-ST.RHR-0001, 21 residual heat removal (RHR) pump in-service testing (IST);
- S1.OP-ST.SSP-0009, Engineering safety features SSPS slave relays test; and
- S1.OP-LR.VC-0002 and S1.OP-LR.VC-0003, Local leak rate test of containment isolation valves (CIV) 1VC3 through 7.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Public Radiation Safety

2PS2 Radioactive Material Processing and Transportation (71122.02 - 6 samples)

a. Inspection Scope

The inspectors reviewed the solid radioactive waste system description in the UFSAR and the recent radiological effluent release reports for information on the types and amounts of radioactive waste disposed, and reviewed the scope of PSEG's audit program to verify that it met the requirements of 10 CFR 20.1101(c).

The inspectors walked down the liquid and solid radioactive waste processing systems to verify and assess that the current system configuration and operation agreed with the descriptions contained in the UFSAR sections 11.2 and 11.5, and in the Process Control Program (PCP); reviewed the status of any radioactive waste process equipment that was not operational and/or was abandoned in place; verified that the changes were reviewed and documented in accordance with 10 CFR 50.59, as appropriate; and, reviewed current processes for transferring radioactive waste resin and sludge discharges into shipping/disposal containers to determine if appropriate waste stream mixing and/or sampling procedures, and methodology for waste concentration averaging provide representative samples of the waste product for the purposes of waste classification as specified in 10 CFR 61.55 for waste disposal.

The inspectors reviewed the radiochemical sample analysis results for PSEG's radioactive waste streams; reviewed PSEG's use of scaling factors and calculations used to account for difficult-to-measure radionuclides; verified that PSEG's program assured compliance with 10 CFR 61.55 and 10 CFR 61.56 as required by Appendix G of 10 CFR Part 20; and, reviewed PSEG's program to ensure that the waste stream composition data accounted for changing operational parameters and remained valid between the annual or biennial sample analysis updates.

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; verified that the requirements of any applicable transport cask Certificate of Compliance were met; verified that the receiving licensee was authorized to receive the shipment packages; and, observed

radiation workers during the conduct of radioactive waste processing and radioactive material shipment preparation activities. The inspectors verified 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 NRC Bulletin 79-19 and 49 CFR Part 172 Subpart H, and 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 sampled non-excepted package shipment records and reviewed these records for compliance with NRC and DOT requirements.

The inspectors reviewed PSEG's licensee event reports, special reports, audits, State agency reports, and self-assessments related to the radioactive material and transportation programs performed since the last inspection and determined that identified problems were entered into the corrective action program for resolution. The inspectors also reviewed corrective action reports written against the radioactive material and shipping programs since the previous inspection.

The inspectors evaluated PSEG's programs against the requirements and commitments set forth in: 10 CFR 20.1906; 10 CFR 20 Subpart H; 10 CFR 20 Appendix G; 10 CFR 61.55; 10 CFR 61.56; 10 CFR 71; 49 CFR Parts 170-188; and, plant technical specification 6.8.1.g.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES [OA]

4OA1 Performance Indicator (PI) Verification (71151 - 7 samples)

a. Inspection Scope

The inspectors reviewed PSEG submittals for the Unit 1 and Unit 2 Mitigating Systems cornerstone performance indicators (PIs) and the Unit 1 and Unit 2 Physical Protection cornerstone performance indicators discussed below. To verify the accuracy of the PI data reported during this period the data was compared to the PI definition and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Indicator Guideline," Revision 5.

Cornerstone: Mitigating Systems

- Unit 1 and Unit 2 emergency AC power system mitigating systems performance index (MSPI)
- Unit 1 and Unit 2 cooling water support system MSPI

For these PIs the inspectors verified the data for the PI results for the fourth quarter 2006 through the third quarter of 2007. The inspectors reviewed the consolidated data entry MSPI derivation reports for the unavailability and unreliability indexes (UAI and URI) for the monitored systems; the monitored component demands and demand failure data for the monitored systems; and the train and system unavailability data for the monitored systems. The inspectors verified the accuracy of the data by comparing it to corrective action program records, control room operator logs, maintenance rule performance and scope reports, licensee event reports, and the MSPI basis document

Cornerstone: Physical Protection

- Fitness-for-Duty
- Personnel Screening
- Protected Area Security Equipment

For these PIs the inspectors reviewed PSEG's programs for gathering, processing, evaluating, and submitting the data . The inspectors reviewed PSEG's tracking and trending reports and security event reports for the PI data collected since the last security baseline inspection. The inspectors also conducted personnel interviews about these topics. The inspectors noted from PSEG's submittal that there were no reported failures to properly implement the requirements of 10 CFR 73 and 10 CFR 26 during the reporting period.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152 - 3 samples)

.1 Review of Items Entered into the Corrective Action Program

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of all items entered into PSEG's corrective action program. This was accomplished by reviewing the description of each new notification and attending daily management review committee meetings. Documents reviewed are listed in the Attachment.

