April 25, 2000

Mr. Harold W. Keiser
President and Chief Nuclear Officer
Nuclear Business Unit
Public Service Electric and Gas Company
Post Office Box 236
Hancocks Bridge, NJ 08038

SUBJECT: NRC INSPECTION REPORT 05000272/2000-002, 05000311/2000-002

Dear Mr. Keiser:

On April 1, 2000, the NRC completed an inspection of your Salem 1 & 2 reactor facilities. The enclosed report presents the results of that inspection. The preliminary findings were presented to PSEG management led by Mr. Larry Wagner in an exit meeting on April 12, 2000.

NRC inspectors examined numerous activities as they related to reactor safety and compliance with the Commission's rules and regulations, and with the conditions of your operating license. The inspection consisted of a selected examination of procedures and representative records, observations of activities, and interviews with personnel. Specifically, it involved five weeks of resident inspection and two region-based inspections of your security program and your response to Generic Letter 98-02. It also included the results of the November 1999 radioactive waste inspection which was inadvertently omitted from Inspection Report 1999-009. Each inspection issue or finding was assessed using the applicable significance determination process. This inspection yielded one Green finding associated with the inadvertent loss of the Unit 1 circulation water traveling screens on March 8, 2000.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

Sincerely,

**/RA/**

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

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

Enclosure: Inspection Report 05000272/2000-002, 05000311/2000-002

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REGION I

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|---|---|
| Docket Nos: | 50-272, 50-311 |
| License Nos: | DPR-70, DPR-75 |
| Report No: | 05000272/2000-002, 05000311/2000-002 |
| Licensee: | Public Service Electric and Gas Company (PSEG) |
| Facility: | Salem Nuclear Generating Station, Units 1 & 2 |
| Location: | P.O. Box 236<br>Hancocks Bridge, NJ 08038 |
| Dates: | February 28 - April 1, 2000 |
| Inspectors: | Scott A. Morris, Senior Resident Inspector<br>F. Jeff Laughlin, Resident Inspector<br>Joseph T. Furia, Senior Health Physicist<br>Gregory C. Smith, Sr. Physical Security Inspector<br>Larry Scholl, Senior Reactor Inspector |
| Approved By: | Glenn W. Meyer, Chief<br>Projects Branch 3<br>Division of Reactor Projects |

SUMMARY OF FINDINGS

Salem Generating Station, Units 1 & 2
NRC Inspection Report 05000272/2000-002, 05000311/2000-002

The report covers a five-week period of resident inspection and inspections of the security program and the PSEG response to Generic Letter 98-02 using the guidance contained in NRC Inspection Manual Chapter 2515*. In addition, the report includes the results of the November 1999 radioactive waste inspection, which was inadvertently omitted from Inspection Report 1999-09. The significance of issues is indicated by their color (green, white, yellow, or red) and was determined by the Significance Determination Process in draft Inspection Manual Chapter 0609 (see Attachment 1).

**Cornerstone: Initiating Events**

- **Green.** A maintenance technician applied a jumper to the wrong contacts on a protective relay during a planned on-line maintenance activity associated with the 12B circulating water pump breaker. This error resulted in the complete loss of all Unit 1 circulating water system traveling water screens (TWSs). The safety significance of this event was very low because the TWSs were restored within five minutes and there was no observable affect on circulating water flow to the main condenser.

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## Report Details

### SUMMARY OF PLANT STATUS

Unit 1 began the period at full power, and remained at full power for the entire report period, with the exception of a March 2, 2000 power reduction to 89% to support off-site transmission system maintenance.

Unit 2 operated at full power for the entire period.

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

1R04 Equipment Alignment

a. Inspection Scope

The inspectors completed partial walkdowns of the Unit 1 service water (SW) system during a SW bay outage, and the Unit 2 charging and safety injection systems during pump outages. These inspections verified that redundant trains were operable and that the systems were properly aligned to support normal and emergency operation.

b. Observations and Findings

There were no findings identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors reviewed the Salem *Updated Final Safety Analysis Report*, *Probabilistic Safety Analysis (PSA),* and procedure S1.OP-AB.ZZ-0002(Q), *Flooding,* to verify that PSEG's flooding mitigation plans and equipment were consistent with design basis requirements and risk analysis assumptions. The inspectors performed a detailed review of the Unit 1 relay room and the 64-foot elevation switchgear room since these areas contain vital electrical equipment which would be quickly submerged during a flooding event.

b. Observations and Findings

There were no findings identified.

