

December 10, 2001

Mr. Harold W. Keiser  
Chief Nuclear Officer and President  
PSEG Nuclear LLC - X04  
P. O. Box 236  
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION - NRC INSPECTION REPORT  
50-272/01-10, 50-311/01-10

Dear Mr. Keiser:

On November 10, 2001, the NRC completed an inspection of your Salem 1 & 2 reactor facilities. The enclosed report documents the inspection findings which were discussed on November 14, 2001, with Mr. Kevin Davison 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. Specifically, this inspection involved six weeks of resident inspection.

Based on the results of this inspection, the inspectors identified two issues of very low safety significance (Green) involving the failure to properly control transient combustible materials in the Unit 1 spent fuel pool building and the failure to implement appropriate follow-up corrective actions for a degraded charging pump condition. Both of these issues were determined to involve violations of NRC requirements. However, because of their very low safety significance and because they have been entered into your corrective action program, the NRC is treating these issues as non-cited violations, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny these non-cited violations, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, 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; and the NRC Resident Inspector at the Salem facility.

Since September 11, 2001, Salem Nuclear Generation Station has assumed a heightened level of security based on a series of threat advisories issued by the NRC. Although the NRC is not aware of any specific threat against nuclear facilities, the heightened level of security was recommended for all nuclear power plants and is being maintained due to the uncertainty about the possibility of additional terrorist attacks. The steps recommended by the NRC include increased patrols, augmented security forces and capabilities, additional security posts, heightened coordination with local law enforcement and military authorities, and limited access of personnel and vehicles to the site.

Mr. Harold W. Keiser

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The NRC continues to interact with the Intelligence Community and to communicate information to PSEG Nuclear. In addition, the NRC has monitored maintenance and other activities which could relate to the site's security posture.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure 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.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

William A. Cook, Chief  
Projects Branch 3  
Division of Reactor Projects

Enclosure: Inspection Report 50-272/01-10, 50-311/01-10  
Attachment: Supplemental Information

Docket No. 50-272; 50-311  
License No. DPR-70; DPR-75

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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: 50-272/2001-10, 50-311/2001-10

Licensee: PSEG Nuclear LLC

Facility: Salem Nuclear Generating Station, Units 1 & 2

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

Dates: October 1 - November 10, 2001

Inspectors: Raymond K. Lorson, Senior Resident Inspector  
Fred L. Bower, Resident Inspector  
Travis L. Tate, Project Manager, NRR

Approved By: William A. Cook, Chief  
Projects Branch 3  
Division of Reactor Projects

## Summary of Findings

IR 05000272-01-10, IR 05000311-01-10, on 10/01 - 11/10/01, Public Service Electric Gas Nuclear LLC, Salem Units 1 and 2. Fire Protection, and Identification and Resolution of Problems.

This inspection was conducted by resident inspectors and identified two green findings, both of which were non-cited violations. The significance of all findings is indicated by their color (Green, White, Yellow, or Red) using IMC 0609 “Significance Determination Process” (SDP). Findings for which the SDP does not apply are indicated by “no color” or by the severity level of the applicable violation. The NRC’s program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.

### A. Inspector Identified Findings

#### **Cornerstone: Initiating Events**

- (Green) The inspectors identified a non-cited violation involving the failure to properly control transient combustible materials located within the Unit 1 spent fuel pool building as required by fire protection program procedure, NC.NA-AP.ZZ-0025 (Q), revision 5, “Operational Fire Protection Program.”

This finding was evaluated using the fire protection significance determination process (SDP) and found to be of very low risk significance since the problem would not have affected the fire mitigation defense in depth elements involving detection, suppression or fire barriers. (Section R05)

#### **Cornerstone: Mitigating Systems**

- (Green) The inspectors identified a non-cited violation involving the failure to implement appropriate corrective actions for a degraded No 22 charging pump (CS) lubricating oil condition. PSEG Nuclear replaced the degraded oil, but did not implement any actions to prevent recurrence.

