June 12, 2000

Mr. Harold W. Keiser
President and Chief Nuclear Officer
PSEG Nuclear LLC
Post Office Box 236
Hancocks Bridge, NJ 08038

SUBJECT: NRC INSPECTION REPORT 05000272/2000-004, 05000311/2000-004

Dear Mr. Keiser:

On May 20, 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. Dave Garchow in an exit meeting on May 24, 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 seven weeks of resident inspection and the region-based biennial heat sink inspection. There were no inspection findings.

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 and will be available on the NRC Public Electronic Reading Room (PERR) link at the NRC home page, http://www.nrc.gov/NRC/ADAMS/index.html.

Sincerely,

/RA/

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

Enclosure: Inspection Report 05000272/2000-004, 05000311/2000-004

Docket Nos. 05000272, 05000311

cc w/encl:
E. Simpson, Senior Vice President and Chief Administrative Officer
M. Bezilla, Vice President - Nuclear Operations
D. Garchow, Vice President - Technical Support
M. Trum, Vice President - Maintenance
T. O'Connor, Vice President - Plant Support
E. Salowitz, Director - Nuclear Business Support
G. Salamon, Manager - Licensing
A. F. Kirby, III, External Operations - Nuclear, Conectiv Energy
J. McMahon, Director - QA/Nuclear Training/Emergency Preparedness
R. Kankus, Joint Owner Affairs
A. Tapert, Program Administrator
J. J. Keenan, Esquire
Consumer Advocate, Office of Consumer Advocate
F. Pompper, Chief of Police and Emergency Management Coordinator
M. Wetterhahn, Esquire
State of New Jersey
State of Delaware
L. G. Canton, Regional Director, FEMA, Region II (EP Exercise/IRs Only)
J. Guinan, NJ PIRG
N. Cohen, Coalition for Peace and Justice
R. Fisher
F. Berryhill
B. August

Distribution w/encl: **(VIA E-MAIL)**
Region I Docket Room (with concurrences)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
H. Miller, RA (to M. Fudge)
J. Wiggins, DRA (to G. Matakas)
G. Meyer, DRP
R. Barkley, DRP
B. Platchek, DRP
L. Prividy, DRS

HQ Distribution w/encl: **(VIA E-MAIL)**
J. Shea, OEDO
E. Adensam, NRR
R. Fretz, PDI-2, NRR
J. Clifford, NRR
W. Scott, NRR
Inspection Program Branch, NRR (IPAS)
C. See, NRR
T. Frye, NRR

DOCUMENT NAME: G:\BRANCH3\Salem\SALEMIR2000-004.wpd
After declaring this document "An Official Agency Record" it **will** be released to the Public.
To receive a copy of this document, indicate in the box: "**C**" = Copy without attachment/enclosure "**E**" = Copy with attachment/enclosure "**N**" = No copy

OFFICE	RI/DRP		RI/DRP		/				
NAME	SmorrisLaughlin GWM f/		Gmeyer GWM						
DATE	06/12/00		06/12/00						

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos:	50-272, 50-311
License Nos:	DPR-70, DPR-75
Report No:	05000272/2000-004, 05000311/2000-004
Licensee:	Public Service Electric and Gas Company
Facility:	Salem Nuclear Generating Station, Units 1 & 2
Location:	P.O. Box 236 Hancocks Bridge, NJ 08038
Dates:	April 2 - May 20, 2000
Inspectors:	Scott A. Morris, Senior Resident Inspector F. Jeff Laughlin, Resident Inspector Todd Fish, Operations Engineer Tom Burns, Reactor Inspector
Approved By:	Glenn W. Meyer, Chief, Projects Branch 3 Division of Reactor Projects

SUMMARY OF FINDINGS

Salem Generating Station, Units 1 & 2
NRC Inspection Report 05000272/2000-004, 05000311/2000-004

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

- There were no findings.

TABLE OF CONTENTS

Report Details

SUMMARY OF PLANT STATUS

Unit 1 began the period at 100% and remained there until April 12, 2000 when operators manually shut down the unit in response to a malfunction of the main turbine electro-hydraulic control system. The malfunction had initiated an unexpected 35% power reduction. It is expected that this reactor trip will be included in the *unplanned scrams per 7,000 critical hrs.* performance indicator (PI) for the second quarter of 2000.

