

September 7, 2000

Mr. Harold W. Keiser
President and Chief Nuclear Officer
PSEG Nuclear Limited Liability Company
P. O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: NRC'S SALEM INTEGRATED INSPECTION REPORT 05000272/2000-006,
05000311/2000-006

Dear Mr. Keiser:

On August 12, 2000, the NRC completed an inspection of your Salem 1 & 2 reactor facilities. The enclosed report presents the results of that inspection. The results were discussed in a formal exit meeting on August 24, 2000, with Mr. Larry Wagner and other members of your staff.

This inspection was an examination of activities conducted under your license as they relate to the identification and resolution of problems, and compliance with the Commission's rules and regulations, and with the conditions of your operating license. Within these areas, the inspection involved selected examination of procedures and representative records, observations of activities, and interviews with personnel.

In this inspection there were no findings identified.

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Sincerely,

/RA/

Glenn W. Meyer, Chief,
Projects Branch 3
Division of Reactor Projects

Enclosure: Inspection Report 05000272/2000-006, 05000311/2000-006

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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: 05000272/2000-006, 05000311/2000-006

Licensee: PSEG Nuclear LLC

Facility: Salem Nuclear Generating Station, Units 1 & 2

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

Dates: July 2 - August 12, 2000

Inspectors: Scott A. Morris, Senior Resident Inspector
F. Jeff Laughlin, Resident Inspector
John G. Caruso, Operations Engineer
Steven Dennis, Operations Engineer
Stephen M. Pindale, Reactor Inspector

Approved By: Glenn W. Meyer, Chief,
Projects Branch 3
Division of Reactor Projects

Summary of Findings

IR 05000272-00-06, IR 05000311-00-06; on 07/02-08/12/2000; Public Service Electric and Gas Company; Units 1 and 2; Resident Operations Report.

The report covers a six-week period of resident inspection using the guidance contained in NRC Inspection Manual Chapter 2515*. The significance of issues is indicated by their color (Green, White, Yellow, or Red) and was determined by the Significance Determination Process in Inspection Manual Chapter 0609 (see Attachment 1).

- There were no findings.

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Report Details

SUMMARY OF PLANT STATUS

Unit 1 began the period at 100% and remained there until July 15, 2000, when operators reduced power to 80% due to the effects of a solar magnetic disturbance. They subsequently reduced power to 73% when the unit experienced an unexpected automatic isolation of the low pressure feedwater heaters. Operators restored the unit to full power on July 17, 2000. On August 9, 2000, the unit experienced an automatic reactor trip due to a fault in the rod control system. Operators synchronized the unit to the grid on August 11, 2000, and the unit was at 80% during power ascension when the period ended.

Unit 2 began the period at 100% and remained there until July 15, 2000, when operators reduced power to 80% due to the effects of a solar magnetic disturbance. Operators restored the unit to full power on July 17, 2000, where it remained for the rest of the period.

1. REACTOR SAFETY (Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity)

R04 Equipment Alignment

a. Inspection Scope

The inspectors performed a complete walkdown of the Unit 1 and 2 125 VDC electrical system the week of July 10, 2000. The inspectors verified that the system was correctly aligned in accordance with procedures, properly labeled in accordance with plant drawings, and maintained with no outstanding work requests or deficiencies which could affect system operability.

b. Issues and Findings

There were no findings identified.

R05 Fire Protection

a. Inspection Scope

The inspectors reviewed outstanding corrective maintenance issues at Unit 2 related to fire detection, suppression, and barriers. The inspectors verified that PSEG Nuclear's compensatory measures complied with the plant fire protection program and 10 CFR 50 Appendix R requirements. The inspectors also toured the switchgear rooms, 84 foot elevation auxiliary building, and the turbine building to ensure that control of transient combustibles and ignition sources was adequate.

b. Issues and Findings

There were no findings identified.

