November 15, 1999

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

SUBJECT: NRC INSPECTION REPORT 50-272/99-08, 50-311/99-08

Dear Mr. Keiser:

On October 10, 1999, the NRC completed an inspection of your Salem 1 & 2 reactor facilities. The enclosed report presents the results of that inspection. Preliminary findings were presented to PSEG Nuclear management led by Mr. Mark Bezilla in an exit meeting on October 20, 1999.

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 selected reviews of procedures and representative records, observations of activities and interviews with personnel. Specifically, it involved six weeks of resident inspection and four discrete region-based inspections of site physical protection practices, occupational exposure radiation protection, radiological environmental monitoring and inservice inspection activities. Each inspection finding was assessed using the applicable Significance Determination Process (SDP); all findings were determined to be within the licensee response band (i.e. Green). However, one additional issue involving ineffective emergency classification guide implementation following a September 8, 1999 reactor coolant system leak event is also described in the report. We are still reviewing the circumstances associated with this performance issue in order to properly employ the emergency preparedness SDP and determine its significance.

With regard to performance indicators (PIs), the inspectors identified errors in the data submitted for the *Safety System Functional Failure* PI. In accordance with Appendix F of the NRC Enforcement Policy, discretion is being exercised pursuant to Section VII.B.6 because these errors in your submittal to the NRC were not willful and because not all of the aspects of the PI data submission process have been finalized. Further, the corrected PI data would not have resulted in a change in the outcome of the indicator (i.e. performance remained in the Green band).

Lastly, we identified three violations of NRC requirements in the areas of operational procedure compliance and Annual Radiological Environmental Operating Report content. These violations are being treated as non-cited violations (NCVs), consistent with the Interim Enforcement Policy for pilot plants, are described in the subject inspection report, and have been entered into your corrective action program. If you contest the violation or severity level of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC

20555-0001, with a copies to the Regional Administrator, Region I, and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

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

Sincerely,

Original Signed By:

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

Enclosure: Inspection Report 50-272/99-08, 50-311/99-08

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REGION I

Docket Nos:	50-272, 50-311
License Nos:	DPR-70, DPR-75
Report No:	50-272/99-08, 50-311/99-08
Licensee:	PSEG Nuclear LLC.
Facility:	Salem Nuclear Generating Station, Units 1 & 2
Location:	P.O. Box 236 Hancocks Bridge, NJ 08038
Dates:	August 30 - October 10, 1999
Inspectors:	Scott A. Morris, Senior Resident Inspector F. Jeff Laughlin, Resident Inspector Ho K. Nieh, Resident Inspector Joseph T. Furia, Senior Radiation Specialist Thomas A. Moslak, Radiation Specialist Laurie A. Peluso, Radiation Specialist Gregory C. Smith, Sr. Physical Security Specialist Paul R. Frechette, Physical Security Specialist Richard S. Barkely, Sr. Project Engineer Stephen T. Barr, Project Engineer E. Harold Gray, Senior Reactor Engineer
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 50-272 & 311/99-08

The report covers a six-week period of resident inspection using the guidance contained in NRC Inspection Manual Chapter 2515*. Additionally, it includes four announced baseline inspections conducted by region-based inspectors.

Inspection findings were assessed according to potential risk significance and were assigned colors of *green, white, yellow, or red.* This inspection resulted in only *Green* findings which were indicative of issues that, while not necessarily desirable, represented little risk to safety. *White* findings would have indicated issues with some increased risk to safety and which may have required additional NRC inspections. *Yellow* findings would have indicated more serious issues with higher potential risk to safety and would have required the NRC to take additional actions. *Red* findings would have represented an unacceptable loss of margin to safety and would have resulted in the NRC taking significant actions that could have included ordering the plant to shut down. The findings, considered in total with other inspection findings and performance indicators, will be used to determine overall plant performance.

Cornerstone: Initiating Events

- **!** Green. PSEG operators failed to properly implement the procedure for placing a mixed bed demineralizer in service which resulted in an inadvertent reduction in reactor coolant system boron concentration of approximately 75 ppm. The safety significance was very low based on the absence of adverse consequences during the event and the TS limit for shutdown boron concentration not having been exceeded. As such, this issue was characterized as a Non-Cited Violation of technical specification (TS) 6.8.1.a.

- **!** Green. Two examples of licensed reactor operators failing to properly implement surveillance test procedures resulted in the operation of (1) a switch in the wrong Unit 1 safeguards equipment cabinet, and (2) a charging system flow control valve on the wrong Salem unit. The safety significance of these examples was very low - in the first case the plant was shutdown and there were no consequences to the error; in the second case only one cornerstone was affected and (in the worst case) the error would have resulted in an uncomplicated reactor trip. As such, these issues were characterized as two examples of a Non-Cited Violation of technical specification (TS) 6.8.1.c.