.2 Semi-Annual Review to Identify Trends

a. Inspection Scope

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," the inspectors performed a review of PSEG's corrective action program (CAP) and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment and corrective maintenance issues, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.1. The review included issues documented in

system health reports, corrective maintenance WOs, component status reports, site monthly meeting reports and maintenance rule assessments. The inspectors' review nominally considered the six-month period of May 1 through November 30, although some examples expanded beyond those dates when the scope of the trend warranted. The inspectors compared and contrasted their results with the results contained in PSEG's latest integrated quarterly assessment report. Corrective actions associated with a sample of the issues identified in PSEG's trend report were reviewed for adequacy. The inspectors also evaluated the trend report specified in SPP-3.1, "Corrective Action Program." Specific documents reviewed are listed in the Attachment.

b. Assessment and Observations

No findings of significance were identified. The inspectors noted a trend in low level issues entered into the CAP related to three specific areas. The first area was leaks through packing, seals, and joints. The second area was monitoring and test equipment, specifically less than adequate control of test equipment resulted in rework and calibration issues. The third area dealt with the results of the predictive maintenance program being inconsistent, which has reduced the site's confidence in the equipment monitoring performed through that program. The inspectors verified that PSEG was aware of these issues and was taking action to address them.

.3 Annual Sample: Human Performance, Procedure Use and Adherence

a. Inspection Scope

The inspectors reviewed the actions PSEG had taken to improve procedure use and adherence at the station. This sample evaluated PSEG's scope of efforts and progress in the area of procedure compliance for the period of July 2007 through December 2007.

b. Findings and Observations

No findings of significance were identified.

On August 31, 2007, the NRC identified a substantive cross-cutting issue in the area of human performance with a cross-cutting theme in the aspect of procedural compliance. In response, the Salem and Hope Creek Vice Presidents issued a communication to station personnel asking for their support and attention in resolving a performance problem in procedure use and adherence. The Salem and Hope Creek Operations Directors were assigned as sponsors to lead the resolution of this issue. A cause evaluation commenced on September 16, 2007.
The cause evaluation confirmed that personnel did not consistently meet management procedure use and adherence expectations. PSEG determined that the root cause was inadequate reinforcement and oversight of procedure use and adherence expectations. As a result of inadequate reinforcement and oversight, the organization tolerated substandard procedures and a disregard for procedural steps perceived to be of low value.

PSEG's cause determination also recognized that workers and first line supervisors believed that different procedure use and adherence expectations applied to routine work verses high priority or plant outage work. This belief was also corroborated by management. Executive leadership acknowledged that emphasis on schedule adherence may have contributed to this belief in the past.

PSEG identified additional contributing causes, including discrepancies between site-wide expectations set forth in HU-AA-104-101, "Procedure Use and Adherence," individual department expectations set forth in various departmental guidelines, a large number of new administrative requirements made in anticipation of a corporate merger, and an inability to establish and maintain accountability through direct field observation or performance trending.

PSEG initiated seventeen corrective actions, including two corrective actions tailored to prevent recurrence. Completed corrective actions addressed communication of site-wide expectations, establishment of human performance tools to reinforce expectations and implementation of accountability for procedure use and adherence expectations. Corrective actions currently in progress include: benchmarking HU-AA-104-101 against industry standards; reconciliation of departmental procedure use guidelines to HU-AA-104-101; departmental assessment of administrative procedures; resolution of procedure revision backlogs; and incorporating procedure reviews into the guidelines for work week preparation. Further, PSEG mandated that all departments review and, where necessary, revise procedures required to support the upcoming refueling outage. These actions are expected to be complete before the Unit 2 outage in the Spring of 2008.

Procedure use and adherence is one of four current station focus areas and has been embedded into the Salem hundred-day plan. Several specific actions are included in the plan to communicate, train, and monitor progress made in the resolution of the procedure use and adherence issue. One manager-in-the-field (MIF) focus area is procedure use and adherence. The MIF program pairs a first line supervisor with a manager, generally on a cross-disciplinary basis. The two spend a work day critically observing activities throughout the plant. Further, a target was set for the number of observations relating to procedure use and adherence in the PSEG fundamentals management system (FMS). The FMS requires supervisors to critically evaluate and document job performance for all assigned subordinates each work week. Additionally, cross-disciplinary FMS reviews are encouraged and, in some instances, required. The FMS database is on-line and forms the basis for annual employee performance appraisals. The FMS database can also be used to identify performance trends. Progress in resolving the procedure use and adherence issue is apparent. The inspectors have noted several instances whereby technicians recognized that a task could not be performed as written. Procedure changes were implemented before proceeding with the task. The inspectors have observed an increasing number of requests to correct or improve procedures as procedure compliance at PSEG is emphasized. The chemistry department has led the effort to improve procedure compliance by completing a dynamic learning activity intended to improve the working knowledge of procedure compliance within the department. The chemistry department

also sponsored an apparent cause evaluation for less than adequate change management while implementing new procedures in anticipation of a corporate merger. Corrective actions from this apparent cause evaluation are complete.

