



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
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November 12, 2008

Mr. Thomas 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 05000272/2008004 and  
05000311/2008004

Dear Mr. Joyce:

On September 30, 2008, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Salem Nuclear Generating Station, Unit Nos. 1 and 2. The enclosed integrated inspection report documents the inspection results discussed on October 14, 2008, with Mr. Braun 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.

Based on the results of this inspection, no findings of significance were identified.

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 by Leonard Cline Acting for/**

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 05000272/2008004 and 05000311/2008004  
w/Attachment: Supplemental Information

cc w/encl:

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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: 05000272/2008004 and 05000311/2008004

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: July 1, 2008 through September 30, 2008

Inspectors: D. Schroeder, Senior Resident Inspector  
H. Balian, Resident Inspector  
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J. Furia, Senior Health Physicist  
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T. O'Hara, Reactor Inspector

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

## SUMMARY OF FINDINGS

IR 05000272/2008004, 05000311/2008004; 07/01/2008 – 09/30/2008; Salem Nuclear Generating Station Unit Nos. 1 and 2; Routine Integrated Report.

The report covered a three-month period of inspection by resident inspectors, and an announced inspection by a regional radiation specialist, and a regional reactor inspector. 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

No findings of significance were identified.

B. Licensee-Identified Violations

None.

## REPORT DETAILS

Summary of Plant Status

Salem Nuclear Generating Station Unit No. 1 (Unit 1) began the period at full power. On September 20, operations reduced power to 84% per direction from the transmission system operator (TSO). The TSO directed that electric power output be reduced to alleviate a high voltage condition on the transmission grid. Operations returned Unit 1 to full power on September 22. Unit 1 operated at full power for the remainder of the inspection period.

Salem Nuclear Generating Station Unit No. 2 (Unit 2) began the period at 98.2% power with electric power output limited by main turbine governor valve limitations. Operations raised power to 99.7% on July 7 after engineering implemented a design change that permitted the reactor to operate at a higher average reactor coolant temperature. Main turbine governor valve limitations continued to prevent operations from achieving 100% of rated thermal output. On September 20, operations reduced power to 48% per direction from the TSO. The TSO directed that electric power output be reduced to alleviate a high voltage condition on the transmission grid. Operations returned Unit 2 to 99.7% power on September 22. Unit 2 operated at 99.7% 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)****.1 Readiness to Cope with External Flooding****a. Inspection Scope**

During the week of September 1, 2008, the inspectors completed one adverse weather inspection sample in preparation for the arrival of Tropical Storm Hanna. The inspectors reviewed adverse weather preparation procedures and compensatory measures to verify that PSEG adequately protected and prepared risk-significant systems for severe weather conditions that posed a risk of flooding. The inspectors interviewed engineering and operations personnel, observed PSEG's Severe Weather Team meeting, and walked down risk-significant systems to independently assess PSEG's preparations. Specifically, the inspectors walked down the service water (SW) intake structure, outdoor areas within the protected area, emergency diesel generators (EDGs), EDG fuel oil transfer pumps and storage tanks, turbine driven auxiliary feedwater pumps, gas turbine generator, and the station blackout (SBO) air compressor. In addition, the inspectors reviewed the technical specifications (TS), updated final safety analysis report, and event classification guide (ECG) to ensure that PSEG operated and maintained systems and components as required. The documents reviewed during this inspection are listed in Attachment A.

Enclosure

b. Findings

No findings of significance were identified.

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

.1 Partial Walk down

a. Inspection Scope

The inspectors completed three partial system walk down inspection samples. The inspectors walked down the systems to verify the operability of redundant or diverse trains and components when safety equipment was inoperable. 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 system 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 for this inspection are listed in Attachment A. The inspectors walked down the systems listed below:

- Unit 1 11 SW pump following maintenance on the pump and motor;
- Unit 1 containment spray (CS) system following surveillance testing of the 11 containment spray pump; and
- Unit 1 1A and 1B EDG during emergent unavailability and inoperability of the 1C EDG.

b. Findings

No findings of significance were identified.

.2 Complete Walk down

a. Inspection Scope

The inspectors completed one complete walk down inspection sample. The inspectors walked down the Unit 2 safety injection (SJ) system on September 15 through 19, 2008. 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 for this inspection are listed in Attachment A.

b. Findings

No findings of significance were identified.

Enclosure

1R05 Fire Protection (71111.05Q - 5 samples, 71111.05A - 1 sample)

.1 Fire Protection – Tours

a. Inspection Scope

The inspectors completed five fire protection quarterly inspection samples. The inspectors performed walk downs 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 Attachment A. The inspectors evaluated the fire protection areas listed below:

- Unit 1 and 2 460 volt switchgear rooms and corridor;
- Controlled combustible zone number 8; and
- Unit 1 and 2 electrical penetration areas.

b. Findings

No findings of significance were identified.

.2 Fire Protection - Drill Observation

a. Inspection Scope

The inspectors completed one fire drill observation inspection sample on August 14, 2008. The inspectors observed an announced fire drill conducted in the Unit 1 460 volt ES switchgear room. The inspectors observed the drill to evaluate the readiness of the plant fire brigade to fight fires. The inspectors verified that PSEG staff identified deficiencies; openly discussed them in a self-critical manner at the drill debrief; and took appropriate corrective actions. Specific attributes evaluated were: proper wearing of turnout gear and self-contained breathing apparatus; proper use and layout of fire hoses and employment of appropriate fire fighting techniques; sufficient fire fighting equipment brought to the scene; effectiveness of fire brigade leader communications and command and control; search for victims and propagation of the fire into other plant areas; smoke removal operations; utilization of pre-planned strategies; and adherence to the pre-planned drill scenario and objectives.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06 - 1 sample)



.1 Internal Flooding

a. Inspection Scope

The inspectors completed one flood protection measures inspection sample. The inspectors evaluated flood protection measures for the Unit 1 and Unit 2 SW pump bays. The inspectors walked down the areas to assess operational readiness of various features in place to protect redundant safety-related components and vital electric power systems from internal flooding. These features included plant drains, sump pumps, watertight doors, and wall penetration seals. The inspectors also reviewed the flood barrier penetration seal inspections, abnormal procedures, preventive maintenance history, and corrective action notifications associated with flood protection measures. Documents reviewed for this inspection are listed in Attachment A.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11Q - 1 sample)

.1 Requalification Activities Review by Resident Staff

a. Inspection Scope

The inspectors completed one requalification activities review inspection sample. Specifically, the inspectors observed two annual operating examinations administered to a single crew. The first scenario involved a failed pressurizer pressure channel, an inadvertently closed feedwater heater inlet valve, a steam leak in containment and an anticipated transient without trip (ATWT). The second scenario involved a failed reactor coolant system temperature detector, a heater drain pump trip, a failed open pressurizer spray valve, a small break loss of coolant accident followed by component failures in high head safety injection, component cooling water and auxiliary feedwater that required manual operator actions to correct or mitigate. Documents reviewed for this inspection are listed in Attachment A.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q - 2 samples)

a. Inspection Scope

The inspectors completed two quarterly maintenance effectiveness inspection samples. The inspectors reviewed performance monitoring and maintenance effectiveness issues for two 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 the 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. Documents reviewed are listed in Attachment A. The inspectors evaluated the systems listed below:

- Unit 1 emergency diesel generator ventilation system; and
- Unit 2 circulating water system.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors completed five maintenance effectiveness and emergent work control inspection samples. The inspectors reviewed the selected 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 walk downs. 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 notifications documenting problems associated with risk assessments and emergent work evaluations. Documents reviewed are listed in Attachment A. The inspectors assessed the plant configurations listed below:

- Emergent inoperability of the 1D vital instrument bus (VIB) inverter concurrent with planned troubleshooting of the station gas turbine generator auto-synchronization circuit on August 24;
- Emergent inoperability of the 12 EDG fuel oil transfer pump on July 10;
- Emergent inoperability of the 1C EDG caused by failure of the EDG ventilation supply fan on August 5;
- Planned unavailability of the SBO air compressor concurrent with the planned unavailability of the 24 SW pump on September 3 to 5; and
- Functional test of 2PT 474 with pressurizer relief valve blocking valve 2PR7 closed on August 19.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 4 samples)

a. Inspection Scope

The inspectors completed four operability evaluation inspection samples. The inspectors reviewed the operability determinations for degraded or non-conforming conditions associated with:

- Unit 2 overhead alarm system given degradation of both redundant 12 Vdc power supplies;
- 24 containment fan coil unit (CFCU) given failure of the CFCU to start in fast speed;
- 12 EDG fuel oil transfer pump given identification of low flow rate during a TS surveillance test; and
- 22 SW strainer gap clearances greater than design limits.

The inspectors reviewed the technical adequacy of the operability determinations to ensure 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. Documents reviewed are listed in Attachment A.

a. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19 - 5 samples)

a. Inspection Scope

The inspectors completed five 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; that testing was adequate for the maintenance performed; that acceptance criteria were clear, demonstrated operational readiness and were consistent with design and licensing basis documentation; that test instrumentation was calibrated, and the appropriate range and accuracy for the application; that tests were performed, as written, with applicable prerequisites satisfied; and that equipment was returned to an operational status and ready to perform its safety function. Documents reviewed for this inspection are listed in Attachment A. The inspectors evaluated the post- maintenance tests for the following maintenance items:

- WO 60078308, repair of the 1D vital instrument bus (VIB) inverter following emergent failure;
- WO 60055048, replacement of radiation monitors 2R19A through D;
- WO 30148582, preventive maintenance unit 1 SW header pressure control valve 1SW308;
- WO 30095022, planned replacement of the 11 SW pump motor; and
- WO 30154520, repair of the 1C EDG ventilation supply fan following emergent failure.

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, that the applicable system requirements for operability were adequately incorporated into the procedures and that test acceptance criteria were consistent with system procedures, TS, the UFSAR, and ASME Section XI for pump and valve testing. Documents reviewed for the inspection are listed in Attachment A. The inspectors evaluated the surveillance tests listed below:

- S1.OP-ST.CS-0001, "Inservice Testing – 11 Containment Spray Pump;"
- S1.OP-ST.CVC-0004, "Inservice Testing – 12 Charging Pump;"
- S2.OP-ST.CH-0001, "Inservice Testing – 21 Chilled Water Pump;"
- S1.OP-ST.RHR-0002, "Inservice Testing – 11 Residual Heat Removal Pump;"
- S2.OP-ST.DG-0005, "22 Fuel Oil Transfer System Operability Test;" and
- S2.IC-ST.SSP-0010, "SSPS Train A, Reactor trip breaker UV coil and auto shunt trip."

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 - 1 sample)

a. Inspection Scope

The inspectors completed one drill evaluation inspection sample. On September 9, 2008, the inspectors observed a drill from the control room simulator during an evaluated annual licensed operator requalification training scenario. The inspectors evaluated operator performance relative to developing event classifications and notifications.

Enclosure

The inspectors reviewed the Salem Event Classification Guides. The inspectors referenced Nuclear Energy Institute 99-02, "Regulatory Assessment PI Guideline," Revision 5, and verified that PSEG correctly counted the evaluated scenario's contribution to the NRC PI for drill and exercise performance.

b. Findings

No findings of significance were identified.

1EP7 Emergency Preparedness Component, of the Force-on-Force Exercise Evaluation (71114.07 – 1 sample)

a. Inspection Scope

The inspectors observed PSEG personnel performance for overall emergency preparedness during the force-on-force exercise on September 23, 2008. The inspectors were stationed in the technical support center for the entire scenario. The inspectors observed communications, event classification, and event notification activities by the shift manager. The inspectors evaluated the adequacy of the operations-security interface and emergency response during a terrorist event exercise. The inspectors also observed portions of the post-exercise critique to determine whether their observations were also identified by PSEG's evaluators. The inspectors verified that issues identified during this inspection were entered into PSEG's corrective action program.

b. Findings

No findings of significance were identified.

2. **RADIATION SAFETY**

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01 - 9 samples)

a. Inspection Scope

The inspectors reviewed all PSEG performance indicators for the occupational exposure cornerstone for follow-up.

The inspectors reviewed and assessed the adequacy of PSEG's internal dose assessment for any actual internal exposure greater than 50 mrem committed effective dose equivalent. No exposures of this magnitude were detected by PSEG.

The inspectors examined PSEG's physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools.

The inspectors reviewed PSEG's self assessments, audits, licensee event reports, and special reports related to the access control program and issued since the last inspection. The inspectors determined whether identified problems were entered into the corrective action program for resolution.

The inspectors reviewed corrective action reports related to access controls. The inspectors interviewed staff and reviewed documents to determine whether the following activities were conducted in an effective and timely manner commensurate with their importance to safety and risk: initial problem identification, characterization, and tracking; disposition of operability and reportability issues; evaluation of safety significance and priority for resolution; identification of repetitive problems; identification of contributing causes; identification and implementation of effective corrective actions; resolution of non-cited violations tracked in the corrective action system; and consideration of risk significant operational experience.

For repetitive deficiencies or significant individual deficiencies in problem identification and resolution, the inspectors determined whether PSEG's self-assessment activities were also identifying and addressing these deficiencies.

The inspectors reviewed PSEG documentation packages for all performance indicator events occurring since the last inspection. The inspectors determined whether any of these performance indicator events involved dose rates  $>25$  R/hr at 30 centimeters or  $>500$  R/hr at 1 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 total effective dose equivalent or  $>5$  rem skin dose equivalent or  $>1.5$  rem lens dose equivalent, the inspectors determined if there were any overexposures or substantial potential for overexposure.

The inspectors reviewed radiological problem reports issued since the last inspection that found the cause of the event was due to radiation worker errors. The inspectors determined whether there was an observable pattern traceable to a similar cause. The inspectors compared this pattern and common cause to the corrective actions documented by PSEG to resolve the reported problems. The inspectors discussed with the radiation protection manager any problems with the correction actions planned or taken.

The inspectors reviewed radiological problem reports since the last inspection that found that the cause of the event was a radiation protection technician error. The inspectors reviewed reported problems to determine whether there was an observable pattern traceable to a similar cause. The inspectors compared this pattern and common cause to the corrective action approach taken by PSEG to resolve the reported problems.

The inspector evaluated PSEG performance against the requirements contained in 10 CFR 20, and Unit 2 Technical Specification 6.12.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02 - 2 samples)

a. Inspection Scope

The inspectors reviewed the assumptions and basis for the current annual collective exposure estimate. The inspectors reviewed applicable procedures to determine the methodology for estimating work activity-specific exposures and the intended dose outcome. The inspectors evaluated both dose rate and man-hour estimates for reasonable accuracy.