Operators restored the unit to full power on April 17, 2000. On May 14, 2000 operators reduced power to 40% to replace the voltage regulator and perform other plant maintenance. They subsequently reduced power to 20% to complete repairs to a leaking heater drain valve. They returned the unit to full power on May 15, 2000 where it remained for the rest of the period.

Unit 2 began the period at 100% and remained there until April 14, 2000 when operators reduced power to 46% for main turbine valve testing and various plant maintenance activities. Operators restored the unit to full power on April 17, 2000 where it generally remained for the rest of the 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 22 component cooling water (CCW) heat exchanger during planned maintenance on the 21 CCW heat exchanger, and the 1A and 1C emergency diesel generators (EDGs) during testing of the 1B EDG. The inspectors verified that redundant trains were operable and that the systems were properly aligned to support normal and emergency operation.

b. Issues and Findings

There were no findings identified.

1R07 Heat Sink Performance

.1 Biennial Heat Sink Performance Inspection

a. Inspection Scope

The inspector verified that the testing, inspection and evaluation of thermal-hydraulic results were adequate to ensure proper heat transfer for one containment fan coil unit and motor cooler, one component cooling water (CCW - closed loop cooling water) heat exchanger and the jacket water and lube oil cooler for one emergency diesel generator. The inspector reviewed heat exchanger test methodology, frequency of testing, test conditions, acceptance criteria and trending of results. The inspector reviewed the

inspection, cleaning and maintenance methods used to evaluate service water (SW) system reliability with systems engineers and SW reliability program personnel to ensure methods used for inspection and cleaning were consistent with expected degradation, and that the heat exchanger final condition was acceptable. The inspector reviewed selected test calculations of component performance data to verify that test results reflected heat exchanger condition and operation were consistent with design. The inspector verified the test results collected for the period from June 1999 to the present were recorded, evaluated and reconciled to address differences between test and operational conditions. The inspector assessed the trending of the measured data for the components inspected, PSEG's determination of the cause for step changes in the trends, and the actions taken to disposition significant step changes. Also, the inspector reviewed a sample of deficiencies related to the extent of bio-fouling, debris fouling and chemical control to verify that PSEG had entered the problems into the corrective action program and provided appropriate corrective actions.

The inspector verified that chemical treatments for corrosion control and biotic fouling of SW (river water) and CCW heat exchangers and coolers were controlled, tested, and evaluated by PSEG for effectiveness and potential adverse effects on equipment.

b. Issues and Findings

There were no findings were identified.

.2 1C Emergency Diesel Generator (EDG) Lube Oil Cooler Inspection

a. Inspection Scope

The inspectors reviewed portions of the 1C EDG lube oil cooler heat exchanger inspection. The inspectors visually inspected the cooler for evidence of bio-fouling and reviewed eddy current test data with technicians to verify that test results met acceptance criteria.

b. Issues and Findings

There were no findings identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed numerous online maintenance evolution plans to assess the adequacy of PSEG's risk assessment process. They also performed a detailed review of maintenance on the 2B reactor trip breaker, the unit 1 main turbine voltage regulator, and the 22 chiller to verify that these maintenance activities were planned and controlled, and that adequate contingencies were established to minimize risk. Additionally, they reviewed maintenance on the Unit 1 chillers, which on two occasions placed the unit in a 72-hour technical specification action statement (2 of 3 chillers inoperable).

b. Issues and Findings

There were no findings identified.

1R14 Personnel Performance During Non-routine Plant Evolutions

.1 Loss of Position Indication on Control Rod 1SB2

a. Inspection Scope

The inspectors reviewed the April 28, 2000, loss of analog rod position indication (ARPI) for control rod 1SB2. This occurred during the monthly surveillance test S1.OP-ST.RCS-0001, Revision 11, *Reactivity Control System Rod Control Assemblies,* which verified control rod operability after shutdown bank B had been driven in 10 steps. The ARPI system and the P-250 computer indicated position “0" for rod 1SB2, the rod bottom light illuminated, and several overhead annunciators alarmed, indicating that rod 1SB2 had dropped to the bottom of the core. After several minutes, the indications returned to normal. Subsequent trouble-shooting revealed that the rod had not dropped and was in its proper position. The inspectors verified that operators carried out the proper alarm response actions and entered the appropriate technical specification action statement.

b. Issues and Findings

There were no findings identified.