R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed second quarter system health reports, corrective action notifications, and functional failure screening accuracy for the Unit 1 and 2 service water (SW) systems. The inspectors also reviewed the adequacy of revised (a)(1) goals for the SW systems and the status of corrective actions.

b. Issues and Findings

There were no findings identified.

R13 Maintenance Risk Assessments and Emergent Work Control

.1 Containment Fan Cooler Unit (CFCU) Bearing High Temperature

a. Inspection Scope

The inspectors reviewed the July 13, 2000, emergent work which resulted from a high temperature indication on the 21 CFCU fan outboard bearing. The inspectors assessed the increased risk, pre-evolution briefing, and contingency actions for radiation dose control due to a required containment entry. Additionally, the inspectors verified the operability of redundant components and procedural adherence during the work evolution.

b. Issues and Findings

There were no findings identified.

.2 Unit 1 Rod Control System Urgent Failure

a. Inspection Scope

The inspectors reviewed numerous online maintenance evolution plans to assess the adequacy of PSEG Nuclear's risk assessment process. They also performed a detailed review of troubleshooting and repair activities associated with the July 24, 2000, Unit 1 rod control system urgent failure alarm to verify that the activities were appropriately planned and controlled, and that adequate contingencies were established to minimize risk. The urgent failure alarm resulted from a failed circuit card which prevented both manual and automatic operation of the rod control system. The trip function of all control rods remained operable.

b. Issues and Findings

There were no findings identified.

.3 22 Containment Spray Pump and 11 Emergency Control Air Compressor Failures

a. Inspection Scope

The inspectors reviewed the August 6, 2000, 22 containment spray pump surveillance test failure and the August 7, 2000, #1 emergency control air compressor failure to verify that operators had taken appropriate actions to minimize risk, including the performance of an updated risk assessment. They also interviewed operators and reviewed operating logs.

b. Issues and Findings

There were no findings identified.

R14 Personnel Performance During Nonroutine Plant Evolutions

.1 Unit 1 and 2 Power Reduction Due to a Solar Magnetic Disturbance

a. Inspection Scope

The inspectors reviewed the July 15, 2000, unplanned rapid power reduction at Units 1 and 2 which resulted from grid instabilities caused by a solar magnetic disturbance (SMD). Both units were operating at 100% power when operators were advised by the offsite electrical system operator to perform an immediate power reduction due to the SMD. The inspectors verified that the operators took appropriate actions per abnormal procedure OP-AB.GRID-0001(Q), *Abnormal Grid*, to reduce main turbine load to less than or equal to 80% as required.

During the power reduction, Unit 1 experienced a feed water flow problem due to the closure of the inlet valves (11, 12, and 13CN27) to all three low pressure feed water heater trains containing the #13, #14 and #15 feedwater heaters. The inspectors verified that operator response to the feed water isolation was appropriate and in accordance with procedures. PSEG Nuclear management initiated level 1 corrective action notification 20035071 for this event. Unit 2 did not experience any problems during its power reduction.

b. Issues and Findings

There were no findings identified.

.2 Unit 1 Rod Control System Repair

a. Inspection Scope

The inspectors reviewed PSEG Nuclear's July 26, 2000, repair of the Unit 1 rod control system, which experienced an urgent failure alarm during a routine surveillance test on July 24. Maintenance technicians and engineers developed a troubleshooting and repair plan to remove a failed circuit card in the system. The plan was controlled as an infrequently performed test or evolution (IPTE) in accordance with station procedures, and was reviewed by the Station Operations Review Committee prior to implementation. As an added precaution, an associated circuit card was removed during the maintenance to ensure that the rods powered by the affected circuit remained engaged by the control rod grippers. Following the maintenance the urgent failure alarm cleared,

and the operators regained manual and automatic rod control. The inspectors reviewed the evolution plan including the associated risk assessment, applicable station procedures, briefings, and contingency plans.

b. Issues and Findings

There were no findings identified.