The number of significant procedure use and adherence issues at Salem has decreased over the past six months. The root cause evaluation on this issue was extensive and identified many corrective actions that are complete or in progress. During the spring of 2008, Salem will execute its first refueling outage since completion of PSEG's evaluation and implementation of the associated corrective actions. This refueling outage will be the first opportunity to fully assess the effectiveness of PSEG's corrective actions in this area.

.4 Annual Sample: Internal Flooding Concerns

a. Inspection Scope

During the week of October 15, 2007, the inspectors reviewed PSEG actions taken to evaluate and correct several internal flooding concerns identified over the past several years of operation. The inspectors reviewed several corrective action notifications (NOTFs) related to potential internal flooding concerns, the completed evaluations, and associated corrective actions to assess PSEG's corrective action program performance. The inspectors conducted independent walkdowns of the 4kV vital switchgear rooms, DFOTP rooms, and other safety-related areas in the auxiliary building for both units to assess potential internal flooding vulnerabilities and the effectiveness of PSEG corrective actions. The inspectors also conducted interviews with plant personnel; and reviewed procedures, related industry operating experience (OE), and drawings. (See Section 1R06 for an update on an associated internal flooding URI.) Documents reviewed are listed in the Attachment.

b. Findings and Observations

No findings of significance were identified.

The inspectors concluded that PSEG had initiated appropriate actions to address several aspects of the internal flooding concerns identified in URI 05000272&311/2007002-01, but as documented in Section 1R06 of this report PSEG, there are still several open aspect for which NRC review could not be completed because PSEGs actions were not yet complete. In addition during this inspection the inspectors also identified several additional problems related to PSEG's identification, evaluation, and resolution of internal flooding concerns identified over the past several years of operation. These issues included:

- In general, PSEG demonstrated weak problem identification, including self-assessment performance, for internal flooding concerns and deficiencies. For example, the majority of the documented concerns are NRC identified or self-revealing in nature.

- Over the years, PSEG had missed several opportunities to identify potential internal flooding vulnerabilities and related equipment deficiencies highlighted in industry OE. [Examples included: NRC (Information Notice) IN 83-44S1 (CD-492B), NRC IN 87-49 (NOTF 20287502), NRC IN 98-31 (CR 980908220, CR 70027022, CR 70046310, CR 70054165), NRC IN 2005-11 (CR 70047651), NRC IN 2005-30 (CR 70050702, CR 70035088)]

- In November 2003, PSEG NOTF 20167048 documented that the Salem Unit 2 moderate energy line break (MELB) analysis contained in S-C-ZZ-SDC-1203 lacked analytical rigor. Engineering initiated actions (NUCR 70035088–090) to perform a MELB internal flooding analysis reconstitution for Unit 2 (the Unit 1 licensing basis did not require a MELB analysis). PSEG extended the due date of this analysis several times since 2003. In March 2007, the vendor submitted a reconstituted analysis (VTD 901116); however, PSEG identified that the analysis was inadequate because it overlooked flooding sources originating from areas that did not contain safe shutdown equipment. In addition, PSEG noted that the assumptions in the analysis did not appear to be consistently applied. PSEG initiated corrective action NOTF 20318368 to address these concerns. PSEG extended the vendor's due date to December 2007, and stated that they should be able to complete their review by the end of March 2008.

- Since November 2003, PSEG routinely closed out internal flooding concerns and deficiencies to their open internal flooding analysis reconstitution effort (70035088). The inspectors noted that PSEG took a very shortsighted approach to resolving these concerns based on the following: the reconstitution effort pertained to MELB only (there are many addition facets to internal flooding - HELB, seismic, inadvertent actuation, PM-related, etc.); since the effect only involved a MELB review the potential existed to overlook Unit 1 because Unit 1 did not require a MELB analysis; and concerns closed out to the reconstitution effort were not uniquely tracked through to completion to ensure adequate resolution of the original issue (examples in this area included but were not limited to: re-evaluating S-C-A364-CSE-0500 to assess an actual flow path from the 100' relay rooms to the 64' switchgear rooms, revising the Probabilistic Risk Assessment (PRA) flooding analysis as necessary to include the 84' switchgear room corridor, determining the design requirement for curbs outside the 64' vital switchgear rooms, determining the design basis curb height above the RHR pump rooms, and addressing weaknesses in the technical basis supporting flooding abnormal procedures).

- In August 1998, the NRC issued NRC IN 98-31 to alert licensees to a rupture of a fire water system valve, due to a water hammer, in a fire main vertical riser at Washington Nuclear Project Unit 2 (WNP-2) that flooded two emergency core cooling system (ECCS) equipment rooms. In December 1998 PSEG determined that NRC IN 98-31 was applicable, that they were potentially susceptible, and that they needed to perform a fire water system hydraulic analysis. In 2002, PSEG identified that their response to NRC IN 98-31 was not adequate as they had not completed the fire water system hydraulic analysis as requested (CR 70027022). In April 2005, PSEG's hydraulic analysis concluded that the activation of a large

demand deluge valve (3" or greater) on the Salem fire water system may result in water hammer leading to possible pipe rupture (NOTF 20231837/CR 70046310). In February 2006, PSEG initiated NOTF 20271990 to track development of a design change to install vacuum breakers at the hose station risers to preclude pipe rupture. The inspectors noted that PSEG engineering had not completed their design review as of October 2007 (see Section 1R06).