For repetitive deficiencies or significant individual deficiencies in problem identification and resolution, the inspectors determined whether PSEG's self-assessment activities were also identifying and addressing these deficiencies.

The inspector evaluated PSEG performance against the requirements contained in 10 CFR 20.1101.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment (71121.03 - 1 sample)

a. Inspection Scope

The inspectors reviewed corrective action program reports related to exposure significant radiological incidents that involved radiation monitoring instrument deficiencies that were identified since the last inspection. The inspectors interviewed staff and reviewed documents to determine whether the following activities were conducted in an effective and timely manner commensurate with their importance to safety and risk: initial problem identification, characterization, and tracking; disposition of operability and reportability issues; evaluation of safety significance and priority for resolution; identification of repetitive problems; identification of contributing causes; identification and implementation of effective corrective actions; resolution of non-cited violations tracked in the corrective action system; and consideration of risk significant operational experience.

The inspectors evaluated PSEG performance against the requirements contained in 10 CFR 20.1501, 10 CFR 20.1703 and 10 CFR 20.1704.

b. Findings

No findings of significance were identified.

4. **OTHER ACTIVITIES**

4OA1 Performance Indicator (PI) Verification (71151 – 8 samples)

a. Inspection Scope

The inspectors reviewed PSEG submittals for the Unit 1 and Unit 2 Mitigating Systems cornerstone performance indicators and the Unit 1 and Unit 2 Occupational Radiation Safety and Public Radiation Safety 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 service water system mitigating systems performance index (MSPI)
- Unit 1 and Unit 2 auxiliary feedwater system MSPI
- Unit 1 and Unit 2 residual heat removal system MSPI

For these PIs the inspectors verified the data for the PI results reported for the third quarter 2007 through the second quarter of 2008. 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: Occupational Radiation Safety

- Occupational Exposure Control Effectiveness

The inspectors reviewed a listing of PSEG action reports for the period January 1, 2008 through September 15, 2008, for issues related to this performance indicator that measures non-conformances with high radiation areas greater than 1R/hr and unplanned personnel exposures greater than 100 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 whether any of these PI events involved dose rates >25 R/hr at 30 centimeters or >500 R/hr at 1 meter. If so, the inspectors determined what barriers had failed and whether 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 whether there were any overexposures or substantial potential for overexposure. The inspectors determined that no PI events had occurred during the assessment period.

#### Cornerstone: Public Radiation Safety

- RETS/ODCM Radiological Effluent Occurrences

For this PI the inspectors verified the data for the PI results reported for January through September 17, 2008. The inspectors reviewed relevant PSEG notifications for radiological effluent release occurrences that exceed 1.5 mrem/qtr whole body or 5.0 mrem/qtr organ dose for liquid effluents; 5 mrads/qtr gamma air dose, 10 mrad/qtr beta air dose, and 7.5 mrads/qtr for organ dose for gaseous effluents.

b. Findings

No findings of significance were identified.

#### 4OA2 Identification and Resolution of Problems (71152 - 1 sample)

.1 Review of Items Entered into the Corrective Action Program (CAP)

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 Attachment A.

.2 Annual Sample – Review of Operator Workaround Program

a. Inspection Scope

The inspectors conducted a cumulative review of operator workarounds for Units 1 and 2 and assessed the effectiveness of PSEG's operator workaround program. The inspectors focused on the potential impact on mitigating systems and the potential to affect operator ability to implement abnormal and emergency operating procedures. The review included interviews with licensed operators and walk downs of main control room panels. The inspector's reviewed PSEG's operator burden list, control room distraction report, and operator burden self-assessment.

Enclosure

b. Findings and Observations

No findings of significance were identified.

PSEG has identified eight operator challenges at Unit 1 and Unit 2. None of these are classified as operator workarounds. The inspectors did not identify additional operator challenges or workarounds. The inspectors reviewed OP-AA-102-103, "Operator Work-Around Program", and OP-AA-102-103-1001, "Operator Burdens Program", for PSEG program requirements, and found that PSEG adequately implemented these procedures. The most recent quarterly operator burden assessment was reviewed for each unit. The cumulative impact of operator challenges was found to be within manageable limits.

4OA3 Event Followup (71153 - 2 samples)

.1 (Closed) LER 05000311/2008001-00, As-Found Pressurizer Safety Valve Lift Setpoint Exceeds Technical Specification Allowable Limits

On March 20, 2008, during Unit 2 refueling outage 2R16, in Mode 6, a pressurizer safety valve (PSV) failed its as-found surveillance test. PSEG was testing the valve in accordance with the requirements of the TS and the ASME OM-1987, Part 1, "Requirements for Inservice Performance Testing of Nuclear Power Plant Pressure Relief Devices." After the failure of the first PSV, the remaining two PSVs were tested and found within TS lift tolerance.

The apparent cause of the safety valve lifting before the desired lift setpoint was valve spring relaxation during its first operational service cycle. All PSVs were replaced with refurbished spare valves that have been tested to a  $\pm 1\%$  set point pressure tolerance. This event was reportable in accordance with 10 CFR 50.73(a)(2)(i)(B), Operation or Condition Prohibited by Technical Specification. This LER was reviewed by the inspectors, no findings of significance were identified and no violation of NRC requirements occurred. The cause and corrective actions were documented in notifications 20362054, 20362094, and technical evaluation 70082755. This LER is closed.

.2 (Closed) LER 05000311/2008002-00, Salem Unit 2 Manual Reactor Trip Due to High Level on 23 Steam Generator

On May 9, 2008, Unit 2 was at approximately 47% power and ramping up to 100% following completion of the 2R16 refueling outage. At 9:44 a.m. the Unit 2 control room observed that there was no power to the circulating water traveling screens. A power reduction was initiated in accordance with operating procedures. Shortly following the removal of the main turbine from service, at approximately 25% power, control room personnel noticed the main feedwater regulating valve (23BF19) had swapped to manual and 23 steam generator level was increasing. With the regulating valve in manual control and level in the steam generator rising, the Unit 2 reactor was ordered tripped at 10:59 a.m. The cause for the 23BF19 swapping to manual shortly after the turbine trip was determined to be the result of the 23 steam generator steam flow input

Enclosure

signal decreasing (spiking) to below the low sensor limit. The steam flow signal spike was caused by a pressure wave initiated from the main turbine stop valves closing as a result of the manually initiated turbine trip. Corrective actions included restoring power to the circulating water screens and PSEG will revise the Unit 1 and 2 advanced digital control feedwater system low sensor limits (for DP transmitters) to consider the lowest possible output that can be experienced. This LER was reviewed by the inspectors, no findings of significance were identified and no violation of NRC requirements occurred. The cause and corrective actions were documented in technical evaluations 70085486, 70085487, and 70085488. This LER is closed.

#### 4OA5 Other Activities

##### .1 Quarterly Resident Inspector Observations of Security Personnel and Activities

###### a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with PSEG security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

###### b. Findings

No findings of significance were identified.