This finding was of very low significance since the No. 22 CS pump has performed satisfactorily subsequent to the oil analysis results being addressed and the lubricating oil replacement. (Section OA2)

### B. Licensee Identified Findings

None

## Report Details

### **SUMMARY OF PLANT STATUS**

Unit 1 began the period in Mode 5 to replace a pressurizer safety valve (PR5) and to perform emergent repairs to correct seat leakage through two emergency core cooling system hot leg injection header isolation check valves. The unit was returned to full power on October 17. Beginning on October 19 minor adjustments were made to unit power (90-100%) to support planned maintenance activities on an off-site electrical line. The maintenance activities were completed on October 27 and the unit was operated at essentially full power for the duration of the period.

Unit 2 began the period at full power and remained there until October 17. On October 17, power was reduced to 68 percent to support planned maintenance activities on an off-site electrical line. On October 19 the unit was returned to and remained at essentially full power for the duration of the period.

#### **1. REACTOR SAFETY**

##### **Initiating Events, Mitigating Systems, and Barrier Integrity [Reactor - R]**

###### R04 Equipment Alignment

###### a. Inspection Scope

The inspectors performed two partial system walkdowns during system maintenance outages to confirm that redundant mitigation systems and components were properly aligned to perform their intended safety function, protected by administrative controls, and in an acceptable material condition. The walkdowns were performed during the following maintenance periods:

- 12A and 12B component cooling water heat exchanger outage on November 5.
- 12 Chilled Water Chiller emergent maintenance on November 5.

The inspectors verified that Notification Nos. 20083268 and 20083080 were entered into the corrective action program to address inspector identified issues. Notification No. 20083268 was associated with the Salem equipment protection matrix not being risk-based. Notification No. 20083080 addressed questions related to the visibility and adequacy of the methods used to identify protected equipment.

###### b. Findings

No findings of significance were identified.

R05 Fire Protection

.1 Fire Protection Walkdown

a. Inspection Scope

The inspectors toured the following risk-significant plant areas to assess PSEG Nuclear's control of combustible materials and ignition sources, the material condition of fire detection and suppression equipment, and the operational status of fire barriers. They verified on a sampling basis that fire impairments were documented and that adequate compensatory measures were in place. The following areas were reviewed:

- Unit 1 and Unit 2 emergency diesel generator rooms
- Unit 1 and Unit 2 Spent Fuel Pool (SFP) Buildings

b. Findings

PSEG Nuclear failed to properly control transient combustible materials located within the Unit 1 SFP building as required by fire protection program procedure, NC.NA-AP.ZZ-0025 (Q), revision 5, "Operational Fire Protection Program." This finding was evaluated using the fire protection significance determination process (SDP) and found to be of very low risk significance (Green) since the problem would not have affected the fire mitigation defense in depth elements involving detection, suppression or fire barriers. The failure to properly control the transient combustible materials as required by the fire protection program procedure was a non-cited violation of TS 6.8.1.f.

While conducting a tour of the Unit 1 SFP building the inspector observed that flammable chemicals (i.e. a can of spray paint and a can of an adhesive chemical) were stored on an open workbench located on the 100' elevation of the building. The inspector also observed other transient combustible materials including a pile of unused temporary cables that were located on the 130' elevation of the SFP building. The inspector interviewed the fire protection program supervisor and reviewed the fire protection program procedure to determine whether the transient combustible materials were stored in accordance with PSEG Nuclear fire protection program requirements and determined that:

- The flammable chemicals were not stored in an approved storage cabinet as required by Section 5.4 of the fire protection program procedure.
- The temporary power cables had been staged for the Unit 1 refueling outage and were not removed after use, as required by Section 5.3 of the fire protection program.

PSEG Nuclear initiated prompt actions to properly store the transient combustible materials. The inspector evaluated these issues using the fire protection significance SDP and found them to be of very low risk significance (Green) since the problems would not have affected the fire mitigation defense in depth elements involving detection, suppression or fire barriers.