- On February 28, 2006, PSEG initiated NOTF 20273398 in response to a self-revealing fire protection hose station internal flooding event that resulted in the flow of approximately 100 gallons of water from the 100' auxiliary building corridor to the Unit 1 64' 4kV vital switchgear room (via the 100' vital relay room and 84' 460V vital switchgear room). PSEG promptly addressed wetted equipment but deferred evaluation of this internal flood pathway to their open internal flooding analysis reconstitution effort (70035088). On June 9, 2006, the NRC resident inspectors identified concerns with this flood pathway as it invalidated assumptions in Salem evaluation S-C-A364-CSE-0500, “Effects on Safety-Related Equipment due to Fire Protection Piping Failure,” and due to missing door sills previously installed at the 100' relay rooms for both Units. In response to NRC concerns, PSEG initiated NOTF 20287502, re-installed the missing door sills, developed an operability determination (CROD 06-014), and implemented compensatory measures. Subsequently, PSEG closed out additional internal flooding review actions to their open internal flooding analysis reconstitution effort (70035088).

- PSEG CROD 06-014 termination criteria called for completion of the internal flooding reconstitution effort and installation of the 22 fire protection vacuum breakers (70058383). In July 2007, PSEG closed out CROD 06-014; however, neither of the above criteria were met.

- In November 2003, PSEG initiated NOTF 20170724 in response to an NRC resident inspector identified deficiency associated with strainers installed in the Unit 1 64' switchgear room drains (no strainers installed in the Unit 2 switchgear room drains). PSEG determined that the Unit 1 drains with strainers installed were nonconforming and that the strainers needed to be removed. The associated removal work order (60041642) documented that the technician proceeded to the Unit 2 64' switchgear room (vice the Unit 1 room) to inspect the floor drains and remove the installed strainers. The technician noted that no strainers were present and consulted with engineering. Engineering informed the technician that the drains conformed to the original design since no strainers were found. PSEG closed the corrective action NOTF in December 2003. In October 2007, the inspectors reviewed the NOTF 20170724 closure documentation and noted an apparent disconnect. During a walkdown of the 64' switchgear rooms on October 15, 2007, the inspectors identified that the strainers were still installed in the Unit 1 switchgear room. In response, PSEG initiated NOTF 20340767 to address corrective actions for this longstanding deficiency.

The inspectors independently evaluated the performance deficiencies noted above for potential significance, except for those items directly tied to the open URI concerns

discussed in Section 1RO6.1. The inspectors determined that none of the individual issues were findings of more than minor significance based upon the guidance in IMC 0612, Appendix E, "Examples of Minor Issues."

4OA3 Event Followup (71153 – 1 sample)

.1 (Closed) LER 05000311/2007003-00, Reactor Trip Due to Spurious Feedwater Interlock Signal (1 sample)

On August 6, 2007, the Salem Unit 2 reactor tripped due to 22 steam generator (SG) water level reaching its low-low level set point. The cause of SG low-low level was faulty solid state protection system output driver card A517 that initiated a spurious feedwater isolation signal and resulted in the closure of the feedwater regulating valves.

The failed circuit card was removed, inspected, and tested by PSEG personnel. Inspection of the card performed at increased magnification identified a defective solder joint. The card was replaced and the system tested satisfactorily. This issue was inspected at the time of the occurrence and was discussed in section 4OA3.1 of NRC Inspection Report 05000272&311/2007004. The inspectors review of this LER identified no new findings. This LER is closed.

4OA5 Other Activities

.1 (Closed) Unresolved Item (URI) 05000272/2006007-01, 05000311/2006007-01

NRC triennial fire protection inspection report number 05000272/2006007 and 05000311/2006007, dated May 23, 2006, (ADAMS accession number ML0614301701) described in section 1R05.01.b that personnel were expected to perform activities in the inner and outer piping penetration rooms during a post-fire shutdown from outside the control room. The triennial fire protection inspection team found that habitability was not sufficiently evaluated to ensure temperatures would remain low enough to allow for personnel entry for the performance of required manual actions per their alternate shutdown procedures. PSEG determined that penetration room temperatures would rise to a point that made personnel access unsafe for more than 15 minutes. In response, PSEG evaluated the required operator actions and found that they could be completed in 12 minutes. PSEG concluded that the operator actions could be completed. Further, PSEG revised abnormal operation procedures to no longer require personnel to remain in the penetration rooms after completing the required operations, to provide alternate means of accomplishing the required operations without entering the inner piping penetration room, and to provide additional ventilation to the outer piping penetration room. The inspectors reviewed PSEG's response and confirmed the adequacy of PSEG's corrective measures. This URI is closed.