.2 Potential Unit 2 Hydrazine Release to the Environment

a. Inspection Scope

The inspectors reviewed the May 8, 2000, Unit 2 hydrazine spill which involved a potential release to the environment. The apparent cause was the lifting of a demineralized water header relief valve, which overflowed the high conductivity pit sump, and caused water with toxic chemicals to drain into the site storm drains. The operations superintendent made a 15-minute report to the State of New Jersey based on an assumed hydrazine release to the Delaware River which exceeded the allowable 500 ppb limit. Subsequent investigation revealed that the release limit was not exceeded and the 15-minute report was appropriately retracted. The inspectors concluded that operators performed appropriate actions to contain the hydrazine release and that the proper notifications were made in accordance with the Event Classification Guide.

b. Issues and Findings

There were no findings identified.

.3 Unit 2 Steam Generator High Sodium Level

a. Inspection Scope

The inspectors reviewed the May 9, 2000, event when the Unit 2 steam generator sodium level exceeded the concentration needing operator response (5 ppb) to reduce the sodium level per PSEG guidance. Sodium level rose to 5.6 ppb, which had no impact on plant safety. The apparent cause of the event was a contaminated mixed bed demineralizer in the condensate polishing system. The inspectors concluded that operators performed appropriate actions to isolate the contaminated demineralizer and reduce the sodium concentration below 5 ppb.

b. Issues and Findings

There were no findings identified.

1R15 Operability Evaluations

.1 Service Water (SW) Ventilation

a. Inspection Scope

The inspectors reviewed operability determination (OD) 00-004 concerning degraded ventilation of the four SW bays. Each bay has a large and small exhaust fan to maintain bay temperature below 110 degrees to ensure operability. Engineering analysis showed that the large fan capacity was sufficient to maintain the bay below the temperature limit. However, the large fan was observed to windmill in the reverse direction when the small fan was placed in service, potentially causing excessive large fan starting current. This OD determined that the SW bays were operable but degraded, when the small fans were tagged out of service to prevent the reverse windmilling condition. Further evaluation showed that there were no adverse effects on the large fans if started from a reverse windmilling condition.

b. Issues and Findings

There were no findings identified. (Minor deficiencies were brought to PSEG's attention by the inspector.)

.2 12 Chiller

a. Inspection Scope

The inspectors reviewed risk-significant degraded and non-conforming conditions to assess the adequacy of PSEG's OD process. When prescribed by ODs, the inspectors also verified compensatory measures were appropriate and completed at the frequency specified. The inspectors also reviewed the OD associated with the 12 chiller SW recirculation pump failure to ensure that component operability was properly justified.

b. Issues and Findings

There were no findings identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed Design Change Packages (DCPs) 70000440 and 70000441 concerning the permanent plugging of Unit 1 & 2 auxiliary building floor drains, to verify that the drain system design basis was not degraded by the modifications.

b. Issues and Findings

There were no findings identified. However, the inspectors identified an issue that the DCPs did not receive the PSEG-expected review by probabilistic safety analysis (PSA) personnel to determine the effect on the internal flooding analysis. Further PSEG review showed that these drains did not adversely affect the flooding analysis. PSA personnel documented the inappropriate lack of review in notification 20024003.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors observed post-maintenance testing (PMT) and reviewed PMT data for the May 16-18, 2000 1C emergency diesel generator outage, to verify that test activities were adequate to assure system operability at the completion of planned maintenance.

b. Issues and Findings

There were no findings identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed or reviewed the results of surveillance tests on the Unit 1 4KV undervoltage circuitry, 12 auxiliary feed water pump, 1B and 1C emergency diesel generators, and the 12 residual heat removal pump. The inspectors verified that these risk-significant components were capable of performing their intended safety functions.

b. Issues and Findings

There were no findings identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed in detail temporary modification (TMOD) packages 00-007, *Electro-hydraulic Control Valve Position Limit (VPL) Monitoring;* 00-008, *Electro-hydraulic Control Valve Position Limit (VPL) Logic Low Nand Gate Jumper ;* and 00-010, *Enable Overhead Annunciator E48 Rod Bottom and E24 Rod Deviation or Sequence,* to verify that these TMODs did not affect the safety functions of important safety systems. The inspectors reviewed the associated 50.59 safety evaluations against system design basis documentation, including the Updated Final Safety Analysis Report and Technical Specifications, to verify that the TMODs did not affect system operability or availability.

b. Issues and Findings

There were no findings identified.