Regarding the flooding assumptions in the PSA, the inspectors found inconsistencies between what was documented in the text and the actual flooding analysis calculation. Additionally, PSA Section 3.10.3, which contained the internal flooding analysis, was not included in the latest revision of the document. Lastly, a recent design change to the status of auxiliary building floor drains had not been reviewed by PSA personnel for its

effect on the internal flooding analysis. Subsequent review revealed that the analysis was unchanged. PSEG documented these deficiencies in notification 20024003.

1R11 Licensed Operator Requalification

a. Inspection Scope

On February 29 the inspectors witnessed a simulator training session for one operating crew to assess operator performance and training effectiveness.

b. Observations and Findings

There were no findings identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

.1 Service Water (SW) System Maintenance

a. Inspection Scope

The inspectors reviewed two instances of SW system maintenance which placed Unit 1 in a 72-hour technical specification action statement (TSAS). The first one concerned the inoperability of the 15 SW pump on March 6, 2000 due to strainer biological fouling (bio-fouling) at the same time the 14 SW pump was inoperable due to high vibrations. The second instance involved a planned 16 SW pump silt inspection on March 8, 2000 concurrent with the same 14 SW pump inoperability. The inspectors also reviewed an emergent maintenance issue concerning the bio-fouling of the 11 SW pump strainer. These events occurred when river grass levels were unusually high, which challenged SW pump trains due to strainer bio-fouling. The SW system is a risk-significant system that serves as the ultimate heat sink for numerous plant safety systems.

b. Observations and Findings

There were no findings identified.

.2 21 Charging Pump 4KV Circuit Breaker

a. Inspection Scope

The inspectors followed up on the discovery of a missing bolt in the 21 charging pump 4KV circuit breaker on March 13, 2000. An equipment operator discovered this condition while racking in (placing in service) the breaker after a pump outage. The bolt was part of the spring discharge crank stop, a mechanism that discharges closing springs when the breaker is racked out. There were two other similar vital 4KV breakers, both of which had the bolt installed. An engineering review and discussions with the vendor revealed that the bolt had no safety function and did not affect operability, and although this issue did

not affect breaker operability, the additional review and inspection extended pump unavailability time .

b. Observations and Findings

There were no findings identified.

.3 Unit 2 Rod Control System Power Supply Replacement

a. Inspection Scope

On March 16, 2000, the inspectors observed the briefing and portions of the maintenance for a Unit 2 rod control system power supply replacement. This system has redundant power supplies, one of which had failed. PSEG management controlled the maintenance activity using the "infrequently performed test or evolution" process due to its potential effect on core reactivity. The inspectors observed this emergent work due to its potential for causing an initiating event.

b. Observations and Findings

There were no findings identified.

1R14 Personnel Performance During Nonroutine Plant Evolutions

a. Inspection Scope

The inspectors reviewed the circumstances associated with a planned replacement of the #21 seal injection filter on March 16, 2000, which resulted in an inadvertent draining of approximately 10 gallons of water from the chemical volume and control system (CVCS). Unknown to operators, one of the filter isolation valves was partially open, so that when the filter drain valves were opened, water drained from the CVCS system to the waste holdup tank. Radiation levels in the plant increased slightly and all reactor coolant pumps experienced low seal water flow alarms. Operators immediately closed the drain valves to isolate the leak. The inspectors verified that operators appropriately responded to and reported this event.

b. Observations and Findings

There were no findings identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed or reviewed the results of scheduled surveillance tests for the 1C and 2B emergency diesel generators and the Unit 1 engineered safety features actuation

system. The inspectors verified that these systems and components were capable of performing their intended safety functions and assessed their operational readiness.

b. Observations and Findings

There were no findings identified.

## 2. RADIATION SAFETY

### Public Radiation Safety [PS]

2PS2 Radioactive Material Processing and Shipping

a. Inspection Scope

The inspectors reviewed the following areas to determine whether PSEG was in compliance with the applicable requirements contained in 49 CFR Parts 170-188 and 10 CFR Parts 20, 61 and 71.

- **!** Systems review (description, control panel review, facilities tour)
  a) Chemistry & Volume Control
  b) Spent Fuel Pool Clean-Up
  c) Floor Drain
  d) Equipment Drain
  e) Miscellaneous Waste
  f) Solid Waste Processing

- **!** Abandoned liquid and solid waste processing components/systems (method of lay-up, walkdowns, UFSAR review)

- **!** Interim radioactive waste storage (walkdown, records)

- **!** Process Control Program (PCP)
  a) PCP procedures
  b) Process documentation
  c) Scaling factors (derivation, sampling type, sampling frequency)

- **!** Solid radioactive waste shipping records review

- **!** Assurance of Quality
  a) Quality Assurance audits (1998-1999), including most recent PCP audit (required by technical specifications)
  b) Quality surveillances
  c) Departmental self-assessments (RP, Chemistry, Operations)

- **!** Training
  a) NRC IE Bulletin 79-19
  b) DOT 49 CFR, Subpart H

b. Observations and Findings

There were no findings identified.