Cornerstone: Public Radiation Exposure

- **!** Green. PSEG failed to provide complete information in their 1997 and 1998 Annual Radiological Environmental Operating Reports in that these documents did not describe plans to prevent recurrence of multiple environmental air sampler

outages. The safety significance was very low because it did not significantly compromise PSEG=s ability to assess the environmental impact of continued plant operation. As such, this issue was characterized as a Non-Cited Violation of TS 3.12.1

Performance Indicator Verification

- PSEG did not accurately report five issues described in 1998 and 1999 Licensee Event Reports (LERs) that should have been included in the *Safety System Functional Failure* performance indicator. However, neither the Unit 1 nor the Unit 2 indicator would have entered the White band even if PSEG had included these issues in the data.

- PSEG submitted accurate data for the *Fitness-for-Duty*, *Personnel Screening* and *Protected Area Security Equipment* performance indicators based on a verification of data submitted for the indicators reported through August 1999.

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Report Details

SUMMARY OF PLANT STATUS

Unit 1 began the period at 78% power in the midst of a power level coastdown due to end-of-life reactor core fuel depletion. On September 18, 1999, operators removed the unit from service to commence the 13th refueling outage. The unit remained in a shutdown condition for the balance of the inspection period.

Unit 2 began the period at 100% power and with one exception remained at full power for the entire inspection period. The exception occurred on September 24, 1999, when operators reduced power to 96% in an effort to mitigate an unexpected reactor coolant system pressure reduction when a pressurizer spray line valve failed to close.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather

a. Inspection Scope

The inspectors observed PSEG=s preparations for the predicted arrival of Hurricane Floyd which included implementation of the site Severe Weather Guide. Additionally, the inspectors remained on site during and after the storm in part to assess PSEG=s emergency preparedness and to evaluate the effectiveness of their storm preparations. (See also section 1R06 of this report)

b. Observations and Findings

There were no findings identified.

1R03 Emergent Work

a. Inspection Scope

The inspectors reviewed PSEG=s updated risk assessment for the preplanned work week of September 12, 1999, which included emergent work activities associated with the 15 service water pump and the 23 containment fan cooler unit. Additionally, the inspectors assessed the impact that an unexpected failure of the 2PS1 pressurizer spray control valve had on pre-planned work activities.

b. Observations and Findings

There were no findings identified.

1R04 Equipment Alignment

a. Inspection Scope

The inspectors performed partial walkdowns of the Unit 1 component cooling water and Unit 2 high head injection safety systems while their redundant trains were out of service for scheduled maintenance.

b. Observations and Findings

There were no findings identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors performed a detailed walkdown of the flood protection measures at Salem Units 1 & 2 and later checked the effectiveness of these measures during the heavy rains experienced on September 16, 1999, during Hurricane Floyd. They reviewed the portion of PSEG=s adverse weather procedure which addressed flood protection measures and interviewed PSEG=s hurricane response coordinator after Hurricane Floyd. Discussions were also held with design and system engineering staff and probabalistic risk assessment personnel regarding internal flooding vulnerabilities and associated means of mitigation including inaccessible underground bunkers and manways containing safety-related cabling potentially subject to submergence.

b. Observations and Findings

There were no findings identified; however, the inspectors made some observations as described below.

The inspectors identified two deficiencies during their review. First, the sump pump in one of the two Unit 1 bays of the service water (SW) intake structure was broken and no spare pump was available. PSEG installed a temporary sump pump with a discharge hose through the bay=s watertight access door. The inspectors noted that this temporary solution would have been rendered unavailable had rising river water levels caused by Hurricane Floyd forced operators to close the watertight door to satisfy technical specifications. The inspectors verified that PSEG was tracking this issue in their corrective action program.

The second issue involved the discovery of an inoperable flood level indicator in one of the watertight SW pipe chases in the lower elevation of the Unit 1 auxiliary building. The inspectors observed that a fire hose was lying on the float sensor and an equivalent level indicator in the adjacent SW pipe chase had a bent stem, but appeared to be functional. Once identified, an equipment operator promptly removed the hose obstructing the level

indicator and checked the other indicator (with the bent stem) for operability. PSEG management later stated that these indicators are checked on a periodic basis and as such the problems would have eventually been identified. The inspectors also noted that the flood level indicators were poorly marked and not well protected from damage.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the results of recent performance testing and inspections of the Unit 1 component cooling water heat exchangers. Design basis information and calculations were examined to determine if test procedures accurately incorporated the proper acceptance criteria. The inspectors discussed the heat exchanger performance monitoring methodology and results with cognizant system and design engineering personnel. Lastly, the inspectors reviewed the corrective maintenance backlog associated with these components to determine whether any current operability issues existed.

b. Observations and Findings

There were no findings identified.