Technical Specification 6.8.1.f requires, in part, that written procedures shall be established and implemented for the fire protection program. Contrary to the above, two examples were identified where PSEG Nuclear failed to properly control transient combustible materials within the Unit 1 SFP building as required by fire protection program procedure NC.NA-AP.ZZ-0025 (Q), revision 5. This is a violation of TS 6.8.1.f. This very low risk significance violation has been entered into PSEG Nuclear's corrective action program (Notification Nos. 20083388 and 20083427) and is being treated as a non-cited violation consistent with the NRC's enforcement policy. **(NCV 50-272/01-10-01)**

.2 Announced Fire Brigade Drill

a. Inspection Scope

On November 11, the inspectors observed a fire brigade training session and an announced fire brigade drill. The observed session involved familiarization and training with the site's new fire engine, and involved timed exercises donning turnout gear, accessing fire fighting equipment on the engine and preparing for hazard area entry. The fire brigade prepared for the drill and completed a pre-evolution briefing. The inspector observed that the fire drill involved responding with the fire engine to the report of a simulated fire in the service water intake structure. The inspectors verified that the fire brigade responded to the hazard area with appropriate turnout gear, breathing apparatus, fire hoses and fire fighting equipment. The inspector verified that the fire brigade leader responded to the scene with the fire fighting response procedures and was observed actively referring to these procedures. The inspector also observed the post-drill critique.

b. Findings

No findings of significance were identified.

R07 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed biofouling test data collected from March 18, 1998, to June 3, 2001, for the 2B emergency diesel generator jacket water (2DAE59) and lube oil (2DAE2) coolers. The inspectors also reviewed biofouling test data collected during the current period for the 21 charging system (CS) pump gear and lubricating oil coolers. These reviews were performed to confirm that PSEG Nuclear monitored the safety-related cooler performance as described in operations procedures, S1.OP-PT.SW-0004(Q), "Service Water Biofouling Monitoring Safety Injection and Charging Pumps," and S2.OP-PT.SW-0006(Q), "Service Water Biofouling Monitoring Diesel Generators." The inspectors independently confirmed that the test results met the acceptance criteria specified in the associated operating procedures.

The inspectors also reviewed operating parameters and performed field walkdowns of the Unit 1 and Unit 2 CS pump coolers, interviewed the service water system



performance engineer, and reviewed notifications (Nos. 20079960, 20081748, and 20082114) that documented recent events where the 12 and 21 CS pumps have been declared inoperable due to biofouling of their associated gear and lubricating oil coolers. These reviews were performed to ensure that PSEG Nuclear had promptly identified and corrected CS cooler performance problems. The inspectors also reviewed Notification No. 20083417 that had been initiated to develop a formal position regarding the ability of the 21 CS pump to meet its licensing basis requirements during a recent period where the pump had been declared inoperable three times in approximately twelve days.

b. Findings

No findings of significance were identified.

R13 Maintenance Risk Assessments and Emergent Work Control

.1 Outage Work

a. Inspection Scope

The inspectors reviewed PSEG Nuclear's actions to manage shutdown risk during the Unit 1 forced outage that included: replacement of the pressurizer safety valve (PR5), and the installation of two freeze seals to support the repair and replacement of two leaking safety injection system isolation check valves. The inspectors reviewed the risk assessment plan and work documents for these activities and performed field walkdowns to ensure that operational controls designed to mitigate the risk associated with these activities were implemented.

The inspectors also reviewed PSEG Nuclear's response to correct an emergent condition involving biofouling of the 21 CS pump gear and motor oil cooler. The inspectors ensured that the emergent cooler problem was appropriately factored into the plant risk assessment, reviewed the performance of the redundant CS pump gear and oil coolers and observed the field activities performed to restore the 21 CS cooler condition.

b. Findings

No findings of significance were identified.

.2 Service Water Bay Operability with Bay Plugs Removed

a. Inspection Scope

The inspectors reviewed the risk assessments associated with the 14 service water pump replacement during work week 26 and the No. 16 service water pump replacement during work week 33 that included removal of the service water intake bay plug. For week 26, the inspectors observed that PSEG Nuclear performed a thorough and detailed risk assessment that considered external events such as adverse weather, river-borne incidents, fire, and unusual air traffic. The inspectors noted that a similar

assessment was not performed for the removal of the bay plug during week 33. The inspectors verified that Order No. 80037215 was entered into the corrective action program to determine whether the difference in the level of risk assessment for removal of the service water intake structure in weeks 26 and 33 was appropriate, whether the appropriate level of risk assessments were performed and whether the appropriate compensatory measures were identified.