R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed operability determination 00-006, which evaluated containment fan cooler unit (CFCU) high efficiency particulate air (HEPA) filter operability during a postulated main steam line break (MSLB), to verify that Salem CFCUs were capable of performing their design function. PSEG Nuclear determined that the HEPA filters were non-conforming in that the temperature spike in containment associated with the MSLB accident is 351.3 degrees F, while the HEPA filter maximum design temperature is 300 degrees. The inspectors also reviewed: License Change Request S96-13 which revised the CFCU response time; Engineering Evaluation S-C-VAR-MEE-1119, *Assessment of Mechanical Components in Salem Containment Building for Main Steam Line Break*; and Notification 20032723 which documented this issue in the corrective action program. Additionally, they interviewed the containment building ventilation and service water system managers and various design engineers associated with the issue. PSEG Nuclear concluded that the HEPA filters would only very briefly exceed their maximum design temperature and the consequences of this were acceptable.

b. Issues and Findings

There were no findings identified.

R16 Operator Workarounds

a. Inspection Scope

The inspectors reviewed open Unit 1 and 2 operator workarounds (OWAs) to identify any potential negative effect on the function of mitigating systems. The inspectors also interviewed licensed operators concerning the significance of the OWAs.

b. Issues and Findings

There were no findings identified.

R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors witnessed portions of the installation of a modification of the 12 auxiliary feed water (AFW) subsystem, reviewed the modification package and the post-modification testing, and verified that no other systems were removed from service during the time the 12 AFW work was being conducted which could significantly increase overall plant risk. This modification, which replaced the 12 AFW pump discharge pressure transmitter with a model of different design, was developed to improve the reliability of the pump discharge pressure interlock circuit which has exhibited intermittent failures in recent years.

b. Issues and Findings

There were no findings identified.

R19 Post Maintenance Testing

.1 2C1 125 VDC Battery Charger

a. Inspection Scope

The inspectors observed portions of post-maintenance testing (PMT) activities and reviewed PMT data for the 2C1 125 VDC battery charger on July 14, 2000. The inspectors verified that test activities and procedures were adequate to assure system operability and that the tests met the appropriate acceptance criteria at the completion of planned maintenance.

b. Issues and Findings

There were no findings identified.

.2 Unit 1 Rod Control System

a. Inspection Scope

The inspectors observed post-maintenance testing (PMT) and reviewed associated data following troubleshooting and repair activities to the Unit 1 rod control system to verify that test activities were adequate to assure system operability at the completion of the maintenance.

b. Issues and Findings

There were no findings identified.

R22 Surveillance Testing

a. Inspection Scope

The inspectors observed portions of surveillance tests (ST) and reviewed test results for the following risk-significant systems: Unit 2 solid state protection system train B reactor trip breaker under-voltage coil and auto shunt trip on July 20, 2000; train B reactor trip and reactor bypass breakers P-4 permissive test on July 20, 2000; and 2C emergency diesel generator monthly ST on July 13, 2000. The inspectors verified that test activities satisfied technical specification and procedural requirements, and that all components were capable of performing their intended safety functions. The inspectors also performed a visual inspection of each system to check for signs of degradation and verified that minor deficiencies were documented in the corrective action program.

b. Issues and Findings

There were no findings identified.

4. OTHER ACTIVITIES [OA]

OA1 Performance Indicator Verification

.1 Mitigating System Performance Indicators

a. Inspection Scope

The inspectors reviewed the last four quarters of Unit 1 and 2 Initiating Event performance indicators (PIs), i.e., unplanned scrams per 7000 critical hours, scrams with loss of normal heat removal, and unplanned power changes per 7000 critical hours to verify their accuracy. They also interviewed PSEG Nuclear personnel responsible for compiling the information and reviewed the process for gathering and reporting the PI data. The inspectors used NEI 99-02, Revision 0, *Regulatory Assessment Performance Indicator Guideline*, as the standard to assess PSEG Nuclear's data accuracy.

b. Issues and Findings

There were no findings identified.