1R08 Inservice Inspection

a. Inspection Scope

During the Unit 1 refueling outage, the inspectors observed a sample of in-progress inservice inspection (ISI) activities including visual examinations, dye penetrant tests, and ultrasonic tests on reactor coolant system pressure boundary piping. The inspectors also reviewed PSEG=s evaluation process for indications discovered through ISI testing. Radiographs and radiographic documentation from Unit 1 containment ventilation piping welds were examined, as were steam generator feedwater nozzle-to-piping repairs conducted during the Spring 1999 Unit 2 outage.

Unit 1 steam generator U-tube eddy current testing was reviewed including the planning, scope, and method employed, as well as portions of applicable test procedures and initial findings. The inspectors observed in-progress repairs of damaged feedwater heater shells identified by PSEG following a similar failure at another facility. Lastly, the inspectors reviewed PSEG activities associated with ISI problem identification and resolution, and evaluated the oversight of ISI program implementation by PSEG=s quality assurance department.

b. Observations and Findings

There were no findings identified.

1R09 Inservice Testing

a. Inspection Scope

The inspectors observed inservice testing of the 13 auxiliary feedwater pump on September 15, 1999, and the 22 residual heat removal pump on September 28, 1999 and compared the test results with the technical specification acceptance criteria to verify operability.

b. Observations and Findings

There were no findings identified.

1R10 Large Containment Valves

a. Inspection Scope

On September 13, 1999, the inspectors observed local leak rate testing of the four Unit 1 containment building purge system isolation valves (1VC1-4) to verify that leak rates remained within design basis allowable limits for containment integrity.

b. Observations and Findings

There were no findings identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed PSEG=s maintenance rule implementation following several equipment performance problems that surfaced during normal plant operation and testing. The proper use of system functional failure (SFF) codes and performance criteria were evaluated against PSEG=s maintenance rule program requirements, specifically those designed in procedure SE.MR.SA.02, A*Salem Generating Station System Function Level Maintenance Rule Scoping vs. Risk Reference*.@ The following is a partial list of issues reviewed:

$ inadvertent closure of 2CC131 reactor coolant pump thermal barrier isolation valve
$ 2PS1 pressurizer spray flow control valve failure to close
$ 1R41 failure and resulting containment isolation
$ Unit 1 fuel handling building ventilation low differential pressure
$ 2SJ49 cold leg injection valve failure to close from the control room
$ 1CAA40 damper found in closed position
$ Unit 1 reactor coolant system (RCS) instrument tubing leakage
$ #1 station air compressor trip and #3 compressor failure to start

$ Unit 1 auxiliary building ventilation low air flow

b. Observations and Findings

There were no findings identified, though the inspectors made observations regarding PSEG=s maintenance rule program implementation as described below.

The inspectors noted several instances of failures to properly code equipment problems as SFFs such that systems could be monitored against established criteria. Specifically, PSEG personnel did not classify the RCS tubing leaks, the fuel handling building ventilation low differential pressure condition, or the 2CC131, 2PS1 and 12SJ49 valve issues as SFFs until prompted by the inspectors. Additionally, the inspectors identified some instances in which there were no plans in the corrective action program (CAP) to perform a root cause assessment to determine whether the SFF was preventable, despite PSEG guidance that such assessments be done. In each of the cases reviewed the affected equipment had been entered into the CAP and repaired in a timely manner.

1R13 Maintenance Work Prioritization

a. Inspection Scope

The inspectors reviewed the September 14, 1999 on-line maintenance plan for the 13 auxiliary feedwater pump to evaluate PSEG=s prioritization, support and risk assessment for the work. The inspectors also observed the pump overspeed trip test, which was treated as an AInfrequently Performed Test or Evolution@ in accordance with PSEG=s work control process, and verified that the pump performed in accordance with the established acceptance criteria.

b. Observations and Findings

There were no findings identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed operability evaluation (OE) 99-012, AReactor Coolant System Relief Valves,@ which described a potential post-fire safe shutdown concern for the valves. This issue affected both Salem units. PSEG=s evaluation was compared with the UFSAR and other design and licensing basis information, and the OE compensatory measures were assessed. The inspectors verified that Salem control room operators were knowledgeable of the OE conditions and assumptions, and were prepared to implement the compensatory measures in the event of a fire.