.2 (Closed) Violation (VIO) 05000311/2007003-01: NRC Integrated Inspection Report 05000311/2007003, dated August 14, 2007, (ADAMS accession number ML072260460) described in section 1R08 that PSEG failed to comply with 10 CFR 50.55a(g)(5)(iii) and (iv). Specifically, PSEG did not report within the required time period that conformance

with certain code requirements was impractical for its facility. Further, PSEG's late report did not contain the information necessary to support PSEG's determinations. The inspectors determined that the corrective actions described in PSEG's Reply to Notice of Violation are reasonable and timely. This violation is closed.

4OA6 Meetings, Including Exit

On January 4, 2008, the resident inspectors presented the inspection results to Mr. G. Gellrich. None of the information reviewed by the inspectors was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

C. Beeson, System Engineer
M. Bruecks, Director – Security
W. Ceravalo, Senior Security Coordinator
R. Chan, Maintenance Superintendant – Instrumentation & Controls
R. DeSanctis, Shift Operations Superintendant
A. Johnson, Salem Mechanical/Structural Design Manager
M. Kafantaris, Training Manager
T. Mulholland, System Engineer
G. O'Leary, Maintenance Superintendant – 12 Hour Shift
R. Settle, Manager – Engineering Response
M. Straubmuller, Operations Training Manager

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened/Closed

05000272/2007005-01	NCV	Inadequate Troubleshooting for a Failure of 13 CFCU to Start in Slow Speed (Section 1R12)
05000311/2007003-00	LER	Reactor Trip Due to Spurious Feedwater Interlock Signal (Section 4OA3.1)

Closed

05000272&311/2006007-01	URI	Temperature Habitability Effects on the Ability to Perform Alternate Shutdown Manual Actions (Section 4OA5.1)
05000311/2007003-01	VIO	Failure to Notify NRC of Incomplete Weld Inspections (Section 4OA5.2)

Discussed

05000272&311/2007002-01	URI	Potential vulnerabilities to internal flooding (Section 1R06.1)

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 Protection

Procedures
SC.MD-GP.ZZ-0001, Station Preparations for Winter – Mechanical, Revision 6
SC.OP-PT.ZZ-0002, Station Preparations for Seasonal Conditions, Revision 11
WC-AA-107, Seasonal Readiness, Revision 5
OP-SH-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 0
SC.OP-AB.ZZ-0001, Adverse Environmental Conditions, Revision 11

Notifications
2034479 20306825 20323914

Orders
20345704 20304808 20337274 20337253 20337281 2033782
20094988 20315551 20340009 20304824 20304809 20304810
30146770 60067207 70066607 80089493

Other Documents
2007 Salem Winter Readiness Affirmation PSEG Memo to Plant Manager dated 11/15/07
2006-2007 Winter Season Winter Readiness Critique dated 4/23/07

Section 1R04: Equipment Alignment

Procedures
S1.OP-SO.AF-0001, Auxiliary Feedwater System Operation, Revision 24
S1.OP-TM.ZZ-0002, Tank Capacity Data, Revision 7
S1.IC-GP.AF-0001, Auxiliary Feedwater System Instrument Valve Lineup Verification, Revision 2
SC.OP-AB.ZZ-0001, Adverse Environmental Conditions, Revision 11
SC.OP-SO.DM-0001, Demineralized Water Transfer System Operation, Revision 1
S1.OP-ST.AF-0011, Auxiliary Feed Water Alternate Suction Source Verification, Revision 2
S1.OP-ST.AF-0008, Auxiliary Feedwater Valve Verification Modes 1-3, Revision 3
S1.OP-PT.AF-0001, Service Water to Auxiliary Feedwater Spool Piece Installation, Revision 5
S1.OP-SO.CAV-0001, Control Area Ventilation Operation, Revision 31
SC.OP-SO.CA-0001, SBO Diesel Control Air Compressor, Revision 11

Drawings
205236 205213 205246 205242 205203 205222
205347 604495

Notifications
20342159 20344146 20344147 20344490 20344489 20344488
20342976

Orders
50108321

Other Documents
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SA PRA-014, Salem PRA Notebook, Revision 0
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DE-CB.AF-0010, Configuration Baseline Documentation for Auxiliary Feedwater System, Revision 5
SC.DE-PS.ZZ-0040, Salem Station Blackout Program, Revision 2

Section 1R05: Fire Protection

Procedures
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FRS-II-424, Salem – Unit 1, (Unit 2) – CVCS Hold-up Tank Area, Elevation: 64' – 0", Revision 2
FRS-II-424, Salem – Unit 1, (Unit 2) – Spent Fuel / Component Cooling Heat Exchanger & Pump Area, Elevation: 84' – 0", Revision 5
FRS-II-511, Salem – Unit 1, (Unit 2) – Electrical Penetration Area, Elevation: 78' – 0", Revision 4
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Section 1R06.1: Flood Protection Measures and Section 4OA2.1: Identification and Resolution of Problems

Procedures
ND.DE-PS.ZZ-0010-A5, Internal Hazards Program Appendix A5 - Flooding Analysis Methodology, Revision 1