##### .2 Inspection Results for Temporary Instruction 2515/172, Reactor Coolant System Dissimilar Metal Butt Welds

###### a. Inspection Scope

The Temporary Instruction, TI 2515/172 provided for confirmation that owners of pressurized-water reactors (PWRs) had implemented the industry guidelines for the Material Reliability Program (MRP) – 139 regarding nondestructive examination and evaluation of certain dissimilar metal welds in reactor coolant systems containing Alloy 600/82/182. The TI required documentation of answers to specific questions in an inspection report. The TI questions and responses were included in Attachment B to this report.

###### b. Findings

No findings of significance were identified.

#### 4OA6 Meetings, Including Exit

Enclosure

On October 14, 2008, the resident inspectors presented the inspection results to Mr. Bob Braun. PSEG acknowledged that none of the information reviewed by the inspectors was proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

## ATTACHMENT A SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

Licensee personnel:

M. Adair, Fire Protection Program Manager  
E. Gallagher, Senior Reactor Operator  
A. Garcia, System Engineer – SW  
R. Gary, Radiation Protection Manager  
E. Villar, Licensing Engineer

### LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened/Closed

050003112008001-00	LER	As-Found Pressurizer Safety Valve Lift Setpoint Exceeds Technical Specification Allowable Limits (Section 4OA3.1)
05000311/2008002-00	LER	Salem Unit 2 Manual Reactor Trip Due to High Level on 23 Steam Generator (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 Protection**

Procedures

OP-SH-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 0  
S2.OP-AB.ZZ-0002, Flooding, Revision 3  
SC.OP-AB.ZZ-0001, Adverse Environmental Conditions, Revision 14

Notifications

20354679      20382522      20382525      20382527

Orders

30156464      60056406      60072367

Operating Experience

NRC Information Notice 93-53: Effect of Hurricane Andrew on Turkey Point Nuclear Generating Station and Lessons Learned, dated 7/20/93

NRC Information Notice 94-27: Facility Operating Concerns Resulting from Local Area Flooding, dated 3/31/94

#### Other Documents

Salem ECG Technical Basis, Revision 31

Salem Event Classification Guide, Revision 77

Tropical Storm Hanna Advisory #29 Site Forecast for US Nuclear Regulatory Commission, Salem / Hope Creek, dated 9/4/08

### **Section 1R04: Equipment Alignment**

#### Procedures

S1.OP-ST.CS-0001, Inservice Testing – 11 Containment Spray Pump, Revision 15

S1.OP-SO.DGV-0001, Diesel Generator Area Ventilation Operation, Revision 3

1-EOP-TRIP-1, Reactor Trip or Safety Injection, Revision 26

1-EOP-LOCA-1, Loss of Reactor Coolant, Revision 25

1-EOP-LOCA-4, Transfer to Hot Leg Recirculation, Revision 25

1-EOP-LOCA-5, Loss of Emergency Recirculation, Revision 24

S2.OP-ST.SJ-0009, Emergency Core Cooling ECCS Subsystems –  $T_{avg} \geq 350^{\circ}\text{F}$

S2.OP-SO.SJ-0004, Post Safety Injection – Systems Restoration, Revision 5

S2.OP-SO.SJ-0001, Preparation of the Safety Injection System for Operation, Revision 17

S2.OP-ST.SJ-0008, Emergency Core Cooling – Accumulators, Revision 6

#### Drawings

205242	226610	238083	205321	RH-1-1	RH-1-3
RH-2-2	RH-2-3	205332	205334	211506	242912
242913					

#### Notifications

20377943	20104191	20383921	20384080	20371300
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#### Other Documents

Tagging Work List 4227584, 11 SW PP/SCRN/STNR - FEG

NOS05ECCS00-06, Salem Licensed Operator ECCS Lesson Plan

SC.DE-BD.SJ-0001, Safety Injection System Design Basis Document, Revision 0

### **Section 1R05: Fire Protection**

#### Procedures

Salem – Unit 1 (Unit 2) – Pre-Fire Plan FRS-II-431, 460V Switchgear Rooms and Corridor Elevation: 84'-0", Revision 7

Salem – Unit 1 (Unit 2) – Pre-Fire Plan FRS-II-511, Electrical Penetration Area Elevation: 78'-0", Revision 5

NC.FP-AP.ZZ-0025(Q), Precautions Against Fire, Revision 8

#### Notifications

20384131	20383239
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Orders

60053852

Other Documents

Fire Drill Scenario S1081408, 84 Swgr Unit1

FP-AA-011, Control of Transient Combustible Material, Revision 0

**Section 1R06: Flood Protection Measures**

Procedures

S2.OP-AB.SW-0003, Service Water Bay Leak, Revision 7

S2.OP-AB.ZZ-0002, Flooding, Revision 3

S2.OP-AR.ZZ-0002, Overhead Annunciators Window B, Revision 35

Notifications

20236871	20252120	20312970	20328697	20351275	20353955
20377795	20382183	20382396	20382480	20382643	

Orders

60056406      60072367

Operating Experience

NRC Information Notice 83-44, Supplement 1: Potential Damage to Redundant Safety

Equipment as a Result of Backflow Through the Equipment and Floor Drain System, dated 8/30/90

NRC Information Notice 2005-11: Internal Flooding/Spray-Down of Safety-Related Equipment

Due to Unsealed Equipment Hatch Floor and/or Blocked Floor Drains, dated 5/6/05

Other Documents

Salem ECG Technical Basis, Revision 31

Salem Event Classification Guide, Revision 77

Salem Generating Station Individual Plant Examination for External Events, January 1996

Salem Generating Station Probabilistic Safety Assessment, August 1998

SC.FP-SV.FBR-0026, Flood and Fire Barrier Penetration Seal Inspection, dated 3/22/07

**Section 1R11: Licensed Operator Regualification Program**

Procedures

S2.OP-AB.STM-0001, Excessive Steam Flow, Revision 9

2-EOP-TRIP-1, Reactor Trip or Safety Injection, Revision 27

2-EOP-FRSM-1, Response to Nuclear Power Generation, Revision 24

2-EOP-LOSC-1, Loss of Secondary Coolant, Revision 23

2-EOP-LOCA-1, Loss of Reactor Coolant, Revision 28

S2.OP-AB.CN-0001, Main Feedwater/Condensate System Abnormality, Revision 24

S2.OP-AB.PZR-0001, Pressurizer Pressure Malfunction, Revision 16

S2.OP-AB.RC-0001, Reactor Coolant System Leakage, Revision 9

2-EOP-LOCA-2, Post LOCA Cooldown and Depressurization, Revision 25

Other Documents

ESG-077, FWH Valve Failure, Cont steam leak, ATWT Examination Scenario Guide, Revision 1  
 ESG-065, PS3 Failure, SBLOCA Examination Scenario Guide, Revision 2

**Section 1R12: Maintenance Effectiveness**Notifications

20376684    20376583    20379463    20384397    20383869    20328855  
 20329022

Orders

70089266    70045157    70068848

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**Procedures

OP-AA-101-112-1002, On-line Risk Assessment, Revision 3  
 S1.OP-AB.115-0004, Loss of 1D 115V Vital Instrument Bus, Revision 11  
 S1.OP-SO.115-0014, 1D Vital Instrument Bus UPS System Operation, Revision 11  
 S2.IC-FT.RCP-0023, 2PT-474 Pressurizer Pressure Protection Channel IV, Revision 21