b. Observations and Findings

There were no findings identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors observed post maintenance testing of the 2PS1 pressurizer spray valve to verify that the scope of the testing was sufficient to ensure component operability. This test was treated as an AInfrequently Performed Test or Evolution@ in accordance with PSEG=s work control process. PSEG management implemented the additional controls and oversight mandated by this process since Unit 2 was at 100% power and the test had the potential to affect reactor coolant system pressure control.

b. Observations and Findings

There were no findings identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

In preparation for Salem Unit 1 refueling outage 1R13, the inspectors reviewed PSEG=s outage work scope and plan and the associated risk assessment to determine whether potentially risk significant conditions had been scheduled. Pre-planned contingency measures were reviewed for cases where PSEG determined that there was a substantial reduction in defense-in-depth for the shutdown core cooling, water inventory, emergency electrical power, and reactivity control functions. During the outage the inspectors performed numerous verifications of shutdown core cooling flow paths, spent fuel pool cooling, offsite power availability, and containment integrity. Emergency makeup sources were also inspected and shutdown reactivity management was assessed. The inspectors observed new and spent fuel handling practices from the refueling platform and the fuel handling building, respectively.

The inspectors performed an in-depth review of equipment status control during scheduled and emergent work outage activities. Salem operators normally utilize the automated Tagging Request and Inquiry System to generate, process, and implement safety tagging; however, this system experienced multiple failures on September 16 and 17, 1999, and operators were required to use a manual tagging system to control equipment status through most of the refueling outage. The inspectors observed operator implementation of the manual tagging system at the Work Control Center and the Outage Control Center in order to verify: the proper maintenance of the equipment normal/of-normal position list; the handling of equipment manipulations for surveillance testing; the control of work scope changes; and the preparation for mode-change line-ups.

b. Observations and Findings

On September 23, 1999, PSEG operators placed a mixed bed demineralizer (MBD) in service which resulted in an inadvertent reduction in reactor coolant system (RCS) boron concentration of approximately 75 ppm boron. This event was not recognized until the following day, when chemistry technicians obtained a routine RCS sample and questioned why boron concentration had lowered from 2145 ppm to 2070 ppm. The technical specification (TS) limit is 2000 ppm and PSEG=s administrative limit is 2050 ppm. PSEG management determined that a licensed reactor operator (RO) had placed the 12 MBD in service as directed by his supervisor, but failed to verify that the boron concentration in the coolant contained within the isolated MBD vessel was within 10 ppm of the RCS concentration as stipulated by procedure S1.OP-SO.CVC-0012(Q) revision 6, A*CVCS Demineralizer - Normal Operation.*@ This procedure specifies that chemistry personnel be contacted prior to placing a demineralizer in service in part to limit the potential for causing reactivity transients.

The inspectors determined that the RO=s failure to follow the noted procedure was a violation of TS 6.8.1.a. Further, the inspectors evaluated the significance of this event and concluded that it was Green, i.e., very low safety significance, based on the absence of adverse consequences during this event and the TS limit for shutdown boron concentration not having been exceeded. As such, this violation is being treated as a non-cited violation, consistent with the Interim Enforcement Policy for Pilot Plants. PSEG entered this issue into their corrective action program as notification #20006427. **(NCV 50-272/99-08-01)**

1R22 Surveillance Testing

a. Inspection Scope

The inspectors followed up on two occurrences of surveillance test procedure implementation errors at Unit 1. The first instance involved the manipulation of a switch in the wrong safeguards equipment cabinet (SEC) and the second concerned the local operation of a valve at the wrong unit during a system performance test. Both errors were committed by licensed reactor operators (ROs).

b. Observations and Findings

Phase B Containment Isolation Test

On September 21, 1999, an RO was directed to perform procedure S1.OP-ST.SSP-0006, A*Engineered Safety Features Containment Isolation Phase B*.@ Step 5.2.7 requires the operator to unlock and open the 1C SEC cabinet door and manipulate various switches for the test. However, the RO mistakenly unlocked and opened the 1B SEC cabinet door and manipulated the analogous switches in that cabinet. Operators in the control room received indications that the 1B SEC cabinet had been opened prior to manipulation of the switches, but failed to recognize the error.

When the test did not produce the desired result, further investigation by a third operator revealed the error. The operators then terminated the test and restored the 1B SEC cabinet to its normal standby condition. Subsequent evaluation by maintenance personnel determined that the switches which were inappropriately manipulated did not perform any 1B SEC safety function, providing assurance that the error had no impact on SEC operability.