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S-C-BD-MEE-0554-0, Potential Damage to Redundant Safety Equipment as a Result of Backflow Through the Equipment and Floor Drain Systems, dated 3/28/91
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S-C-FP-MEE-1894, Salem Unit 1 & 2 Fire Protection Piping Evaluation for Consequences of Potential Water Hammer, dated 5/17/05
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Drawings
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250984, No. 2 Unit AUX BLDG Vent Piping for Heating Water & Steam Pipe Encapsulations, Revision 0
DWG No. HS 2-2 SH 9, No. 2 Unit Auxiliary Building EL. 100' Heating Steam & Condensate Return Construction Piping Isometric, Revision 0
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70052914	70054165	70054633	70054727	70058383	70066205
80088529					

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20142241	20164760	20167048	20167603	20167604	20169101
20169263	20170196	20170217	20170724	20170949	20210736
20231837	20253937	20261503	20267475	20271990	20273398
20273733	20287502	20312851	20318368	20340767	

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NRC Information Notice No. 87-49: Deficiencies in Outside Containment Flooding Protection, dated 10/9/87
NRC Information Notice 98-31: Fire Protection System Design Deficiencies and Common-mode Flooding of Emergency Core Cooling System Rooms at Washington Nuclear Project Unit 2, dated 8/18/98
NRC Information Notice 2005-30: Safe Shutdown Potentially Challenged By Unanalyzed Internal Flooding Events and Inadequate Design, dated 11/7/05

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Section 1R11: Licensed Operator Requalification Program

Simulator Procedures
TQ-AA-301 Simulator Configuration Management
TQ-AA-302 Simulator Testing and Documentation.
TQ-AA-303 Controlling Simulator Core Updates and Thermal Hydraulic Model Updates
TQ-AA-304 Simulator Modifications and Projects Planning

Transient Tests:
OPA-01 Manual Reactor Trip12/20/06
OPA-02 Simultaneous Trip of All FW Pumps 12/20/06
OPA-11 Load Rejection 12/20/06

Malfunction/Transient Tests:
EL-0155 Loss of 460/230V INFD Breaker 2A4D
CN008 Loss of Main Condenser Vacuum
SG009 SG FF XmTR (510) CH 1 fails
AF0181 Aux Feedwater Pump Trip
RH0299 LOCA outside containment

Steady State Tests
100% Steady State Test

Normal Evolution Tests:
TQ-AP-303-0104 PWR Approach to Criticality using Boric Acid
TQ-AP-303-0102 PWR Rod Worth Coefficient of Reactivity

Core Performance Tests (BOC)
Core Model Update Testing 10/2006

Condition Reports/ Work Requests
Index of Simulator Work Requests (SWRs) from 7/2005 to 7/2007
SWR S-2006-044 RHR System leakage model

Procedures/Documents
OP-SA-106-101-2001, Operating with an Emergency on Opposite Unit, Revision 1
NC.EP-EP.ZZ-0102, Emergency Coordinator Response, Revision 13
S2.OP-AB.STM-0001, Excessive Steam Flow, Revision 9
S2.OP-SO.MS-0002, Steam Dump System Operation, Revision 12
S2.OP-SO.TL-0002, Main Turbine Lube Oil Purification and Transfer System, Revision 14
S2.OP-AB.TL-0001, Loss of Main Turbine Lube Oil, Revision 4

S2.OP-AB.LOAD-0001, Rapid Load Reduction, Revision 15
2-EOP-TRIP-1, Reactor Trip or Safety Injection, Revision 26
2-EOP-LOSC-1, Loss of Secondary Coolant, Revision 23
2-EOP-LOCA-1, Loss of Reactor Coolant, Revision 27
2-EOP-TRIP-3, Safety Injection Termination, Revision 25
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TQ-AA-106, Licensed Operator Requal Training Program
OP-AA-105-101, Administrative Process for NRC License and Medical Requirements
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TQ-AA-201, Examination Security and Administration
LER 311/06-005
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S-ESG-0704, Simulator Scenario Guide, Revision 0

Section 1R12: Maintenance Effectiveness

Procedures
MA-AA-716-004, Conduct of Troubleshooting, Revision 7
SC.MD-AP.ZZ-0102, Maintenance Department Troubleshooting Repair and Post-Maintenance Testing, Revision 0
S1.OP-SO.CBV-0001, Containment Ventilation Operation, Revision 24
S1.OP-ST.SW-0015, Inservice Testing Service Water System CFCU and Accumulator Check Valves, Revision 5

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203577	203573	628408	600218		

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20349684	20343985	20346912	20314043	20310248	20344589
20349052	20380842	20310570	20344786	20344165	20313430
20330914	20344862	20344195	20317466	20331003	20346865
20331378	20338977				

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S-C-SJ-MEE-1978, Required Mission Times for Salem ECCS Pumps During Recirculation Phase, Revision 0