Notifications

20381628    20376690

Orders

70087087

Other Documents

SGS Unit 1 PRA Risk Evaluation Form for work week 835 (August 24 to 30, 2008), Revision 1  
 Work Clearance 4229376

**Section 1R15: Operability Evaluations**Procedures

S2.OP-AB.ANN-0001, Loss of Overhead Annunciator System, Revision 20  
 S2.IC-EU.ANN-0001, General Troubleshooting Procedure for the 4100 Beta Overhead  
 Annunciator System, Revision 8  
 S2.IC-PM.ANN-0001, Functional Test and Preventive Maintenance for the 4100 Beta Overhead  
 Annunciator System, Revision 10  
 S2.IC-PM.ANN-0002, 4100 Beta Overhead Annunciator System Functional Test and Preventive  
 Maintenance, Revision 0  
 SC.OP-ST.ZZ-0001, In-service Testing Guidelines & Portable Test Equipment, Revision 4  
 S1.OP-ST.DG-0005, 12 Fuel Oil Transfer System Operability Test, Revision 23  
 S1.RA-St.DG-0005, In-service Testing Diesel Generator Auxiliary 12 Fuel Oil Transfer System  
 Operability Test Acceptance Criteria, Revision 8

Drawings

232976    232977    604567



Notifications

20377878	20378104	20230546	20376442	20376690	20381817
20381877					

Orders

70045986	70086945	70053998	70087087	70088806
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Other Documents

VTD 901167, Annunciator Verification System One-Line Diagram, Revision A  
 S-C-DF-MDC-0852, Fuel Oil System – Design Calculation of System Parameters, Revision 0  
 VTD 301103, Viking Pump Division General Purpose Special Mounted Pumps

**Section 1R19: Post-Maintenance Testing**Procedures

MA-AA-716-012, Post Maintenance Testing, Revision 11  
 NC.MD-AP.ZZ-0050, Maintenance Testing Program Matrix, Revision 11  
 SC.MD-CM.115-0001, 10/12 KVA Uninterruptible Power Supply Troubleshooting and Repair, Revision 10  
 S1.OP-AB.115-0004, Loss of 1D 115V Vital Instrument Bus, Revision 11  
 S1.OP-ST.4KV-0002, Electrical Power Systems AC Distribution, Revision 21  
 S1.OP-SO.115-0014, 1D Vital Instrument Bus UPS System Operation, Revision 11  
 S2.OP-ST.PAS-0001, Inservice Testing Sampling System Valves, Revision 10  
 S2.IC-ZZ.RM-0055, 2R19A/B/C/D Steam Generator Blowdown Process Radiation Monitor Mechanical Isolation/Restoration, Revision 4  
 S2.IC-FT.RM-0129, 2R19A-D Steam Generator Blowdown Process Radiation Monitors, Revision 4  
 SC.MD-EU.SW-0002, Johnston Service Pump Removal and Installation, Revision 17  
 S1.OP-ST.SW-0001, Inservice Testing – 11 Service Water Pump, Revision 26  
 SC.MD-PM.ZZ-0005, Molded Case Circuit Breaker Maintenance, Revision 4

Drawings

211370	218681	309945	601241	601242	238083
205321					

Notifications

20377892	20378671	20378766	20379165	20379279	20379374
20379463	20379481	20379493	20379698	20381368	20381544
20381582	20381628				

Orders

60078308	80057596	60055048	30095022	30148582	30095022
30154520					

Other Documents

VTD 309945, One Line Diagram 10 KVA Vital Bus UPS  
 S-C-SW-MDC-1350, 1SW308, Salem Inservice Testing Program Basis Data Sheets – Valves, Revision 5  
 S-C-SW-MDC-1350, Service Water MODE OPS Analysis, Revision 7

DE-CB.DGV-0020, Configuration Baseline Documentation for Diesel-Generator Area Ventilation System, Revision 0

**Section 1R22: Surveillance Testing**

Procedures

S1.OP-ST.CS-0001, Inservice Testing – 11 Containment Spray Pump, Revision 15  
S1.RA-ST.CS-0001, Inservice Testing 11 Containment Spray Pump Acceptance Criteria, Revision 5  
S1.OP-ST.CVC-0004, Inservice Testing – 12 Charging Pump, Revision 18  
S1.RA-ST.CVC-0004, Inservice Testing 12 Charging Pump Acceptance Criteria, Revision 10  
S2.OP-ST.CH-0001, Inservice Testing – 21 Chilled Water Pump, Revision 16  
S2.RA-ST.CH-0001, 21 Chilled Water Pump Surveillance Data Acceptance Criteria, Revision 4  
S1.OP-ST.RHR-0002, Inservice Testing – 12 Residual Heat Removal Pump, Revision 14  
S1.RA-ST.RHR-0002, Inservice Testing 12 Residual Heat Removal Pump Acceptance Criteria, Revision 6  
S2.OP-ST.DG-0005, 22 Fuel Oil Transfer System Operability Test, Revision 22  
S2.RA-ST.DG-0005, Diesel Generator Auxiliaries 22 Fuel Oil Transfer System Operability Test Acceptance Criteria, Revision 9  
S2.IC-ST.SSP-0010, SSPS Train A – Reactor Trip Breaker UV Coil and Auto Shunt Trip, Revision 19

Drawings

205232          671332

Orders

50114285      50114410

**Section 1EP6: Drill Evaluation**

Procedures

SC.OP-AB.CR-0004, Security Event, Revision 4  
NC.EP-EP.ZZ-0102, Emergency Coordinator Response, Revision 14  
ECG ATT 2, Alert at Salem, Revision 11  
ECG ATT 3, Site Area Emergency at Salem, Revision 11

Notifications

20379962

Other Documents

Salem Event Classification Guide, § 9.1, Hazards – Internal/External, Security Threats, Revision 8  
SGS EAL/RAL Technical Basis, Salem Generating Station Emergency Action Level/Reporting Action Level Technical Basis Document, Revision 8  
PSEG Nuclear: Hope Creek and Salem Station, EP.1: Emergency Planning Performance, Internal Performance Indicator Statistics, dated September 23, 2008  
ESG-065, PS3 Failure, SBLOCA Examination Scenario Guide, Revision 2

## **Section 1EP7: Emergency Preparedness Component, of the Force-on-Force Exercise Evaluation**

### Procedures

SC.OP-AB.CR-0004, Security Event, Rev. 4  
 NC.EP-EP.ZZ-0102, Emergency Coordinator Response, Rev. 14  
 ECG ATT 2, Alert at Salem, Rev. 11  
 ECG ATT 3, Site Area Emergency at Salem, Rev. 11

### Notifications

20379962

### Other Documentation

Salem Event Classification Guide, § 9.1, Hazards – Internal/External, Security Threats, Rev. 8  
 SGS EAL/RAL Technical Basis, Salem Generating Station Emergency Action Level/Reporting Action Level Technical Basis Document, Rev. 8  
 PSEG Nuclear: Hope Creek and Salem Station, EP.1: Emergency Planning Performance, Internal Performance Indicator Statistics, dated September 23, 2008

## **Section 2OS1: Access Control to Radiologically Significant Areas**

### Procedures

MA-AA-176-008, Rev 3, Foreign Material Exclusion Program  
 EN-AA-501, Rev 1, Controlled Material and Hazardous Communication Program  
 TQ-AA-203, Rev 3, On-the-Job Training and Task Performance Evaluation