Cornerstone: Emergency Preparedness [EP]

1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies

a. Inspection Scope

The inspectors reviewed Temporary Standing Order 00-04 containing several emergency preparedness issues expectations, part of the corrective actions associated with recent emergency classification weaknesses (notification 20013662). The review assessed the adequacy of PSEG's corrective actions to correct previous weaknesses.

b. Issues and Findings

There were no findings identified.

4. OTHER ACTIVITIES [OA]

4OA1 Performance Indicator Verification

a. Inspection Scope

The inspectors reviewed the first quarter 2000 performance indicator (PI) data for Unit 2 Safety System Unavailability to verify its accuracy. The inspectors used NEI 99-02, Revision 0, *Regulatory Assessment Performance Indicator Guideline,* as guidance and interviewed the PSEG personnel responsible for compiling the information.

b. Issues and Findings

The inspectors found several minor errors in PSEG's calculation of safety system unavailability for the 22 and 23 auxiliary feed water pumps, the 21 charging pump, and the 2B emergency diesel generator. None of these errors would have caused the PIs to change from green to white for increased regulatory action; therefore the errors were considered a minor violation not subject to formal enforcement action. The inspectors also questioned the basis for system availability during various system surveillance tests. The errors and the inspectors' questions were documented in notification 20030342 for evaluation and resolution.

4OA3 Event Follow-up

a. Inspection Scope

The inspectors were present in the control room and observed the response to the Unit 1 manual reactor trip on April 12, 2000. Operators manually tripped the unit due to a rapidly decreasing main turbine generator electrical output, caused by a sudden 35% power reduction when the valve position limit (VPL) circuit of the electro-hydraulic control system malfunctioned. A noise signal of unknown origin in the VPL circuit had previously caused turbine generator load to intermittently drift downward. At the time of the trip, VPL trouble-shooting was in progress and a circuit card was being replaced in an attempt to eliminate this noise. PSEG determined that the apparent cause of the unexpected rapid load reduction was a momentary power decrease on the circuit card adjacent to the one being replaced, due to a slight bump by the technician performing the replacement. The inspectors determined that operator response to the load reduction was appropriate, consistent with the pre-determined contingency for this situation. The inspectors verified that all safety systems functioned as designed and the plant was stabilized in Mode 3 at normal operating temperature and pressure after the trip.

Further PSEG troubleshooting after the reactor trip identified a missing filter capacitor from the VPL circuit, which may have contributed to the intermittent main turbine load decreases. However, there was insufficient documentation to determine if the capacitor was ever installed or had been removed some time later. PSEG replaced this capacitor after the trip to restore the EHC system to the designed configuration. The installation of the capacitor may have precluded the need for EHC system troubleshooting (it may have prevented the noise signal), but the noise signal went away before that could be validated.

b. Issues and Findings

There were no findings identified. (The EHC system is not a safety-related system and therefore no violation of regulatory requirements existed due to the missing filter capacitor. The reactor trip is expected to be included in the second quarter 2000 PI data for unplanned scrams).

4OA5 Other

(Open/Closed) LER 272/00-002-00: *Salem Unit 1 Manual Reactor Trip Due to Unexpected Rapid Turbine Load Drop.* This event was documented in Section 4OA3. The LER provided no new information and was closed.

4OA6 Management Meetings

a. Exit Meeting Summary

On May 24, 2000, the inspectors presented their overall findings to members of PSEG management led by Dave Garchow, Vice President of Technical Support. 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

Opened/Closed

05000272/2000-002-00	LER	Salem Unit 1 reactor trip due to unexpected rapid turbine load drop. (Section 4OA5)

LIST OF ACRONYMS USED

ARPI	Analog Rod Position Indication
CCW	Component Cooling Water
DCP	Design Change Package
EDGs	Emergency Diesel Generators
EHC	Electro-hydraulic Control
NRC	Nuclear Regulatory Commission
OD	Operability Determination
OE	Operability Evaluation
PDR	Public Document Room
PERR	Public Electronic Reading Room
PI	Performance Indicator
PMT	Post Maintenance Testing
PSA	Probabilistic Safety Analysis
PSEG	Public Service Electric Gas
SW	Service Water
TMOD	Temporary Modification
TSAS	Technical Specification Action Statement
VPL	Valve Position Limit

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
● 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.

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