Hot Shutdown Panel Performance Test

On September 22, 1999, with Unit 1 in cold shutdown, an RO was directed to take local control of the Unit 1 charging system flow control valve (1CV55) and operate it in accordance with procedure S1.OP-PT.HSD-0002, A*Hot Shutdown Panel/Local Panel Functional Test*.@ However, the RO mistakenly went to the analogous Unit 2 flow control valve (2CV55) and took local control of it. Unit 2 was operating at 100% power at the time of this occurrence. The RO realized his error when Unit 1 control room operators informed him that they could still operate the 1CV55 from the control room. The RO then contacted the Unit 2 control room operators and restored the 2CV55 to automatic.

Unit 2 operators observed a small increase in pressurizer level after the RO took local control of the 2CV55 valve. Level returned to normal after the valve was returned to automatic operation. The inspectors noted that the RO who performed the test had attended a pre-evolution briefing and had the proper Unit 1 procedure in hand while at the 2CV55 control panel.

Significance Determination

The inspectors determined that both of these human errors involved violations of Technical Specification 6.8.1.c in that surveillance test procedures were not properly implemented, resulting in the operation of components either on the wrong train or the wrong unit. The inspectors concluded that both of these issues were of very low safety significance and were within the licensee response band (Green). In the first case the plant was shutdown and there were no consequences to the error; in the second case only one cornerstone was affected (Initiating Events) and in the worst case the error would have resulted in an uncomplicated reactor trip. PSEG initiated notification #20006183 to document both of these errors. As such, these violations are being treated as two examples of a non-cited violation, consistent with the Interim Enforcement Policy for pilot plants. **(NCV 50-272/99-08-02)**

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed a temporary modification made to the Unit 1 refueling platform in containment during the refueling outage. This modification involved the placement of numerous lead blankets weighing a total of approximately 4000 pounds on the platform to

provide a means of exposure reduction to workers during core alterations. PSEG controlled this modification using procedure SC.RP-TI.ZZ-0701(Q) revision 4, AUse and Control of Temporary Lead Shielding.@ The inspectors verified PSEG=s compliance with this procedure and reviewed the 10 CFR 50.59 Aapplicability review@ conducted by engineering personnel to justify the addition of the lead weight to the platform.

b. Observations and Findings

There were no findings identified.

Cornerstone: Emergency Preparedness [EP]

1EP1 Drill, Exercise, and Actual Events

a. Inspection Scope

The inspectors followed up on a September 8, 1999 event at Unit 1 in which reactor coolant was inadvertently discharged to a radioactive liquid waste hold up tank from the reactor coolant system (RCS) via the chemical and volume control system (CVCS). The inspectors focused on the control room operators= use of the Salem Emergency Classification Guide (ECG) following recognition of the event, specifically with regard to timeliness and accuracy of event classification. Corrective actions from previous similar events were also examined. Operations, emergency preparedness (EP), and quality assurance department personnel were interviewed, and procedures and logs were reviewed.

b. Observations and Findings

Salem control room operators properly responded to a September 8, 1999 reactor coolant leak event and promptly terminated the leak. However, the operators did not determine the appropriate emergency classification until well after the expected time. The event occurred while operators in the field were attempting to drain coolant from the 12 mixed resin bed demineralizer (MBD) in the CVCS, which had been isolated earlier in the day. Soon after the MBD drain valve was opened, control room operators observed the level in the CVCS volume control tank decrease from 28% to 17%. In addition, the plant ventilation exhaust radiation monitor channels indicated increasing levels and one channel (1R16) alarmed. Within three minutes, the field operators were directed to shut the demineralizer drain valve which terminated the leak and the inadvertent radioactive release.

In their post-event review, the inspectors noted that the control room operations superintendent (OS - a licensed senior reactor operator) had initially consulted the ECG, but focused on the section involving radioactive releases from the plant, without considering the emergency action level for RCS leaks. Operators determined that the leak

rate was approximately 80 gallons per minute (gpm) during the event, in excess of the 25 gpm leak rate requiring an Unusual Event declaration. Approximately 45 minutes after the event, the Salem operations manager recognized the OS=s error; the OS subsequently reported the Unusual Event condition in a 1-hour non-emergency 10 CFR 50.72 report to the NRC. The inspectors noted that the shift technical advisor also did not recognize the unusual event entry condition.