### Notifications

20351642      20361058      20361742      20362443      20363297

### Other Documents

Lesson Plan NITOJTTPLECT-01, Instructor Training/OJT Trainer – TPE Evaluator Continuing Training

## **Section 2OS2: ALARA Planning and Controls**

### Notifications

20350706      20352336      20361940      20363137      20363817      20370494  
 20371226      20375562      20380888

## **Section 2OS3: Radiation Monitoring Instrumentation**

### Notifications

20355297      20360432      20361329      20363510      20363926      20365872  
 20376598

## **Section 4OA1: Performance Indicator Verification**

### Notifications

20379272      20358208

Orders

70083216      70071433

Other Documents

S-C-SW-MDC-1350, Service Water System MODE OPS Analysis, Revision 7

**Section 40A2: Identification and Resolution of Problems**

Notifications

20379492	20378588	20378590	20357390	2033128	20333121
20333119	20333118	20333114	20333113		

Orders

60076384	70072773	70072772	70072770	70072769	70072766
70072765					

Other Documents

O-AA-101-103, Operator Work-Around program, Revision 1  
 OP-AA-102-103-1001, Operator Burdens Program, Revision 0  
 Salem Unit 1 Quarterly Operator Burden Assessment, Second Quarter 2008  
 Salem Unit 2 Quarterly Operator Burden Assessment, Third Quarter 2008

**Section 40A5: Other Activities**

Procedures

HU-AA-1211, Briefings – Pre-job, Heightened Level of Awareness, Infrequent Plant Activity and Post-job Briefings  
 HU-AA-104-101, Procedure Use and Adherence, Revision 3  
 OP-AA-108-110, Evaluation of Special Tests or Evolutions, Revision 0  
 S2.PI-SP.ZZ-0001, Power Ascension Test for HP Turbine and Stm Gen Replacement, Revisions 4, 6, 8 -11  
 SC.RE-RA.ZZ-0004, Statepoint Data Collection, Revision 19  
 SC.SE-DG.ZZ-0002, Statepoint Data Processing for I&C Procedures, Revision 1  
 S2.RE-Ra.ZZ-0011, Tables, Revision 245  
 S2.OP-DL.ZZ-0003, Control Room Readings – Modes 1-4, Revision 1  
 S2.OP-DL.ZZ-0003, Control Room Readings – Modes 1-4, Revision 2  
 S2.OP-AR.ZZ-0006, Overhead Annunciators Window F, Revision 13  
 S2.OP-AR.ZZ-0007, Overhead Annunciators Window G, Revision 43  
 SC.DE-TS.ZZ-1904, Instrument Setpoint Calculations, Revision 1

Notifications

20379342	20373585	20369267	20369574	20372502	20369724
20352829	20369574	20369686	20369881	20369779	20370764
20371567	20372115				

Orders

80083522      70085368      70085441      70085314      70085358      70085444

### Other Documents

SY-AA-152, Attachment 3, Salem/Hope Creek Tactical Course Description – 2008, Revision 3  
 SC-CN007-01, Salem Unit 1, 2 Steam Generator S.I. Initiate, Steam Flow Ind & Rec, Revision 1  
 SC-CN007-02, Salem Unit 2 Steam Flow Computerized Scaling, Revision 5B  
 SC-CN007-02, Salem Unit 2 Steam Flow Computerized Scaling, Revision 5 Final  
 SC-MS002-01, Turbine Inlet Pressure Scaling/Uncertainty Calculation, Revision 11  
 SC-RCP001-04, Overpower  $\Delta T$  / Overtemperature  $\Delta T$  Uncertainty Calculation, Revision 1  
 Prompt Investigation U2 Steam Flow/Feed Flow Mismatch  
 PSE-08-47, Westinghouse Letter to PSEG re: Transmittal of Information for Salem Unit 2 Hot  
 Zero Power Steamline Break Evaluation with Relaxed High Steam Flow Setpoint, dated May  
 15, 2008  
 PSE-08-48, Westinghouse Letter to PSEG re: Transmittal of Information for Salem Unit 2  
 Increased High Steam Flow Setpoint – Impact on Steamline Break Mass/Energy Release  
 Analyses, dated May 23, 2008, Revision 2  
 SDE-07-0005, PSEG Internal Memo re: NUCP 80083522 Salem 2 Steam Generators  
 Replacement/Key Parameters Values for Scaling/Uncertainty Calculations, Dated May 1,  
 2007  
 Complex Troubleshooting Procedure for Salem Unit 2 Steam Flow/Feed Flow Mismatch  
 OpEval 08-030, Salem Unit 1 Steam Flow/Feed Flow Mismatch, Revision 0  
 NOS05ADFWCS-07, Operations Training Lesson Plan for Advanced Digital Feedwater Control  
 System  
 VTD 320367, PSEG Salem Units 1&2 – ADFCS Stm Flow, Stm Press, FW Header Press,  
 Revision 3  
 VTD 328295, Salem Unit 2 RSG – OSG-RSG Comparison, Revision 1  
 DE-CB.RCP-0038, Design Basis Documentation for Reactor Protection System, Revision 2  
 WCAP-16444-NP, Salem Unit 2 Replacement Steam Generator Program NSSS Licensing  
 Report, Revision 1

### **LIST OF ACRONYMS**

ATWT	Anticipated Transient Without Trip
CAP	Corrective Action Program
CFCU	Containment Fan Coil Unit
CS	Containment Spray
ECG	Event Classification Guide
EDGs	Emergency Diesel Generators
LDE	Lens Dose Equivalent
MSPI	Mitigating Systems Performance Index
MRP	Material Reliability Program
NCV	Non-cited Violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PI	Performance Indicator
PSEG	Public Service Enterprise Group Nuclear LLC
PSV	Pressurizer Safety Valve

SBO	Station Blackout
SDE	Skin Dose Equivalent
SDP	Significance Determination Process
SJ	Safety Injection
SW	Service Water
TEDE	Total Effective Dose Equivalent
TS	Technical Specification
TSO	Transmission System Operator

**Attachment B**09/30/08  
TI172Qs**TI 172 Documentation for Salem Unit 1 and Unit 2****Introduction:**

The Temporary Instruction, TI 2515/172 provides for confirmation that owners of pressurized-water reactors (PWRs) have implemented the industry guidelines of the Materials Reliability Program (MRP) -139 regarding nondestructive examination and evaluation of certain dissimilar metal welds in reactor coolant systems containing nickel based Alloys 600/82/182. The TI requires documentation of specific questions in an inspection report. The questions and responses are included in this Attachment.

Some MRP-139 program opportunities for improvement were discussed with PSEG during a debrief meeting in late August 2008. PSEG has initiated Notification 20383863 (9/17/08) to address these non-conforming matters for Unit 1 and Unit 2.

**TI-172 Questions and Answers Specifically for Salem Unit 1:**

Salem Unit 1 has MRP-139 applicable Alloy 600/82/182 RCS welds in the four RCS hot and four RCS cold leg pipe to reactor pressure vessel nozzle connections. These welds were last examined from the inside volumetrically (UT) in 2002 with a non-PDI UT process. No indication of cracking was found in the affected RCS hot leg and cold leg nozzle dissimilar metal (DM) welds in 2002. These nozzles were not mitigated, by Mechanical Stress Improvement (MSIP) or structural weld overlay, as of September 2008.

