

December 28, 1999

EA 99-306

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

SUBJECT: NRC INSPECTION REPORT 05000272/99009, 05000311/99009;  
WHITE FINDING

Dear Mr. Keiser:

On November 28, 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 December 8, 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 seven weeks of resident inspection and four region-based inspections of radioactive effluent controls, radioactive waste treatment, emergency preparedness, and license condition change practices.

One inspection finding was identified and assessed using the applicable Significance Determination Process (SDP) and was preliminarily determined to be White, i.e., an issue with some increased importance to safety, which may require additional NRC inspections. This White finding involved ineffective corrective actions in the emergency preparedness area, which permitted the untimely declaration of a September 8, 1999 event at Salem Unit 1 to recur following an untimely declaration of an December 8, 1998 event at Salem Unit 2. When using the SDP we determined the finding to be White based on determining that a problem identification and resolution (PIDR) problem existed, that there was a failure to resolve the problem (based on its recurrence), and that an emergency preparedness planning standard (10 CFR 50.47(b)(14)) was involved. The determination is further described in the inspection report in Section 1EP1.1.

In addition, we have identified an apparent violation associated with the White finding regarding requirements that identified emergency preparedness deficiencies be corrected. This apparent violation is also addressed in the inspection report in Section 1EP1.1.

Although we believe that we have sufficient information to make our final significance determination, we are giving you the opportunity to send us your position on the finding's significance and the bases for your position in writing. Also, please inform us if you would like

Mr. Howard W. Keiser

2

to schedule a regulatory conference to discuss your evaluation and any differences with the NRC evaluation. Accordingly, no enforcement is presently being issued for this inspection finding. Please contact Glenn Meyer at 610-337-5211 within 10 days of the date of this letter to inform the NRC of your intentions. If we have not heard from you in writing or regarding a conference within 14 days, we will continue with our significance determination and enforcement decision. You will be advised by separate correspondence of the results of our deliberations on this matter.

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,

ORIGINAL SIGNED BY:

A. Randolph Blough, Director  
Division of Reactor Projects

Docket Nos. 05000272; 05000311  
License Nos. DPR-70; DPR-75

Enclosure: Inspection Report 05000272/99009, 05000311/99009;

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos: 05000272, 05000311  
License Nos: DPR-70, DPR-75

Report No: 05000272/99009, 05000311/99009;

Licensee: PSEG Nuclear LLC

Facility: Salem Nuclear Generating Station, Units 1 & 2

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

Dates: October 11 - November 28, 1999

Inspectors: Scott A. Morris, Senior Resident Inspector  
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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 05000272/99009, 05000311/99009;

The report covers a seven-week period of resident inspection and four announced region-based inspections using the guidance contained in NRC Inspection Manual Chapter 2515\*. The significance of identified issues is indicated by their color (green, white, yellow, red) and was determined using the Significance Determination Process (SDP) in draft Inspection Manual Chapter 0609.

### **Cornerstone: Emergency Preparedness**

- White. The inspectors identified a problem regarding corrective actions for emergency classifications, based on an untimely emergency declaration for a Unit 2 event in December 1998 which recurred during a Unit 1 event in September 1999. Using the SDP, the finding was determined to be White with low to moderate safety significance, in that a problem identification and resolution (PIDR) problem existed, that there was a failure to resolve the problem (based on its recurrence), and that an emergency preparedness planning standard (10 CFR 50.47(b)(14)) was involved. In addition, the inspectors noted related observations regarding ineffective PSEG efforts to address the problem. (Section 1EP1.1)

### **Performance Indicator Verification**

- PSEG did not accurately report data needed to support two Salem Unit 2 performance indicators (PI). Specifically, an October 1997 reactor trip was not included in the *Scrams with Loss of Normal Heat Removal* PI, and third and fourth quarter 1998 *Unplanned Transient* PI data were reversed. Neither of these errors affected the outcome of the PI with respect to its threshold, and the PIs remained Green. (Section 4OA2.1)

### **Identification and Resolution of Problems**

- PSEG had not completed initial root cause evaluations in a timely manner for several previously identified conditions adverse to quality. (Section 4OA1.1)