The inspectors observed that PSEG Nuclear's previous practice was to declare all three of the pumps in the service water intake structure inoperable when the intake bay plugs were removed. More recently, the inspectors noted that the intake bay was not declared inoperable with the bay plug removed. The inspectors reviewed the engineering evaluation (Order No. 80030281) that supported this change in practice. The inspectors also reviewed calculation No. 6SO-1846, Evaluation of Service Water Intake Structure. The inspector noted that this calculation evaluated external events such as tornado missiles with the roof hatch installed. The inspectors questioned whether the plant procedures contained sufficient detail and entry criteria to protect the service water pumps from external events such as severe weather and tornado generated missiles. PSEG Nuclear wrote Notification No. 20083513 to review this issue.

b. Findings

No findings of significance were identified.

.3 No. 11 Residual Heat Removal (RHR) Pump Hydraulic Transient Event

a. Inspection Scope

The inspector reviewed PSEG Nuclear's response to a hydraulic transient event (i.e. waterhammer) that occurred on October 7, 2001, following start-up of the No. 11 RHR pump. The inspector reviewed applicable documentation and interviewed operations and engineering department personnel to ensure that PSEG Nuclear took appropriate actions to assess the significance of the event and to prevent recurrence. The following documents were reviewed:

- The transient assessment response plan (TARP) report for this event.
- Engineering calculation S-1-RHR-MEE-1593, Revision 0, "Analysis of the RHR System Waterhammer Event."
- Notification No. 20079293.

PSEG Nuclear reported that no additional RHR system abnormal operating conditions were noted during the waterhammer event and performed a walkdown of the RHR system and did not identify any damage caused by the event. The longer term corrective actions included operating procedure changes to prevent recurrence.

b. Findings

No findings of significance were identified.

R14 Personnel Performance During Nonroutine Plant Evolutions

.1 Hazardous Material Response

a. Inspection Scope

The inspectors observed, on October 16, 2001, PSEG Nuclear's response to an unknown substance discovered inside the protected area. The inspectors observed the hazardous material brief, recovery of the unknown substance, and the decontamination of the affected area in accordance with NC.FP-ED.ZZ-0002, "Fire Department Hazardous Material Response." Upon further investigation and chemical analysis, the unknown substance was determined to be non-hazardous. The inspectors also reviewed PSEG Nuclear's event notification to the NRC (Event Number 38392.)

b. Findings

No findings of significance were identified.

.2 Start-up from Unit 1 Forced Outage

a. Inspection Scope

The inspectors observed the reactor start-up on October 15 following the Unit 1 manual trip and forced outage that began September 24. The inspectors observed crew communications and monitoring of reactor power during the approach to criticality. The inspectors verified that the reactor start-up was accomplished in accordance with procedure S1.OP-IO.ZZ-0003(Q), "Hot Standby to Minimum Load." On October 16, the inspectors also verified that the main generator was synchronized to the grid in accordance with procedure S1.OP-SO.TRB-0001(Q), "Turbine Generator Startup Operations."

b. Findings

No findings of significance were identified.

R19 Post Maintenance Testinga. Inspection Scope

The inspectors observed system performance and reviewed documentation for the post-maintenance testing (PMT) activities performed following the cleaning of the 21 CS pump gear and lubricating oil coolers and subsequent to the repair and replacement of the Unit 1 safety injection system hot leg isolation check valves. The review was performed to confirm that the test scope was appropriate for the completed maintenance activities and to confirm that the test results were acceptable. The inspectors also monitored performance of the components subsequent to the repair activities to confirm that the repairs were effective.

b. Findings

No findings of significance were identified.

R22 Surveillance Testinga. Inspection Scope

The inspectors observed the performance of surveillance test procedures or reviewed test data of selected risk-significant systems, structures, and components (SSCs) to assess whether the SSCs satisfied Technical Specifications, Updated Final Safety Analysis Report, and licensee procedure requirements. The inspectors assessed whether the testing appropriately demonstrated that the SSCs were operationally ready and capable of performing their intended safety functions. The following tests were reviewed:

- S2.OP-ST.RHR-0002(Q), Inservice Testing - 22 Residual Heat Removal Pump.
- S1.OP-ST.CVC-0004(Q), Inservice Testing - 12 Charging Pump.
- S1.OP-ST.AF-0003(Q), Inservice Testing - 13 Auxiliary Feedwater Pump.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES [OA]**OA2 Identification and Resolution of Problems.1 No. 22 Charging Pump Abnormal Gear Oil Conditiona. Inspection Scope