**a. For MRP-139 baseline inspections:**

**Question Qa1.** Have the baseline inspections been performed or are they scheduled to be performed in accordance with MRP-139 guidance?

**Response Qa1:** Yes. PSEG did verify the presence or absence of Alloy 600/82/182 weld metal in the potential Alloy 600/82/182 weld locations in Salem Unit 1 in accordance with Table 2-1 of MRP-139. PSEG provided shop fabrication records which defined the weld metal composition of the nozzle to safe end welds on the pressurizer surge (1), spray (1), safety (2) and relief nozzles (2). PSEG did verify that the RCS branch line connection locations did not contain Alloy 600/82/182 welds.

For Unit 1 ultrasonic volumetric (UT) examinations (non-PDI) were last done from the inside weld diameter on the four cold leg and four hot leg piping to vessel nozzle welds during the 2002 refuel outage (RFO). For Unit 1, PSEG has verbally committed to perform MSIP mitigation on all 8 reactor vessel to piping welds during the upcoming October 2008 refueling outage. PSEG has, also, verbally committed to performing pre- and post- MSIP fully qualified PDI UT inspections. PSEG has verbally committed to replacing the RCS hot and cold leg thermowells during the October 2008 refueling outage. The existing RCS hot and cold leg thermowells are installed with Alloy 600/82/182 weld material.

PSEG does not have an accurate written program which explicitly demonstrates that the criteria of MRP-139, Section 5 and Section 6 (including categorization of affected welds and inspection frequency) for all welds known to contain Alloy 600/82/182 welds has been met. PSEG has initiated Notification 20383863 (9/17/08) to address these non-conforming matters for Unit 1.

**Question Qa2.** Is the licensee planning to take any deviations from the MRP-139 baseline inspection requirements of MRP-139? If so, what deviations are planned and what is the general basis for the deviation? If inspectors determine that a licensee is planning to deviate from any MRP-139 baseline inspection requirements, NRR should be informed by email as soon as possible.

**Response Qa2:** The licensee has responded to MRP-126; Generic Guidance for Alloy 600 Management, saying that PSEG does not plan on seeking deviations from MRP-139.

b. For each examination inspected, was the activity:

**Question Qb1.** Performed in accordance with the examination guidelines in MRP-139 Section 5.1 for unmitigated welds or mechanical stress improved welds and consistent with NRC staff relief request authorization for weld overlaid welds?

**Response Qb1:** Yes. Neither mechanical stress improvement or weld overlays have been used at Salem Unit 1. There have not been any PDI qualified volumetric inspections performed on affected welds at Salem Unit 1.

**Question Qb2:** Performed by qualified personnel? (Briefly describe the personnel training/qualification process used by the licensee for this activity.)

**Response Qb2:** To date, the UT inspection which have been done were completed by a qualified UT procedure and done by qualified individuals, however, these inspections were not PDI qualified inspections.

**Question Qb3.** Performed such that deficiencies were identified, dispositioned, and resolved?

**Response Qb3:** No material deficiencies were identified in the non-PDI UT inspections completed to date on the affected welds.

c. For each weld overlay inspected, was the activity:

**Question Qc1.** Performed in accordance with ASME Code welding requirements and consistent with NRC staff relief requests authorizations? Has the licensee submitted a relief request and obtained NRR staff authorization to install the weld overlays?

**Response Qc1:** Structural weld overlays have not been performed at Salem Unit 1 on affected welds.

**Question Qc2.** Performed by qualified personnel? (Briefly describe the personnel training/qualification process used by the licensee for this activity.)



**Response Qc2:** Structural weld overlays have not been performed at Salem Unit 1 on affected welds.

**Question Qc3.** Performed such that deficiencies were identified, dispositioned, and resolved?

**Response Qc3:** Structural weld overlays have not been performed at Salem Unit 1 on affected welds.

d. For each mechanical stress improvement used by the licensee during the outage, was the activity performed in accordance with a documented qualification report for stress improvement processes and in accordance with demonstrated procedures? Specifically:

**Question Qd1.** Are the nozzle, weld, safe end, and pipe configurations, as applicable, consistent with the configuration addressed in the SI qualification report?

**Response Qd1:** Mechanical stress improvement (MSIP) has not used at Salem Unit 1 as of September 2008.

**Question Qd2.** Does the SI qualification report address the location radial loading is applied, the applied load, and the effect that plastic deformation of the pipe configuration may have on the ability to conduct volumetric examinations?

**Response Qd2:** Mechanical stress improvement (MSIP) has not used at Salem Unit 1. as of September 2008.

**Question Qd3.** Do the licensee's inspection procedure records document that a volumetric examination per the ASME Code, Section XI, Appendix VIII was performed prior to and after the application of the SI?

**Response Qd3:** Mechanical stress improvement (MSIP) has not used at Salem Unit 1. as of September 2008.

**Question Qd4.** Does the SI qualification report address limiting flaw sizes that may be found during pre-SI and post-SI inspections and that any flaws identified during the volumetric examination are to be within the limiting flaw sizes established by the SI qualification report.

**Response Qd4:** Mechanical stress improvement (MSIP) has not used at Salem Unit 1. as of September 2008.

**Question Qd5.** Performed such that deficiencies were identified, dispositioned, and resolved?

**Response Qd5:** Mechanical stress improvement (MSIP) has not used at Salem Unit 1. as of September 2008.

e. For the inservice inspection program:

**Question Qe1.** Has the licensee prepared an MRP-139 inservice inspection (ISI) program? If not, briefly summarize the licensee's basis for not having a documented program and when the licensee plans to complete preparation of the program.

**Response Qe1:** For Salem Unit 1, the MRP-139 inspections are included in the Risk-Informed ISI program.

**Question Qe2.** In the MRP-139 ISI program, are the welds appropriately categorized in accordance with MRP-139? If any welds are not appropriately categorized, briefly explain the discrepancies.

**Response Qe2:** At Salem Unit 1, the MRP-139 welds were not designated by MRP-139 category. However, PSEG has initiated Notification 20383863 (9/17/08) to address this non-conformance for Unit 1.

**Question Qe3.** In the MRP-139 ISI program, are the ISI frequencies, which may differ between the first and second 10-year intervals after the MRP-139 baseline inspection, consistent with the ISI frequencies called for by MRP-139?

**Response Qe3:** At Salem Unit 1 PSEG has not indicated MRP-139 frequencies in their ISI program. However, PSEG has initiated Notification 20383863 (9/17/08) to address this non-conformance for Unit 1.

**Question Qe4.** If any welds are categorized as H or I, briefly explain the licensee's basis for the categorization and the licensee's plans for addressing potential PWSCC.

**Response Qe4:** Salem Unit 1 has not listed MRP-139 affected welds by MRP-139 category. However, PSEG has initiated Notification 20383863 (9/17/08) to address this non-conformance for Unit 1.

**Question Qe5.** If the licensee is planning to take deviations from the ISI "requirements" of MRP-139, what are the deviations and what are the general bases for the deviations? Was the NEI 03-08 process for filing deviations followed?

**Response Qe5:** PSEG has responded to MRP-126; Generic Guidance for Alloy 600 Management, saying that PSEG does not plan on seeking deviations from MRP-139.