## TABLE OF CONTENTS

1.	REACTOR SAFETY .....	1
	1R02 Changes to License Conditions .....	1
	1R04 Equipment Alignment .....	2
	1R10 Large Containment Valves .....	2
	1R11 Licensed Operator Requalification .....	3
	1R12 Maintenance Rule Implementation .....	3
	.1 Routine Reviews .....	3
	.2 12SJ49 Failure to Close .....	4
	1R14 Nonroutine Plant Evolutions .....	4
	1R15 Operability Evaluations .....	4
	1R19 Post Maintenance Testing .....	5
	1R20 Refueling and Outage .....	5
	.1 Containment Walkdown .....	5
	.2 Reactor Coolant System (RCS) Reduced Inventory Operations .....	6
	1R22 Surveillance Testing .....	7
	.1 Routine Surveillance Observations .....	7
	.2 2SJ12&13 Seat Leakage Test .....	7
	.3 (Closed) LER 05000311/99007-00: .....	8
	1EP1 Drills, Exercises, and Actual Events .....	8
	.1 Event Classifications During Actual Events .....	8
	1EP2 Alert and Notification System Testing .....	12
	1EP3 Emergency Response Organization (ERO) Augmentation .....	12
	1EP4 Emergency Action Level Revisions .....	12
	2PS1 Gaseous and Liquid Effluent .....	13
	2OS2 ALARA Planning and Controls .....	13
3.	SAFEGUARDS .....	14
	1R02 Change to License Conditions .....	14
	.1 Revision to PSEG Site Security Plan .....	14
4.	OTHER ACTIVITIES .....	14
	4OA1 Identification and Resolution of Problems .....	14
	4OA2 Performance Indicator (PI) Verification .....	15
	.1 Initiating Events Cornerstone .....	15
	.2 Emergency Preparedness Cornerstone .....	16
	.3 Occupational Radiation Safety Cornerstone .....	16
	.4 Public Radiation Safety Cornerstone .....	17
	4OA3 Event Follow-up .....	17
	.1 (Closed) LER 05000272/98004 .....	17
	.2 (Closed) LER 05000272/99006 .....	17
	.3 (Closed) LER 05000272/99007 .....	17
	.4 (Closed) LER 05000272/99008 .....	17
	.5 (Closed) LER 05000272/99010 .....	17

4OA4 Other .....	17
.1 (Closed) IFI 05000272/98008-12 .....	17
.2 (Closed) URI 05000272&311/99008-05 .....	17
4OA5 Management Meetings .....	18
.1 Exit Meeting Summary .....	18
.2 PSEG Nuclear/NRC Management Meeting .....	18
ITEMS OPENED AND CLOSED .....	19
LIST OF ACRONYMS USED .....	20
ATTACHMENT 1 .....	21
NRC's REVISED REACTOR OVERSIGHT PROCESS .....	21

## Report Details

### **SUMMARY OF PLANT STATUS**

Unit 1 began the period in a shutdown condition for the thirteenth refueling outage. On October 26, 1999, operators completed a restart of the unit and synchronized it to the offsite electrical power grid. On November 3, 1999, operators reduced power to 81% in response to an unplanned reduction in cooling water flow to the main condenser. Once this problem was corrected, operators returned the unit to 100% power where it remained for the balance of the report period.

Unit 2 began the period at 100% power, and remained there until November 13, 1999, when operators reduced power to 47% in order to remove a steam generator feed pump from service for planned maintenance. Operators resumed 100% power operation on November 14, 1999, where remained for the rest of the report period.

### **1. REACTOR SAFETY**

#### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

##### **1R02 Changes to License Conditions**

##### **a. Inspection Scope**

The inspectors reviewed 11 safety evaluations from the last two years to determine if the associated changes to the facility or procedures resulted in more than a minimal increase in risk without prior NRC approval. The safety evaluations were associated with either the mitigating systems or barrier integrity cornerstones. The inspectors also reviewed several 10CFR50.59 applicability reviews and operability determinations to assess whether safety evaluations should have been performed but were not. Finally, the inspectors reviewed a sample of problems identified by PSEG in their corrective action program to verify the effectiveness of corrective actions.

The following safety evaluations were reviewed:

#### **Mitigating Systems:**

- |                      |  |
|----------------------|--|
| S97-308              | Update to Emergency Operating Procedure EOP-LOCA-3 and UFSAR;<br>Revised Refueling Water Storage Tank Draindown; |
| S97-312              | Rerouting of Non-Reactor Coolant System Leakage to Containment<br>Sump Instead of the Pressurizer Relief Tank;   |
| S99-048 &<br>S99-055 | Alternate Power Sources for Refueling Outages;   |
| S99-053              | Freeze Seal for Replacement of Valve 12AF101;  |

#### **Barrier Integrity:**



- S97-297 Service Water System Containment Fan Coil Unit Thermal Overpressure Protection;
- S98-037 Replacement of Pressurizer Safety Valves 2PR3, 4, and 5;
- S98-069 Temporary Leak Repair of Pressure Seal Valve 12BF22;
- S99-001 Minimum Number of Operating Containment Fan Coil Units;
- S99-030 Removal of Service Water Valves 11SW65 and 11SW72 and the Installation of Blind Flanges; and
- S99-043 Removal of Service Water Valves and the Installation of Blind Flanges.

b. Observations and Findings

There were no findings identified.

1R04 Equipment Alignment

a. Inspection Scope

The inspectors performed partial walkdowns of several safety system trains during planned outages of the redundant trains. The inspectors also conducted an in-depth walkdown of the 2A and 2B emergency diesel generators (EDGs) during a planned 2C EDG maintenance outage to verify the continued operability of these redundant trains.

b. Observations and Findings

There were no findings identified, but the inspectors had the following observations.

Regarding the EDG walkdowns, the inspectors noted several minor issues such as scaffolding from previous maintenance which should have been dismantled, unsecured ladders near safety equipment, and housekeeping issues. These discrepancies were quickly corrected or were entered into PSEG's corrective action program.