The failure to implement the ECG in a timely and accurate manner was an apparent violation of technical specification 6.8.1.e, which requires that emergency plan procedures be properly implemented. However, the inspectors had not completed their evaluation of the significance of this event by the end of the report period. The EP significance determination process for actual events involves a review of the specific event in question, and also an assessment of the effectiveness of corrective actions from previous similar events and from deficiencies identified during EP drills, exercises, and licensed operator training. The effectiveness of prior corrective actions for a slow event declaration on December 8, 1998, are uncertain given the poor event declaration in the September 8, 1999 event. Until this determination is completed, this issue will remain unresolved. **(URI 50-272/99-08-03)**

PSEG determined that the RCS leak event was caused by an equipment malfunction in that the 12 MBD outlet isolation valve was never actually shut. The valve is located behind a concrete wall and is operated Asight unseen@ by a reach rod. PSEG determined that the reach rod had become disconnected from the valve and the field operators did not know that it did not close. When the MBD drain valve was later opened, a flow path from the RCS via the CVCS through the demineralizer and out the drain was created causing the leak. Maintenance personnel promptly repaired the condition after its discovery.

2. RADIATION SAFETY

Cornerstone: Public Radiation Safety [PS]

2PS3 Radiological Environmental Monitoring

a. Inspection Scope

The inspectors reviewed the radiological environmental monitoring program (REMP), including the meteorological monitoring program (MMP), by examining technical specification (TS) and UFSAR requirements; associated procedures of the REMP and MMP; the 1997 and 1998 Annual Environmental Operating Reports; frequency and type of samples and analysis; annual land use census; interlaboratory comparison program; calibration and maintenance of REMP sampling equipment; and calibration and maintenance of meteorological instrumentation.

The inspectors also reviewed PSEG self-assessments, audits, equipment log books, and problem reports affecting environmental sampling, sample analysis, and meteorological monitoring instrumentation to determine whether identified problems or program deficiencies were entered into the corrective action program (CAP).

b. Observations and Findings

The inspectors identified that PSEG did not provide complete information in their recent Annual Radiological Environmental Operating Reports. Specifically, though PSEG appropriately reported REMP program deviations associated with multiple instances of out of service air samplers in the 1997 and 1998 reports, they failed to describe their plans to prevent recurrence of these problems, a violation of TS 3/4.12.1.

The inspectors determined that this issue had very low safety significance and was within the licensee response band (Green) using the Public Radiation Exposure significance determination process. This conclusion was based on the fact that this issue did not compromise PSEG=s ability to assess environmental impact because the other air samplers were in service at the time the outages noted above occurred, and because approximately 40 thermoluminescent dosimeters were positioned around the site to continuously monitor the environment. The inspectors noted that PSEG entered this issue into their corrective action program as notification #20004448. As such, this violation is being treated as a non-cited violation, consistent with the Interim Enforcement Policy for Pilot Plants. **(NCV 50-272&311/99-08-04)**

The inspectors also identified that an air sampler was inoperable for approximately seven days in March 1999 but had not been entered into the CAP. The inspectors further noted that this error had been overlooked during a recent quality assurance department audit. PSEG subsequently entered this observation into the CAP as notification #20004816.

Cornerstone: Occupation Radiation Safety [OS]

2OS1 Access Control to Radiologically Significant Areas

a. Inspection Scope

The inspectors reviewed PSEG=s access control program by examining the controls established for exposure significant areas including postings, markings, dosimetry, surveys and alarm set points. Areas selected were located in areas impacted by significant changes in primary coolant activity, especially in the containment building. Specifically, following the Unit 1 shutdown for refueling, an unanticipated elevation of dose rates due to soluble cobalt-58 in the reactor coolant system (RCS) necessitated significant changes in radiological postings at a number of locations.

On September 22, 1999, the inspectors observed the removal of a very highly radioactive (approximately 5000 rem/hour on contact) RCS particulate filter from the chemical and

volume control system. Radiation worker performance, ALARA controls and lessons learned from this evolution were assessed.

b. Observations and Findings

There were no findings identified.

2OS2 ALARA Planning and Controls

a. Inspection Scope

The inspectors reviewed work performance during the Unit 1 refueling outage. Selected jobs which appeared to exceed radiological exposure estimates were examined relative to: work integration; coordination between working groups; shielding and other engineering controls to minimize exposures; accuracy of person-hour and effective dose rate estimates; post-job reviews; and ALARA reports. The inspectors also examined in-process self-assessments that PSEG conducted of its ALARA performance.

1. Observations and Findings

There were no findings identified, however the inspectors made several observations as described below.