The inspectors reviewed PSEG Nuclear's follow-up corrective actions for an abnormal No. 22 CS pump speed increaser lubricating oil condition that was initially identified on August 5, 2001 (Notification No. 20073891). An off-site laboratory analyzed the oil and

determined that the oil had oxidized, as evidenced by a significant increase in the total acid number (TAN). The inspectors reviewed the oil analysis report that was provided to PSEG Nuclear on August 16, 2001, applicable notifications (Nos. 20075748, 20073891, and 30023804), and interviewed engineering personnel to evaluate the impact of the degraded oil condition on the operability of the No. 22 CS pump, and the adequacy of the planned and completed corrective actions.

The completed corrective actions involved replacement of the No. 22 CS pump speed increaser lubricating oil. The inspector reviewed the results of oil samples taken subsequent to the replacement and did not identify any additional abnormalities.

b. Findings

PSEG Nuclear failed to implement appropriate corrective actions for a degraded No. 22 CS pump condition. PSEG Nuclear replaced the degraded oil, but did not implement any actions to prevent recurrence. This finding was evaluated using the SDP and determined to be of very low significance (Green) since the pump has performed satisfactorily subsequent to the initial event. The failure to promptly identify and correct the condition adverse to quality was a non-cited violation of 10 CFR 50 Appendix B, Criterion XVI.

The corrective actions for the degraded pump oil condition addressed the immediate problem (i.e. the oxidized oil condition), but did not address the underlying system problem(s) that caused the adverse condition to develop. This was considered to have a credible impact on safety since the degraded oil condition could have recurred and adversely affected the reliability and/or availability of the No. 22 CS pump. The finding was evaluated using the SDP and determined to be of very low significance (Green) since the pump has performed satisfactorily subsequent to the initial event.

10 CFR 50, Appendix B, Criterion XVI, requires, in part, conditions adverse to quality be promptly identified and corrected. Contrary to the above, PSEG Nuclear failed to identify and correct a condition adverse to quality that could have challenged the operation of the No. 22 charging system pump. This is a violation of 10 CFR 50, Appendix B, Criterion XVI. This very low risk significance violation has been entered into PSEG Nuclear's corrective program as Notification No. 20083003 and is being treated as a non-cited violation consistent with the NRC's enforcement policy. **(NCV 50-311/01-10-02)**

OA6 Management Meetings

a. Exit Meeting Summary

On November 14, 2001, the inspectors presented their overall findings to members of PSEG Nuclear management led by Mr. Kevin Davison of Salem Operations. Mr. William Cook, Chief, Projects Branch 3, attended the exit meeting. PSEG Nuclear management took no exception to the findings presented. PSEG Nuclear management stated that none of the information reviewed by the inspectors was considered proprietary.

b. PSEG Nuclear/NRC Management Meeting

On October 3 and 4, Mr. Hub Miller, Region I Administrator, and Mr. Randy Blough, Director - Division of Reactor Projects, met with members of PSEG Nuclear management; discussed regulatory issues during a working lunch; and toured the Salem and Hope Creek plants.

**ATTACHMENT 1****SUPPLEMENTAL INFORMATION**a. Key Points of Contact

K. Davison, Operations Manager  
 D. Garchow, Vice-President, Operations  
 G. Salamon, Licensing Manager  
 L. Waldinger, Operations Director

b. List of Items Opened, Closed, and DiscussedOpened/Closed

50-272/01-10-01	NCV	PSEG Nuclear failed to properly control transient combustible materials within the Unit 1 spent fuel pool. (Section RO5)
50-311/01-10-02	NCV	PSEG Nuclear failed to promptly identify and correct a condition adverse to quality that had the potential to affect the operability of the No. 21 charging system pump (Section OA2)

c. List of Acronyms

CS	Charging System
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PMT	Post Maintenance Testing
PSEG	Public Service Electric Gas
RHR	Residual Heat Removal
SDP	Significance Determination Process
SFP	Spent Fuel Pool
SSCs	Systems, Structures, and Components
TAN	Total Acid Number
TARP	Transient Assessment Response Plan