1R10 Large Containment Valves

a. Inspection Scope

During the Salem Unit 1 refueling outage, the inspectors witnessed as-found leak rate tests of the 100' containment building airlock (10 CFR 50 Appendix J Type B test) and the 1VC3 and 1VC4 atmospheric purge exhaust isolation valves (Type C test). The data collected from each of these tests indicated that the leakage past these large containment penetrations exceeded the criteria established in the governing test procedures. The inspectors questioned cognizant PSEG engineering personnel regarding the impact of these test failures on overall containment leakage and observed the retests following the repairs of the leaks.

b. Observations and Findings

There were no findings identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed a simulator training session for one operating crew to assess operator performance and training effectiveness, and to identify any deficiencies or discrepancies in training.

b. Observations and Findings

There were no findings identified.

1R12 Maintenance Rule Implementation

.1 Routine Reviews

a. Inspection Scope

The inspectors reviewed PSEG's maintenance rule (Mrule) implementation for several equipment performance problems, including:

- Fuel Handling Building Ventilation System low differential pressure
- 11 Auxiliary Feedwater (AFW) pump failure to start
- 13 AFW pump steam supply check valve (11MS46) inservice test failure
- Multiple Service Air/Control Air compressor trips
- 21 Chiller service water (SW) recirculating pump automatic start failure
- 22SW102 control valve failure
- 2R41 plant ventilation exhaust radiation monitor failures

PSEG's implementation of the Mrule following the above noted problems was evaluated against PSEG system engineering procedure SE.MR.SA.02, "*Salem Generating Station System Function Level Maintenance Rule Scoping vs. Risk Reference.*"

b. Observations and Findings

There were no findings identified.

.2 12SJ49 Failure to Close

a. Inspection Scope

On October 1, 1999, the 12SJ49 valve failed to stroke closed when operators attempted to reposition it to support a tagging evolution. This valve is one of two emergency core cooling cold leg safety injection valves. The Salem emergency operating procedures (EOPs) specify that one of these valves be closed when transitioning from the injection to recirculation phase of safety injection following a postulated loss of coolant accident (LOCA). PSEG made a 10 CFR 50.72 non-emergency report to the NRC concerning this issue once it was revealed. (Operators later withdrew this report because the 11SJ49 valve would have provided the necessary post-LOCA function and the NUREG-1022 NRC reporting guidance does not specify that a random single failure be considered when determining reportability.)

b. Observations and Findings

There were no findings identified, but the inspectors had the following observation.

Operations department personnel concluded that the 12SJ49 valve failure was not a system functional failure for Mrule monitoring purposes. However, the inspectors questioned this conclusion and referred their concerns to the cognizant system engineer. Following the engineer's review, PSEG appropriately classified the valve failure as a maintenance preventable system functional failure.

1R14 Nonroutine Plant Evolutions

a. Inspection Scope

The inspectors reviewed the circumstances associated with an unplanned manual trip of Salem Unit 1 on October 24, 1999 during low power physics testing. Additionally, the inspectors observed the Salem Unit 1 operators respond to an unplanned loss of two circulating water pumps from an initial reactor power level of 97%.

b. Observations and Conclusions

There were no findings identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors performed a detailed review of Salem operability evaluation (OE) #99-013 dated November 19, 1999. PSEG operators and engineering staff prepared this OE to justify the continued operability of the 21 safety-related chiller unit following a failure of the automatic service water temperature controller and associated chiller condenser recirculation pump. The system design basis information contained in the UFSAR and technical specifications was reviewed while conducting this evaluation.

Additionally, the inspectors verified that the compensatory measures established by this OE were appropriate and were being properly controlled and implemented.

The inspectors also conducted frequent reviews of control room narrative logs and new entries into PSEG's corrective action system to ensure that any identified degraded conditions were properly reviewed and assessed for operability.

b. Observations and Findings

There were no findings identified.

1R19 Post Maintenance Testing

a. Inspection Scope

Following a planned maintenance outage of the 12 auxiliary feedwater (AFW) subsystem, the inspectors reviewed PSEG's post maintenance testing to verify that the scope of the testing was sufficient to ensure the satisfactory function and operability of all AFW components affected by the on-line work. The inspectors also reviewed the pump test run data and compared it to established acceptance criteria to ensure that the pump operated within required limits.

b. Observations and Findings

There were no findings identified.

1R20 Refueling and Outage

.1 Containment Walkdown

a. Inspection Scope

The inspectors walked down the Unit 1 containment building just prior to reactor startup following the thirteenth refueling outage. The inspectors performed this review to verify that no debris was left in the building which could affect the performance of the containment sump following a postulated design basis loss of coolant accident, and to ensure that equipment material conditions were adequate to support final containment closure.

b. Observations and Findings

There were no findings identified.

## .2 Reactor Coolant System (RCS) Reduced Inventory Operations

### a. Inspection Scope

The inspectors witnessed Unit 1 reduced inventory (mid-loop) operations to ensure that operators controlled the evolution safely and to determine if PSEG's commitments in response to NRC Generic Letter (GL) 88-17, "*Loss of Decay Heat Removal*," were satisfied. PSEG committed to employing two independent level transmitters with indication in the control room during the conduct of mid-loop operations. Additionally, a clear tygon tube was to be provided as a back-up indication to the noted level indicators.