**TI-172 Questions and Answers Specifically for Salem Unit 2:**

Salem Unit 2 has MRP-139 applicable Alloy 600/82/182 RCS welds in the four RCS hot and four RCS cold leg pipe to reactor pressure vessel nozzle connections. These were last examined from the inside volumetrically (UT) in 2002 with a non-PDI UT process. No indication of cracking was found in the affected RCS hot leg and cold leg nozzle welds in 2002. These nozzles have not been mitigated by MSIP at this time. PSEG has verbally committed to conducting MSIP on these nozzles during the next refueling outage in 2009.

Attachment

PSEG does not have an accurate written program which explicitly demonstrates that the criteria of MRP-139, Section 5 and Section 6 (including categorization of affected welds and inspection frequency) for all welds known to contain Alloy 600/82/182 welds have been met. PSEG has initiated Notification 20383863 (9/17/08) to address these non-conforming matters for Unit 2.

a. For MRP-139 baseline inspections:

**Question Qa1.** Have the baseline inspections been performed or are they scheduled to be performed in accordance with MRP-139 guidance?

**Response Qa1:** Yes. PSEG did address all potential Alloy 600/82/182 weld locations in Salem Unit 2 in accordance with Table 2-1 of MRP-139.

For Unit 2 ultrasonic volumetric (UT) examinations (non-PDI) was done from the inside weld diameter on the four cold RCS leg and four RCS hot leg piping to vessel nozzle welds during the 2002 refuel outage (RFO). For Unit 2, PSEG has verbally committed to perform MSIP mitigation on all 8 reactor vessel to piping welds during the next, Fall 2010, refueling outage. PSEG has, also, verbally committed to performing pre- and post- MSIP fully qualified PDI UT inspections.

**Question Qa2.** Is the licensee planning to take any deviations from the MRP-139 baseline inspection requirements of MRP-139? If so, what deviations are planned and what is the general basis for the deviation? If inspectors determine that a licensee is planning to deviate from any MRP-139 baseline inspection requirements, NRR should be informed by email as soon as possible.

**Response Qa2:** PSEG has responded to MRP-126; Generic Guidance for Alloy 600 Management, saying that PSEG does not plan on seeking deviations from MRP-139.

b. For each examination inspected, was the activity:

**Question Qb1.** Performed in accordance with the examination guidelines in MRP-139 Section 5.1 for unmitigated welds or mechanical stress improved welds and consistent with NRC staff relief request authorization for weld overlaid welds?

**Response Qb1:** Neither mechanical stress relief or weld overlays have been used at Salem Unit 2. There have not been any PDI qualified volumetric inspections performed on possibly affected welds at Salem Unit 2.

**Question Qb2:** Performed by qualified personnel? (Briefly describe the personnel training/qualification process used by the licensee for this activity.)

**Response Qb2:** To date, for Salem Unit 2, the UT inspection which have been done were completed by a qualified UT procedure and done by qualified individuals, however, these inspections were not PDI qualified inspections.

**Question Qb3.** Performed such that deficiencies were identified, dispositioned, and resolved?

**Response Qb3:** No material deficiencies were identified in the non-PDI UT inspections completed to date on the affected welds during past outages at Salem Unit 2.

c. For each weld overlay inspected, was the activity:

**Question Qc1.** Performed in accordance with ASME Code welding requirements and consistent with NRC staff relief requests authorizations? Has the licensee submitted a relief request and obtained NRR staff authorization to install the weld overlays?

**Response Qc1:** Structural weld overlays have not been performed at Salem Unit 2 on affected welds.

**Question Qc2.** Performed by qualified personnel? (Briefly describe the personnel training/qualification process used by the licensee for this activity.)

**Response Qc2:** Structural weld overlays have not been performed at Salem Unit 2 on affected welds.

**Question Qc3.** Performed such that deficiencies were identified, dispositioned, and resolved?

**Response Qc3:** Structural weld overlays have not been performed at Salem Unit 2 on affected welds.

d. For each mechanical stress improvement used by the licensee during the outage, was the activity performed in accordance with a documented qualification report for stress improvement processes and in accordance with demonstrated procedures? Specifically:

**Question Qd1.** Are the nozzle, weld, safe end, and pipe configurations, as applicable, consistent with the configuration addressed in the SI qualification report?

**Response Qd1:** Mechanical stress improvement (MSIP) has not used at Salem Unit 2 as of September 2008.

**Question Qd2.** Does the SI qualification report address the location radial loading is applied, the applied load, and the effect that plastic deformation of the pipe configuration may have on the ability to conduct volumetric examinations?

Mechanical stress improvement (MSIP) has not used at Salem Unit 2 as of September 2008.

**Question Qd3.** Do the licensee's inspection procedure records document that a volumetric examination per the ASME Code, Section XI, Appendix VIII was performed prior to and after the application of the SI?

**Response Qd3:** Mechanical stress improvement (MSIP) has not used at Salem Unit 2 as of September 2008.

**Question Qd4.** Does the SI qualification report address limiting flaw sizes that may be found during pre-SI and post-SI inspections and that any flaws identified during the volumetric examination are to be within the limiting flaw sizes established by the SI qualification report.

**Response Qd4:** Mechanical stress improvement (MSIP) has not used at Salem Unit 2 as of September 2008.

**Question Qd5.** Performed such that deficiencies were identified, dispositioned, and resolved?

**Response Qd5:** Mechanical stress improvement (MSIP) has not used at Salem Unit 2 as of September 2008.

e. For the inservice inspection program:

**Question Qe1.** Has the licensee prepared an MRP-139 inservice inspection (ISI) program? If not, briefly summarize the licensee's basis for not having a documented program and when the licensee plans to complete preparation of the program.

**Response Qe1:** For Salem Unit 2, the MRP-139 inspections are included in the Risk-Informed ISI program.

**Question Qe2.** In the MRP-139 ISI program, are the welds appropriately categorized in accordance with MRP-139? If any welds are not appropriately categorized, briefly explain the discrepancies.

**Response Qe2:** At Salem Unit 2, the MRP-139 welds were not designated by MRP-139 category. However, PSEG has initiated Notification 20383863 (9/17/08) to address this non-conformance for Unit 2.

**Question Qe3.** In the MRP-139 ISI program, are the ISI frequencies, which may differ between the first and second 10-year intervals after the MRP-139 baseline inspection, consistent with the ISI frequencies called for by MRP-139?

**Response Qe3:** At Salem Unit 2 PSEG has not indicated MRP-139 frequencies in their ISI program. However, PSEG has initiated Notification 20383863 (9/17/08) to address this non-conformance for Unit 2.

**Question Qe4.** If any welds are categorized as H or I, briefly explain the licensee's basis for the categorization and the licensee's plans for addressing potential PWSCC.

**Response Qe4:** Salem Unit 2 has not listed MRP-139 affected welds by MRP-139 category. However, PSEG has initiated Notification 20383863 (9/17/08) to address this non-conformance for Unit 2.

**Question Qe5.** If the licensee is planning to take deviations from the ISI "requirements" of MRP-139, what are the deviations and what are the general bases for the deviations? Was the NEI 03-08 process for filing deviations followed?

**Response Qe5:** PSEG has responded to MRP-126; Generic Guidance for Alloy 600 Management, saying that PSEG does not plan on seeking deviations from MRP-139.