## 3. SAFEGUARDS

### Physical Protection [PP]

PP3 Response to Contingency Events

a. Inspection Scope

The inspectors reviewed PSEG's contingency response strategy, procedures, training and target set analysis. The protected area perimeter intrusion detection and alarm assessment systems were evaluated for vulnerabilities. Testing of the intrusion detection system was conducted in 10 locations. Seven table top exercises with security supervisors and response team members were conducted and eight response team members demonstrated tactical firing at the onsite firing range with contingency weapons. The inspectors also reviewed drill critiques for prior contingency response drills.

b. Observations and Findings

There were no findings identified.

## 4. OTHER ACTIVITIES [OA]

4OA1 Identification and Resolution of Problems

.1 Temporary Instruction 2515/142, *Reactor Coolant System Draindown During Shutdown and Common-Mode Failure (NRC Generic Letter 98-02)*

a. Inspection Scope

The inspectors reviewed PSEG's evaluation of the Wolf Creek reactor coolant system draindown event of September 17, 1994, to assess the adequacy of any actions taken to address applicable lessons learned from this event to the Salem station. The inspection scope included a review of PSEG's response to Generic Letter (GL) 98-02, *Loss of Reactor Coolant Inventory and Associated Potential for Loss of Emergency Mitigation Functions While in a Shutdown Condition*, as well as changes to plant operating procedures, surveillance test procedures and operator training. The adequacy of

administrative controls in place to minimize the potential for an inadvertent draindown event were also assessed.

b. Observations and Findings

There were no findings identified.

4OA3 Event Follow-up

a. Inspection Scope

The inspectors reviewed the circumstances associated with an inadvertent loss of all circulating water (CW) system traveling water screens (TWS) at Unit 1 on March 8, 2000. This event could have led to a loss of all CW pumps and as a result a loss of condenser vacuum that would have led to a reactor trip without the normal heat sink being available. Further, at the time of this event, the 14 and 16 service water pumps were out of service for maintenance.

b. Observations and Findings

Operators promptly and effectively responded to the loss of TWS event, which was indicated in the control room by actuation of several overhead annunciators (alarms). The screens were returned to operation within about five minutes, before sufficient river-borne debris could collect on the idle screens to cause a significant degradation of CW flow to the main condenser.

The TWS were inadvertently lost as a direct result of personnel error. Specifically, during planned maintenance associated with the 12B CW pump breaker, a maintenance technician applied an electrical jumper to the wrong contacts on a protective relay which tripped open the electrical feeder breaker that supplies power to all six CW pump TWSs. The technician immediately recognized the error and reported the condition to the control room.

The inspectors determined that this event was Green (very low safety significance). Due to the short period of time that the screens were not in operation, no adverse impact to CW flow resulted, and no actual challenge to plant mitigation systems occurred. PSEG documented this event in their corrective action program as notification 20022811. The CW system is not a safety-related system, and procedures governing maintenance on this system do not fall under the purview of technical specification 6.8.1 or Regulatory Guide 1.33. As such, no violation existed.

4OA5 Management Meetings

a. Exit Meeting Summary

On April 12, 2000, the inspectors presented their overall findings to members of PSEG management led by Larry Wagner. PSEG 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.

## ITEMS OPENED AND CLOSED

None

## LIST OF ACRONYMS USED

| | |
|---|---|
| bio-fouling | Biological Fouling |
| CFR | Code of Federal Regulations |
| CVCS | Chemical Volume and Control System |
| CW | Circulating Water |
| GL | Generic Letter |
| NRC | Nuclear Regulatory Commission |
| PCP | Process Control Program |
| PSA | Probabilistic Safety Analysis |
| PSEG | Public Service Electric and Gas |
| RHR | Residual Heat Removal |
| SW | Service Water |
| TSAS | Technical Specification Action Statement |
| TWS | Traveling Water Screens |

# ATTACHMENT 1

# NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) 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 safety performance at NRC licensed plants.

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 |
|---|---|---|
| ! Initiating Events | ! Occupational | ! Physical Protection |
| ! Mitigating Systems | ! Public | |
| ! Barrier Integrity | | |
| ! Emergency Preparedness | | |

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.