The inspectors also attended the pre-evolution briefing for the subsequent vacuum refill of the RCS, and observed portions of the evolution to assess the effectiveness of PSEG's controls over this infrequently performed and potentially risk-significant evolution.

### b. Observations and Findings

There were no findings identified, but the inspectors had the following observations.

The inspectors noted that during the vacuum refill evolution, both installed mid-loop level transmitters failed low, leaving only the tygon tube as an indication for RCS level. The inspectors noted that PSEG maintained an operator at the tygon tube throughout the RCS refill who was in constant communication with the control room. Even though the control room level indicators failed, the level in the tygon tube remained at or above the expected range. PSEG personnel indicated that the failure of the installed level indicators was a repeat issue caused by vacuum-induced perturbations of the level transmitter bellows.

The inspectors questioned the on-shift control room Operations Superintendent (OS) as to how the GL commitments were met once both level transmitters failed. The OS stated that step 5.1.3 of procedure S1.OP-SO.RC-0002(Q), "*Vacuum Refill of the RCS*," specifies that level be maintained in the band of 97.3 to 97.5 feet by the lowest indication on the two narrow range level transmitters or the tygon tube. He also stated that there were other indications of RCS inventory loss, such as the RCS letdown system volume control tank level and containment sump levels. Further, the OS stated that he believed that there was less potential risk by proceeding with the vacuum refill (without the control room RCS level indications) than if the evolution was periodically stopped to vent the level transmitters, since the exposure time to mid-loop conditions would be reduced.

The inspectors concluded that there were no safety consequences associated with the temporary loss of the two mid-loop level transmitters since the tygon tube provided an accurate and continuous RCS level indication. However, the inspectors expressed concern to PSEG management that their GL 88-08 commitments may not have been met in this situation. PSEG entered this issue into its corrective action program as notification #20009769.

## 1R22 Surveillance Testing

.1 Routine Surveillance Observations

a. Inspection Scope

The inspectors observed routine testing of several safety-related systems, including:

- Emergency Diesel Generators
- Emergency Control Air Compressor
- Axial Flux Differential instrument
- Station Service Water pumps

Activities observed included pre-evolution briefings, pre-test checks by equipment operators and system engineers, and actual system operation.

b. Observations and Findings

There were no findings identified.

.2 2SJ12&13 Seat Leakage Test

a. Inspection Scope

PSEG committed to performing a performance test at both units for seat leakage past the SJ12 and SJ13 valves in response to NRC Bulletin 88-08, "*Thermal Stresses in Piping Connected to Reactor Coolant Systems.*" The test is designed to ensure that any seat leakage associated with these high head safety injection valves is below a level that could cause thermally-induced fatigue failures of downstream piping welds. Failures of these welds would result in an unisolable reactor coolant system leak. PSEG committed to conducting these tests at the conclusion of refueling outages and every 92 days thereafter.

b. Observations and Findings

There were no findings identified, but the inspectors had the following observations.

The inspectors determined that PSEG had not performed the leakage tests at either Salem unit in accordance with their established commitments. Specifically, as of the end of the report period, the test had not been completed at Unit 2 though it went overdue on October 23, 1999. Additionally, the test was not completed at Unit 1 prior to restarting the unit following refueling outage 1R13. The inspectors noted that PSEG did not enter either issue into their corrective action program until prompted by the inspectors. This concern was initially documented as an issue of minor significance (i.e. Level 3 which does not require a cause determination) but was later upgraded to a Level 2 based on further questioning. The inspectors noted that PSEG guidance on the notification process listed missed NRC commitments as an example of a Level 1 notification including a full root cause assessment and corrective actions to prevent recurrence.

- .3 (Closed) LER 05000311/99007-00: missed surveillance for quadrant power tilt ratio (QPTR). On June 1, 1999, Salem Unit 2 operators declared the upper and lower QPTR monitors inoperable during power ascension (above 50% power) operations following refueling outage 2R10. Technical Specification (TS) surveillance requirement 4.2.4.1.b requires that the QPTR be calculated every 12 hours when the installed monitors are inoperable to ensure that it remains within limits. Operators on the relieving shift failed to complete the surveillance requirement within the 12-hour interval. When the calculation was subsequently performed, operators determined that the QPTR was still within TS limits. The duration between calculations was 15.75 hours, 3.75 hours beyond the required interval. The inspectors concluded that the cause of this event was human error, that there were no safety consequences, and that corrective actions appeared adequate. Therefore this failure to comply with TS 4.2.4.1.b is considered a minor violation which is not subject to formal enforcement action.

### **Cornerstone: Emergency Preparedness [EP]**

#### 1EP1 Drills, Exercises, and Actual Events

##### .1 Event Classifications During Actual Events

##### (Closed) URI 05000272/99-08-03: Timeliness and Accuracy of Emergency Classification Guide Implementation

###### a. Inspection Scope

The inspectors reviewed PSEG's response and corrective actions following actual events that had occurred at Salem and Hope Creek since December 1998 (see below). Corrective action program documents and self-assessments were examined, and discussions were held with key members of PSEG's operations and emergency response departments.