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Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
WC-AA-101, On-line Work Control Process, Revision 14
ER-AA-600, Risk Management, Revision 5
OP-SH-101-112-1002, Revision 0
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SGS Unit 2 PRA Risk Evaluation Form, Work Week 744 (October 28 to November 3, 2007), Revision 0
SGS Unit 2 PRA Risk Evaluation Form, Work Week 746, (November 11 to 17, 2007), Revision 1
SGS Unit 1 PRA Risk Evaluation Form, Work Week 748 (November 25 to December 1, 2007), Revision 0
SGS Unit 2 PRA Risk Evaluation Form, Work Week 748 (November 25 to December 1, 2007), Revision 0
SGS Unit 1 PRA Risk Evaluation Form, Work Week 749 (December 2 to 8, 2007), Revision 0

Section 1R15: Operability Evaluations

Procedures
SH.MD-GP.ZZ-0007, General Guidelines for Fuse Inspection/Replacement, Revision 2
SC.DE-PS.ZZ-0051, Fuse Control Program for Salem Generating Station Units 1, 2, &3, Revision 1
SH.DE-TS.ZZ-2037, Fuse Selection Design Standard for Salem & Hope Creek Generating Stations, Revision 1
CC-AA-206, Fuse Control, Revision 5
MA-AA-716-021, Rigging and Lifting Program, Revision 9
MA-SA-716-021, Salem General Rigging Guidelines, Revision 0
NC.NA-AP.ZZ-0022, Measuring & Test Equipment, Lifting & Rigging and Tool Control, Revision 5
NC.CC-AP.ZZ-0011, Transient Loads, Revision 3
SC.MD-PM.ZZ-0135, Ventilation Damper Inspection and Guidelines, Revision 7

S1.OP-SO.CAV-0001, Control Area Ventilation Operation, Revision 31
S1.OP-ST.CH-0003, Inservice Testing Chilled Water Valves Modes 1-6, Revision 11

Drawings

201114	201176	205248	205216	612214	

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20252369	20271971	20344525	20344571	20344510	20344469
20344017	20346010	20346359	20346384	20346826	20346626
20342821	20349622	20347596	20342547	20346684	20346667
20150683	20150971	20150794	20150798	20238534	20342976

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VTD 316695, Time Current Characteristics for Bussman Fuses, Revision 4
S-1-ZZ-CEE-0542, Evaluation of Containment Liner Plate Corrosion, Revision 0
NEI White Paper, Treatment of Operational Leakage from ASME Class 2 and 3 Components, Revision 2
SH.DE-TX.ZZ-4405, Design of Lifting and Rigging Systems, Revision 0
DE-CB.CH-0025, Configuration Baseline Documentation for Chilled Water System, Revision 3
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Salem Inservice Testing Program Basis Data Sheets – Valves, for 1CH74, Revision 8
S-C-CH-MEE-1139, Chilled Water System (CH) – Single Failure Criteria Vulnerability Assessment, Revision 1

Section 1R19: Post-Maintenance Testing

Procedures
SC.IC-CM.ZZ-0007, Disassembly, Inspection, Assembly and Testing of Fisher Piston Type 476U Air Actuator, Revision 4
ER-AA-410-1002, Air Operated Valve Testing Requirements, Revision 2
MA-AA-716-100, Maintenance Alterations Process, Revision 8
SC.MD-PM.ZZ-0210, Disassembly, Inspection, and Reassembly of BNL Ball Valve Mark # AA-303, BA-154 and AA-319, Revision 9
SC.IC-PM.ZZ-0008, Maintenance of Bettis Actuator (Model CB), Revision 10

SH.MD-EU.ZZ-0001, Crimping Instructions, Revision 7
S2.OP-ST.CVC-0002, Inservice Testing – 22 Boric Acid Transfer Pump, Revision 20
SC.MD-PM.CVC-0005, Boric Acid Transfer Pump Disassembly, Inspection, and Reassembly, Revision 7

Notifications
20329576 20330441 20331088 20330784

Orders
30139696 70058992 70071904 60070942 60064527 30135357
60073285 60072977

Other Documents
Salem Inservice Testing Program Basis Data Sheets – Valves, 22SW127
DE-CB.SW-0047, Configuration Baseline Documentation for Service Water System, Revision 7
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Section 1R20: Refueling and Other Outage Activities

Procedures
1-EOP-TRIP-1, Reactor Trip or Safety Injection, Revision 26
1-EOP-TRIP-2, Reactor Trip Response, Revision 24
S1.OP-SO.RCS-0001, Rod Control System Operation, Revision 28
S1.OP-SO.CN-0002, Steam Generator Feed Pump Operation, Revision 21
S1.OP-AR.ZZ-0004, Overhead Annunciators Window D, Revision 21
S1.OP-SO.ANN-0001, Overhead Annunciators Operation, Revision 19

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20350143 20330305 20329260 20329619 20350164 20350162
20350173 20350171 20350168 20350167 20350165 20350163
20350146 20350143 20350140 20350137 20350327 20350355

Orders
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Section 1R22: Surveillance Testing