Due to significantly elevated dose rates caused by cobalt-58 in the reactor coolant, radiation exposures for the 1R13 refueling outage were approximately 100% above projections through the first two weeks of the outage. The inability to effectively filter and demineralize the primary coolant resulted in numerous area dose rates being orders of magnitude above expected values, and caused outage doses to exceed estimates for the reactor disassembly and defueling by approximately 25 person-rem.

Peak reactor coolant activity following the crud burst initiated upon shutdown measured 5.5 microcuries per milliliter. Initial filtration and demineralization was limited due to the rapid loading of the primary reactor coolant filter, and PSEG=s inability to replace this filter and continue coolant purification in a timely manner. Additionally, an initial failure to recognize that the primary radioisotopic contaminant was in a soluble form led to the flooding of the refueling cavity with inadequate short-term water purification systems available. Specifically, the use of underwater mechanical filters was unsuccessful in decontaminating the cavity water inventory. This resulted in dose rates at the water surface in the cavity to initially read 1000 millirem per hour, versus the expected value of less than 10 millirem per hour. Activity in the reactor cavity water was eventually reduced utilizing the demineralizers in the chemistry and volume control system, augmented by a secondary path established via the refueling canal to the spent fuel pool clean-up system.

In response to these significant changes in expected dose rates, PSEG re-evaluated its outage planning and ALARA reviews in support of work to be performed in areas where elevated dose rates were located. Additionally, the station ALARA Committee met and agreed on a revised outage exposure goal of 145 person-rem, up from the original goal of 100 person-rem. Additional temporary shielding packages were also installed in a number of high dose areas, some work was deferred to later in the outage, and still other work was deleted entirely from the outage plan.

3. SAFEGUARDS

Cornerstone: Physical Protection [PP]

3PP1 Site Access Authorization Program

a. Inspection Scope

The inspectors verified that PSEG properly implemented the behavior observation portion of their personnel screening and fitness-for-duty program. Representatives of PSEG management and escort personnel were interviewed concerning their understanding of their behavior observation responsibilities and ability to recognize aberrant behavior traits. Access authorization and fitness-for-duty self-assessments, event reports, audits and loggable events were also reviewed.

2. Observations and Findings

There were no findings were identified.

3PP2 Site Access Control

1. Inspection Scope

The inspectors verified that PSEG maintained effective access controls and security system equipment to detect and prevent the introduction of contraband (firearms, explosives, incendiary devices) into the protected area that could be used to commit radiological sabotage. Verification of the identification and authorization process is used to confirm that only those who have been properly screened are granted unescorted access to the protected and vital areas. Access control activities were observed, including observation of personnel processing through the search equipment during peak ingress periods and testing of all access control equipment. Access control event logs, audits and maintenance work requests were also reviewed.

2. Observations and Findings

There were no findings identified.

4. OTHER ACTIVITIES [OA]

4OA2 Performance Indicator Verification

.1 Mitigating Systems Cornerstone

a. Inspection Scope

The inspectors verified the accuracy and completeness of the data that PSEG used to calculate and report the *Safety System Functional Failure* (SSFF) performance indicator (PI). All 1998 and 1999 licensee event reports (LERs) issued for Salem 1 and 2 were reviewed to determine whether issues meeting the SSFF definition in NEI 99-02 Draft Revision B, *ARegulatory Assessment Performance Indicator Guideline,@* were included in the data set.

b. Observations and Findings

The inspectors determined that PSEG failed to include five issues in the SSFF PI data submitted through October 1999. As described below, three discrepancies concerned Unit 1 data and two affected the Unit 2 data.

Unit 1

LER 50-272/98-09: This LER describes degraded containment building hydrogen analyzers that should have been counted under the accident monitoring function since the potential existed for these analyzers not being able to perform their safety function. PSEG did not include this LER because they believed that they could take credit for this function by using the post-accident sampling system. However, the PI guidance allows credit for only for redundant trains of the same system (i.e diverse systems are not to be credited).

LER 50-272/98-12: This LER describes a condition in which the 13 containment fan cooler unit service water over-pressure protection was isolated, resulting in a potential failure of the piping and therefore the

containment integrity function. PSEG evaluated this condition only under the containment cooling function.