The inspectors noted that the following four Salem events occurred from December 1998 to September 1999. (None of these events had any consequence to the general public.)

- |                  |  |
|------------------|--|
| December 8, 1998 | During startup activities Salem Unit 2 inadvertently operated at the low pressure relief setting, which caused reactor coolant to be discharged to a relief tank and pressurizer level to decrease for over four minutes. Operators declared an Unusual Event in an untimely manner; it was later determined that the coolant discharge rate had actually met an Alert (emergency action level) EAL. |
| February 3, 1999 | The Salem Unit 2 overhead annunciator system was inadvertently incapacitated for three hours. Operators quickly recognized the condition and made a timely and accurate Unusual Event declaration.   |

- August 12, 1999 Operators inadvertently drained a Salem Unit 2 spent resin storage tank that released radioactive waste gas into the auxiliary building. No EAL was exceeded, however emergency procedures were not followed in that the applicable abnormal operation procedure was not entered until 45 minutes after the release began and this delayed the required dose assessment by about 1 ½ hours.
- September 8, 1999 An inadvertent 80 gpm reactor coolant discharge into radwaste occurred for 2.5 minutes when operators attempted to drain a mixed bed demineralizer at Salem Unit 1. The event classification was not timely as PSEG determined 40 minutes later that the reactor coolant leakage EAL had been exceeded and an Unusual Event should have been declared.

On September 29, 1999 Hope Creek had an uncontrolled Freon leak into a safety-related chiller room. An EAL was exceeded and operators declared an Unusual Event in a timely manner.

Records from five emergency preparedness (EP) exercises at Salem and Hope Creek since September 1998 were also reviewed to evaluate timeliness and accuracy of event declarations.

b. Observations and Findings

Based on the recurrence during Salem events, the inspectors concluded that there was an uncorrected problem associated with the timeliness of emergency event declarations. Specifically, on December 8, 1998, Salem Unit 2 had an event that was declared as an Unusual Event but in an untimely manner. This late declaration was cited in a violation issued by NRC on February 12, 1999. The problems that led to this untimely declaration were not corrected, in that on September 8, 1999, at Salem Unit 1 reactor coolant was inadvertently discharged into radwaste systems at a rate that met the reactor coolant leakage EAL for an Usual Event, but no Usual Event was declared. (NRC was later notified that PSEG determined this error 40 minutes after the event.)

In accordance with Sheet 4 ("PIDR Problem") of the NRC Significance Determination Process for Emergency Preparedness Inspector Findings, this issue represented a White finding, which has low to moderate safety significance. Specifically, the inspectors determined that a problem identification and resolution (PIDR) concern existed based on the occurrence of two Salem events within ten months that were not properly classified, that there was failure to resolve the problem based on the recurrence of an improperly classified emergency event at Salem on September 8, 1999, and that a planning standard (PS) (10 CFR 50.47(b)(14) regarding the correction of identified deficiencies) was involved.

Further, the inspectors determined that this issue also represented an apparent violation of regulations that emergency preparedness deficiencies be identified and corrected, as described in 10 CFR 50.47(b)(14) and 10CFR 50, Appendix E, IV.F.2.g. **(AV**



**05000272/99009-01; 05000311/99009-01)** As the final determination of risk significance has not been made, possible enforcement actions have not been determined.

Based on review of Hope Creek events and exercises, the inspectors concluded that although similar problems may exist at Hope Creek based on an incorrectly classified General Emergency during an emergency preparedness exercise on June 16, 1999, there was no evidence of an uncorrected problem as PSEG properly and promptly classified an Unusual Event at Hope Creek on September 29 1999. Nonetheless, based on the common emergency preparedness program between Salem and Hope Creek, the corrective actions determined by PSEG should be evaluated for application at Hope Creek.

In addition, the inspectors made the following observations regarding ineffective PSEG efforts to address the problem. In accordance with PSEG corrective action program procedures, an initial evaluation of each event (apparent cause analysis) should have been performed within 30 days of identifying an issue. At the time of this inspection, the inspectors could not determine the adequacy of these root cause analyses because, with the exception of the December 1998 event, the reports were still being completed. Following the four Salem events, the EP staff implemented corrective actions based on what they understood about the events. However, these actions were focused on immediate correction of the specific items for the associated event. The inspectors determined these EP-specific corrective actions were appropriate.

Additionally, the root cause analysis report addressing the December 1998 event appeared to be narrowly focused on the human error associated with the event classification. Further, the root cause analysis team did not include an EP specialist to provide an independent review of the EP actions taken during the event. The report did not include a review of other potential contributing factors (e.g. difficulties using the emergency classification guides).

The inspectors also noted that a General Emergency classification was missed during the June 1999 Hope Creek exercise. Further, in four other exercises, PSEG identified procedure implementation problems associated with using the emergency classification guide and "second guessing" the accuracy of emergency declarations.