.2 Safety System Functional Failure Performance Indicator

a. Inspection Scope

The inspectors reviewed PSEG Nuclear's program for gathering and submitting data for the safety system functional failure PI. The review included Licensee Event Reports and personnel interviews concerning the PI data submitted from the third quarter of 1999 through the second quarter of 2000.

b. Issues and Findings

There were no findings identified.

OA3 Event Follow-up

.1 Unit 1 Reactor Trip

a. Inspection Scope

Salem Unit 1 experienced an automatic reactor trip on August 9, due to an unexpected "negative rate trip high" protection signal. PSEG Nuclear personnel promptly notified the inspectors who responded to the site and independently evaluated the circumstances surrounding the trip, including operator and equipment performance. The inspectors verified that the licensed operators properly executed the post-trip operating procedures and consulted the Emergency Classification Guide for offsite reportability requirements. The inspectors also conducted an independent verification of the decay heat removal equipment lineup and followed up on some of the equipment abnormalities that surfaced during and following the shutdown.

The inspectors observed portions of troubleshooting efforts to establish the cause of the reactor trip. Maintenance technicians determined that a logic card in one of the rod control cabinets failed, causing the C control bank rods to drop into the core. This large negative reactivity insertion caused the automatic trip signal. The inspectors reviewed the post-maintenance test results to verify the adequacy of the testing.

b. Issues and Findings

There were no findings identified.

The shutdown bank control rod 1SB2 which experienced a loss of analog position indication on April 28, 2000 (described in detail in NRC Inspection Report 5000272&311/2000-04) was not repaired during the forced outage which followed the trip, largely due to the extreme environmental conditions on top of the reactor vessel head where the position instrumentation is located. The unit remained in Mode 3 (Hot Standby) for the duration of the outage.

.2 Partial Loss of Unit 1 Overhead Annunciators

a. Inspection Scope

On August 8, 2000, Salem Unit 1 experienced a partial loss of overhead annunciators (OHAs) due to a failed 24VDC power supply. Though not safety-related, the OHAs provide numerous alarms to warn operators of off-normal plant conditions. The inspectors witnessed the operators' response to this event, including the use of dedicated operators monitoring alternate alarm and indication panels. Additionally, the inspectors independently reviewed the Salem Emergency Classification Guide to assess the accuracy of PSEG Nuclear's determination that this unexpected condition was not reportable. Lastly, portions of the troubleshooting and retest efforts were observed.

b. Issues and Findings

There were no findings identified.

OA6 Management Meetings

a. Exit Meeting Summary

On August 24, 2000, the inspectors presented their overall findings to members of PSEG Nuclear management led by Mr. Larry Wagner. PSEG Nuclear management acknowledged the findings presented and did not contest any of the inspectors' conclusions. Additionally, they stated that none of the information reviewed by the inspectors was considered proprietary.

b. PSEG Nuclear/NRC Management Meeting

On August 10 and 11, Mr. Hub Miller, NRC Region I Administrator, met with members of PSEG Nuclear management, interviewed plant personnel and toured the Salem and Hope Creek plants.

ITEMS OPENED AND CLOSED

None

LIST OF ACRONYMS USED

ADAMS	Agency-wide Document Access and Management System
AFW	Auxiliary Feed Water
CFCU	Containment Fan Cooler Unit
HEPA	High Efficiency Particulate Air
IPTE	Infrequently Performed Test or Evolution
MSLB	Main Steam Line Break
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OHA	Overhead Annunciators
PARS	Publicly Available Records
PDR	Public Document Room
PIs	Performance Indicators
PMT	Post-maintenance Testing
SMD	Solar Magnetic Disturbance
ST	Surveillance Test
SW	Service Water
VDC	Volts Direct Current

ATTACHMENT 1

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety	Radiation Safety	Safeguards
<ul style="list-style-type: none"> ● Initiating Events ● Mitigating Systems ● Barrier Integrity ● Emergency Preparedness 	<ul style="list-style-type: none"> ● Occupational ● Public 	<ul style="list-style-type: none"> ● Physical Protection

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be

taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.