LER 50-272/99-08: This LER describes an inadequate cable separation condition in which the potential existed to lose both trains of the safety-related service water system following a hot short. The PI guidance states that Aevents involving cable separation problems...are counted if the problem disables, or has the potential to disable, an entire safety system...@

Unit 2

LER 50-311/99-02: This LER describes a station air system containment penetration leak rate test failure. PSEG did not include this LER because they believed that this issue was not a condition alone that could have resulted in a release in excess of 10 CFR 100 or 10 CFR 50 Appendix A (GDC 19) limits. Specifically, PSEG argued that another single failure would have to be assumed in the station air system (e.g., a piping failure or valve left open inside containment) in order to meet the SSFF definition. However, the inspectors noted that the PI guidance states that Aa single failure does not have to be considered in the absence of an identified potential failure mechanism.@

LER 50-311/99-08: This LER describes an inadequate cable separation condition in which the potential existed to lose both trains of the safety-related service water system following a hot short. The PI guidance states that Aevents involving cable separation problems...are counted if the problem disables, or has the potential to disable, an entire safety system...@

Summary:

The inspectors determined that neither the Unit 1 or Unit 2 SSFF PIs would have entered the White band even if PSEG had included the above noted LERs in the data set. However, this issue will remain unresolved pending the inspectors= review of PSEG=s next PI data submittal in November 1999 to ensure that the submitted data is updated. **(URI 50-272 & 311/99-08-05)**.

.2 Physical Protection Cornerstone

The inspectors reviewed the data PSEG submitted for the *Fitness-for-Duty, Personnel Screening* and *Protected Area Security Equipment* PIs to determine its accuracy and completeness.

b. Observations and Findings

There were no findings identified.

The inspectors determined that PSEG=s submittal of historical data for the *Protected Area Security Equipment* PI was based on a best effort to reconstruct information from systems that did not capture it in the format currently being used. The inspectors noted that PSEG used some very conservative assumptions during this data reconstruction effort. As such PSEG was considering recalculating the PI data using more realistic assumptions and resubmitting it. The use of the conservative assumptions resulted in several quarters of data being in the White performance band that may be in the Green band, upon recalculation.

4OA4 Other

.1 (Closed) VIO 50-272&311/EA 99-055: Discrimination against an employee for engaging in protected activities. This violation was issued on July 28, 1999, following a Department of Labor decision on March 4, 1999, and a June 24, 1999, transcribed enforcement conference with the NRC in this matter. PSEG=s response to this violation, dated August 28, 1999, was reviewed and found acceptable. The corrective actions taken in the matter were appropriate to the circumstance.

.2 Year 2000 (Y2K) Readiness: The inspectors verified (by reviewing work orders) that Y2K readiness program activities were completed for the systems described in PSEG=s response to NRC Generic Letter 98-01. These systems included the Safety Parameter Display System, the Emergency Response Data System, the control room simulator, the Unit 2 Radiation Monitoring System, and the Unit 1 Advanced Digital Feedwater Control System, P-250 Plant Computer, and Overhead Annunciator System.

4OA5 Management Meetings

.1 Exit Meeting Summary

On October 20, 1999, the inspectors presented their overall findings to members of PSEG Nuclear management led by Mark Bezilla. The PSEG managers 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

Open/Closed

50-272/99-08-01	NCV	Failure to follow procedure for placing a mixed bed demineralizer in service resulting in inadvertent positive reactivity addition. (Section 1R20)
50-272/99-08-02	NCV	Two examples of failures to follow surveillance test procedures resulting in wrong channel or wrong unit equipment operation. (Section 1R22)
50-272&311/99-08-04	NCV	Failure to report actions to prevent recurrence of failures to properly implement elements of the radiological environmental monitoring program. (Section 2PS3)

Opened

50-272/99-08-03	URI	Timeliness and accuracy of Emergency Classification Guide implementation. (Section 1EP1)
50-272&311/99-08-05	URI	Inaccurate submittal of *Safety System Functional Failure* performance indicator data. (Section 4OA2.1)

Closed

50-272&311/EA 99-055	VIO	Discrimination against nuclear mechanical technician. (Section 4OA4)

LIST OF ACRONYMS USED

ALARA	As Low As Is Reasonably Achievable
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CVCS	Chemical and Volume Control System
ECG	Emergency Classification Guide
EP	Emergency Preparedness
GDC	General Design Criteria
gpm	Gallons Per Minute
ISI	Inservice Inspection
LER	Licensee Event Report
MBD	Mixed Resin Bed Demineralizer
MMP	Meteorological Monitoring Program
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OE	Operability Evaluation
OS	Operations Superintendent
PI	Performance Indicator
PSEG	Public Service Enterprise Group - Nuclear LLC
QA	Quality Assurance
RCS	Reactor Coolant System
REMP	Radiological Environmental Monitoring Program
RO	Reactor Operator
SDP	Significance Determination Process
SEC	Safeguards Equipment Cabinet
SFF	System Functional Failure
SSFF	Safety System Functional Failure
SW	Service Water
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
Y2K	Year 2000