Lastly, the inspectors determined that PSEG's self-assessment program did not adequately identify the problems associated with the timeliness or accuracy of making emergency classifications during actual events and/or exercises. Although a self-assessment was initiated, it was narrowly focused and did not include a comprehensive collection of data over a long period of time.

## .2 Exercise Conclusions

### a. Inspection Scope

The inspectors reviewed emergency preparedness (EP) drill and exercise reports and critique forms to determine if PSEG personnel accurately identified and captured issues

in their corrective action program (CAP). Also, a review was conducted of PSEG corrective actions related to four Salem events and one Hope Creek event that have occurred since December 1998 (see above for details).

b. Observations and Findings

There were no findings identified, but the inspectors had the following observations.

The inspectors noted disparities regarding how EP problems were characterized at various levels with PSEG. For example, the corrective action system contained exercise findings and areas of improvements from the past two years. The inspectors found the deficiency list to be comprehensive and the player critique forms to be self-critical. The EP department staff gathered exercise comments and documented the findings in a comprehensive exercise report for internal (EP staff) review.

However, these PSEG findings were characterized differently in separate reports to senior management providing short synopses of their overall conclusions issued within five days of exercises. When the inspectors compared conclusions and issues described in the two reports, the finding characterizations did not always coincide. For example, there were repetitive critical player comments in several exercises with respect to issuing press releases without management approval because the emergency operations facility was not always responsive in a timely manner. (Not having management's approval of the facts in a press release can lead to misinformation being given to the public.) The controller's conclusions were rolled up to be some communication problems in the Emergency News Center (ENC). The report to management stated that the ENC operated effectively and no issues were noted. Another example was that the final reports noted performance problems associated with making emergency classifications. This was not reflected in the report to senior management. The inspectors determined the reports did not afford senior management the opportunity to adequately assess the emergency response program and any possible decline in emergency response organization performance.

The EP Manager stated that the purpose of the management report was to provide conclusions in a timely manner, but realized that this was based on preliminary information. However, EP had not reissued any report to management if conclusions changed.

The inspectors also noted that some of the critical comments by players on the respective critique forms did not coincide with the controller's report that was used for input into the CAP. PSEG stated that some of the significant players' comments may not have been documented because they may have been immediately addressed. However, there was no mechanism for the inspectors to determine if PSEG was entering all significant exercise findings in their CAP and if corrective actions were effective.

PSEG planned to review this area of concern and the process by which they document immediately resolved issues in their problem identification and resolution system.

1EP2 Alert and Notification System Testing

a. Inspection Scope

The inspectors evaluated the design of the offsite siren system and reviewed test records to determine compliance with 10 CFR 50.47(b)(5). Also, corrective action program records were reviewed to determine PSEG's effectiveness in identifying and tracking siren-related problems.

b. Observations and Findings

There were no findings identified.

1EP3 Emergency Response Organization (ERO) Augmentation

a. Inspection Scope

The inspectors reviewed ERO augmentation to determine PSEG's ability to achieve facility activation goals and identify any problems related to the effectiveness of ERO augmentation.

b. Observations and Findings

There were no findings identified.

1EP4 Emergency Action Level Revisions

a. Inspection Scope

The inspectors reviewed all changes to PSEG's emergency action level scheme since 1998 to verify that the changes did not decrease the effectiveness of the emergency plan.

b. Observations and Findings

There were no findings identified.

## 2. RADIATION SAFETY

### Public Radiation Safety [PS]

#### 2PS1 Gaseous and Liquid Effluent

##### a. Inspection Scope

The inspection of PSEG's liquid and gaseous effluents control program included a walkdown of the liquid and gaseous treatment and release systems and a review of:

- Radiological Semiannual Effluent Release reports for the second half of 1998 and the first half of 1999, and radioactive gaseous and liquid effluent release permits,
- Calibration, functional testing and maintenance records for the liquid and gaseous effluent monitoring systems (liquid radioactive waste effluent line monitors and flow rate monitors; steam generator blowdown monitors and flow rate monitors; containment fan cooler service water monitors; containment vent noble gas monitors; plant vent effluent noble gas monitors and flow rate monitors; and Unit 1 plant vent monitors),
- Ventilation system surveillance tests, including filter performance verifications (containment buildings, fuel handling buildings, auxiliary building exhaust air filtration systems, control room emergency filtration systems),
- Calibration records for count room instruments utilized in the radiological effluents program,
- Performance indicators, self-assessments and audits of the radiological effluents technical specification program.

##### b. Observations and Findings

There were no findings identified.

### Occupation Radiation Safety [OS]

#### 2OS2 ALARA Planning and Controls

##### a. Inspection Scope

The inspectors conducted a review of PSEG's performance in maintaining occupational exposures as low as reasonably achievable (ALARA) during the Unit 1 refueling outage (1R13). As documented in NRC inspection report 05000272, 05000311/99008, significant additional exposures to workers occurred during this outage following

PSEG's difficulty in filtering the primary coolant after inducing a crud burst following reactor shutdown.

b. Observations and Findings

There were no findings identified, and the inspectors had the following observation.