Procedures
SC.RE-ST.ZZ-0001, Daily Power Range Channel Calibration by Calorimetric, Revision 25
S2.OP-IO.ZZ-0004, Power Operation, Revision 60
SC.RE-RA.ZZ-0019, Feedwater Flowrate Correction Factor, Revision 6
S1.RE-RA.ZZ-0011, Tables, Revision 230

S2.OP-ST.DG-0002, 2B Diesel Generator Surveillance Test, Revision 43
S2.RA-ST.DG-0002, 2B Diesel Generator Surveillance Test Acceptance Criteria, Revision 4
S2.OP-ST.DG-0020, 2B Diesel Generator Hot Restart Test, Revision 11
S2.OP-ST.RC-0008, Reactor Coolant System Water Inventory Balance, Revision 28
S-C-RCS-ECS-0178, RCS Mass Leak Rate Correction Calculation, Revision 0
S1.OP-ST.SSP-0009, Engineered Safety Features SSPS Slave Relays Test, Revision 31
S1.OP-LR.CVC-0001, Type C Leak Rate Test 1CV3, 1CV4, 1CV5, 1CV6, and 1CV7, Revisions 1 and 2
S1.OP-LR.CVC-0002, Type C Leak Rate Test 1VC4 and 1VC4, Revision 1
S1.OP-LR.CVC-0003, Type C Leak Rate Test 1VC5 and 1VC6, Revision 0
S2.OP-ST.RHR-0001, Inservice Testing – 21 Residual Heat Removal Pump, Revision 21
S2.RA-ST.RHR-0001, Inservice Testing – 21 Residual Heat Removal Pump Acceptance Criteria, Revision 7

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Order
50106583

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VTD 324663, Improved Flow Measurement Accuracy using Crossflow Ultrasonic Flow Measurement Technology, Revision 2
Salem Inservice Testing Program Basis Data Sheets – Valves, 22SW39, Revision 8

Section 2PS2: Radioactive Material Processing and Transporation

Procedures
RP-AA-605-1001, Evaluation of 10 CFR 61 Sample Results, Revision 0
RP-AA-605, 10 CFR 61 Program, Revision 0

Other Documents
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Condition Report 70072529
Shipment Records: 07-98; 07-99; 07-100; 07-04; 07-17; 07-53; 07-71; 07-84
Audit NOSA-SLM-06-04, Chemistry, Radwaste, Effluent and Environmental Monitoring
NUPIC Audit # 19230, 19229, 19228, 19227, Duratek, Inc.
Lesson Plan NRP9902RMATC-00, Radioactive Materials Shipping
Hazardous Material Transportation Certification Course, September 2006
Waste Stream Reports: Duratek Resin/Charcoal; Unit 1 Primary Resins; Unit 2 Primary Resins; Dry Active Waste

Section 4OA2: Identification and Resolution of Problems

Notifications
20345266 20346135

Orders
30153551 70076378 70077204 70075200 70077140 70077519

Section 4OA5: Other Activities

Procedures
S1.OP-AB.CR-0002, Control Room Evacuation due to Fire in the Control Room, Relay Room, 460/230V Switchgear Room, or 4kV Switchgear Room, Revision 22
S2.OP-AB.CR-0002, Control Room Evacuation due to Fire in the Control Room, Relay Room, 460/230V Switchgear Room, or 4kV Switchgear Room, Revision 24
SA-AA-111, Heat Stress Control, Revision 5

Notifications
20315469

Orders
70067163

LIST OF ACRONYMS

AFW	Auxiliary Feewater System
BAT	Boric Acid Transfer
CCHX	Component Cooling Heat Exchanger
CCW	Component Cooling Water
CFCU	Containment Fan Coil Unit
CFR	Code of Federal Regulations
CR	Condition Report
CS	Containment Spray
CVCS	Chemical and Volume Control System
DFOTP	Diesel Fuel Oil Transfer Pump
DM	Demineralized
DOT	Department of Transportation
EACS	Emergency Air Conditioning System
ECCS	Emergency Core Cooling System
FMS	Fundamentals Management System
HELB	High Energy Line Break
IMC	Inspection Manual Chapter
IN	Information Notice
JPM	Job Performance Measure
LER	Licensee Event Report
MELB	Moderate Energy Line Break

MIC	Microbiologically Induced Corrosion
MIF	Manager-in-the-field
NCV	Non-cited Violation
NOTF	Notification
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
OE	Operating Experience
PARS	Publicly Available Records
PCP	Process Control Program
PI	Performance Indicator
PM	Preventive Maintenance
PORV	Pilot Operated Relief Valve
PRA	Probabilistic Risk Assessment
PSEG	Public Service Enterprise Group Nuclear LLC
RG	Regulatory Guide
RHR	Residual Heat Removal
SAC	Station Air Compressor
SBO	Station Blackout
SDP	Significance Determination Process
SG	Steam Generator
SGS	Salem Generating Station
SQUG	Seismic Qualification Utility Group
SSC	Structure, System, and Component
SSPS	Solid State Protection Systems
SWP	Service Water Pump
SWRs	Simulator Work Requests
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VIO	Violation
VTD	Vendor Technical Document
WO	Work Order