During the third week of 1R13, PSEG increased its originally planned outage exposure goal from 100 person-rem to 145 person-rem to account for increased exposure rates resulting from the noted crud burst. However, by the end of the outage on October 26, 1999, outage exposures had reached 190 person-rem. The majority of the additional exposure was the result of continued elevated dose rates in areas near the reactor coolant system piping and connected systems. Efforts to reduce coolant activity prior to cavity flood-up were ineffective, and caused continued high dose rates for work performed in and around the reactor cavity, especially the activities associated with refueling and reactor reassembly.

### 3. SAFEGUARDS

#### Physical Protection [PP]

##### 1R02 Change to License Conditions

##### .1 Revision to PSEG Site Security Plan

##### a. Inspection Scope

The inspectors conducted an in-office review of Revision 13 to PSEG's site security plan, which was submitted to the NRC in a letter dated September 14, 1999 in accordance with 10 CFR 50.54(p). The inspectors reviewed the changes to verify that they did not reduce the effectiveness of the plan.

##### b. Observations and Findings

There were no findings identified.

### 4. OTHER ACTIVITIES [OA]

##### 4OA1 Identification and Resolution of Problems

##### a. Inspection Scope

The inspectors reviewed numerous corrective action program documents in an effort to determine whether identified problems were being evaluated and corrected in a timely manner, consistent with PSEG guidance on the performance improvement process, which specifies that initial evaluations for issues involving conditions adverse to quality should be completed within 30 days of the notification's initiation date.

b. Observations and Findings

There were no findings identified, but the inspectors had the following observation.

The inspectors discovered several examples of notifications that had been entered into PSEG's corrective action program but had not received an initial cause determination within the established timeliness guidelines. A few examples include (notification/order#):

- (70001273) Operator manipulated equipment on wrong channel/wrong unit
- (70001620) 11 EDG fuel oil storage below minimum required level
- (70002089) 11SW162 locked open valve found out of position
- (70002329) Test equipment installed on wrong emergency diesel generator

The inspectors discussed this issue with the cognizant members of PSEG's management staff who indicated that they had also recognized this concern and were developing a plan to address it.

4OA2 Performance Indicator (PI) Verification

.1 Initiating Events Cornerstone

a. Inspection Scope

The inspectors verified the accuracy and completeness of the data PSEG used to calculate and report the *Scrams*, *Scrams with Loss of Normal Heat Removal*, and *Unplanned Transients* PIs. All 1997, 1998 and 1999 licensee event reports and monthly operating reports for Salem Units 1 and 2 were reviewed to determine whether issues meeting the PI definition in NEI 99-02 draft revision C, "*Regulatory Assessment Performance Indicator Guideline*," were included in the data set.

b. Observations and Findings

(1) Scrams

There were no findings identified.

(2) Scrams with Loss of Normal Heat Removal

The inspectors identified that PSEG failed to include a Salem Unit 2 trip on October 2, 1997, in the PI data. This event was caused by a loss of both operating steam generator feed pumps and met the definition of "loss of normal heat removal" per the NEI 99-02 guidance. The inspectors discussed this error with cognizant members of PSEG staff and concluded that the failure to include this event in the Unit 2 PI data was an administrative oversight. Because this error was not significant in that no change in the NRC's action would have resulted from this data and was not wilful, this error is considered as a minor violation not subject to formal enforcement action. However, this issue will remain unresolved pending the inspectors' review of PSEG's next data submittal

in December 1999 to ensure that the submitted data is updated. (URI 05000311/99009-02)

(3) Unplanned Power Changes

There were no findings identified.

0.2 Emergency Preparedness Cornerstone

a. Inspection Scope

The inspectors verified the accuracy and completeness of the data PSEG used to calculate and report the *Drill and Exercise Performance, Emergency Response Organization Participation and Alert and Notification System Reliability* PIs. Information related to both Salem Units 1 and 2 was reviewed to determine whether issues meeting the PI definition in NEI 99-02 draft revision C, "*Regulatory Assessment Performance Indicator Guideline*," was included in the data set. Specifically, the review included all PSEG emergency preparedness drill and exercise reports, tracking and trending reports, self-assessment reports and actual event reports for the PI data submitted from the fourth quarter of 1998 through the third quarter of 1999.

b. Observations and Findings

There were no findings identified.

.3 Occupational Radiation Safety Cornerstone

a. Inspection Scope

The inspectors reviewed applicable data submitted by PSEG regarding the *Occupational Exposure Control Effectiveness* PI. The data reviewed represented a sampling of records from January 1, 1998 through July 15, 1999. This data was reviewed to identify (1) occurrences of unanticipated and unintended doses exceeding an established percentage of regulatory limits, and (2) non-compliances with the access requirements established for areas having dose rates exceeding 1000 millirem per hour.

b. Observations and Findings

There were no findings identified.

.4 Public Radiation Safety Cornerstone

a. Inspection Scope

The inspectors reviewed applicable data submitted by PSEG regarding the *Radiological Effluent Occurrences* PI. The data reviewed represented a sampling of records from January 1, 1998 through September 30, 1999.

b. Observations and Findings

There were no findings identified.

4OA3 Event Follow-up

- .1 (Closed) LER 05000272/98004: Failure to comply with technical specifications for radioactive liquid release. This issue was the subject of a detailed NRC investigation that resulted in issuance of a Severity Level IV violation. The details of the NRC review and the basis for the violation are included in an April 30, 1999 NRC letter to PSEG.
- .2 (Closed) LER 05000272/99006: Steam generator blowdown radiation monitor setpoints set non-conservatively. This LER described a minor issue and was closed.
- .3 (Closed) LER 05000272/99007: Engineered safety feature actuation, 1R12A containment noble gas monitor alarm and containment ventilation system isolation. This LER described a minor issue and was closed.
- .4 (Closed) LER 05000272/99008: Engineered safety feature actuation, 1R11A containment air particulate monitor alarm and containment ventilation system isolation. This LER described a minor issue and was closed.
- .5 (Closed) LER 05000272/99010: Unplanned subcritical manual reactor trip due to rod control system failure. This issue was reviewed in section 1R14 of this report. The inspectors did not identify any negative licensee performance issues associated with this event.

4OA4 Other

- .1 (Closed) IFI 05000272/98008-12: Radiological calibration results not available for review. During this report period, PSEG supplied the necessary records which the inspectors reviewed and determined to be appropriate.
- .2 (Closed) URI 05000272&311/99008-05: Inaccurate submittal of *Safety System Functional Failure* performance indicator data. The inspectors verified that PSEG corrected the errors identified in NRC Inspection Report 05000272&311/99008 in their November 1999 data submittal.



#### 4OA5 Management Meetings

##### .1 Exit Meeting Summary

On December 8, 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. Nonetheless, PSEG noted their confusion as to why the corrective action issue for emergency event declarations was the subject of a white finding when existing performance indicators covered this area and were green. Additionally, they stated that none of the information reviewed by the inspectors was considered proprietary.

##### .2 PSEG Nuclear/NRC Management Meeting

On October 27, 1999, the NRC held a public meeting with members of PSEG management to discuss insights and "lessons learned" from implementation of the new regulatory oversight process. A copy of PSEG's presentation slides from this meeting were attached to a November 5, 1999 letter to PSEG summarizing the results of the meeting.

**ITEMS OPENED AND CLOSED****Opened**

05000272&311/99009-01	AV	Corrective actions on emergency event classification deficiencies. (Section 1EP1.1)
05000311/99009-02	URI	Inaccurate performance indicator data submittal. (Sections 4OA2.2 and 4OA2.3)

**Closed**

05000272/98008-12	IFI	Radiation monitoring system calibrations. (Section 4OA4.1)
05000272/98008-03	URI	Timeliness and accuracy of emergency classification guide implementation. (Section 4OA1.2)
05000272&311/99008-05	URI	Inaccurate performance indicator data submittal. (Section 4OA4.2)
05000272/980004-00	LER	Failure to comply with technical specifications for radioactive liquid release. (Section 4OA3.1)
05000272/99006-00	LER	Steam generator blowdown radiation monitor setpoints set non-conservatively. (Section 4OA3.2)
05000272/99007-00	LER	Containment isolation due to 1R12A noble gas alarm. (Section 4OA3.3)
05000272/99008-00	LER	Containment isolation due to 1R12A noble gas alarm. (Section 4OA3.4)
05000311/99007-00	LER	Missed surveillance for reactor core quadrant power tilt ratio. (Section 1R22)
05000272/99010-00	LER	Unplanned subcritical manual reactor trip due to rod control system failure. (Section 4OA3.5)

**LIST OF ACRONYMS USED**

AFW	Auxiliary Feedwater
ALARA	As Low As Reasonably Achievable
CAP	Corrective Action Program
EAL	Emergency Action Level
EDG	Emergency Diesel Generator
ENC	Emergency News Center
EOP	Emergency Operating Procedure
EP	Emergency Preparedness
ERO	Emergency Response Organization
GL	Generic Letter
IFI	Inspector Followup Item
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
Mrule	Maintenance Rule (10 CFR 50.65)
NRC	Nuclear Regulatory Commission
OE	Operability Evaluation
OS	Operations Superintendent
PI	Performance Indicator
PSEG	Public Service Enterprise Group Nuclear LLC
QPTR	Quadrant Power Tilt Ratio
RCS	Reactor Coolant System
SDP	Significance Determination Process
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item

## 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 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

- Initiating Events
- Mitigating Systems
- Barrier Integrity
- Emergency Preparedness

#### Radiation Safety

- Occupational
- Public

#### Safeguards

- 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 with low to moderate safety significance, which may require additional NRC inspections. YELLOW findings are more serious issues with substantial safety significance and would require the NRC to take additional actions. RED findings represent issues of high safety significance with an unacceptable loss of safety margin and would result in the NRC taking significant actions that could include ordering the plant shut down.

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 incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. The color for an indicator corresponds to levels of performance that may result in increased NRC oversight (WHITE), performance that results in definitive, required action by the NRC (YELLOW), and performance that is unacceptable but still provides adequate protection to public health and safety (RED). GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections.

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. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, as described in the matrix. 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.