February 8, 2000

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

SUBJECT: NRC INTEGRATED INSPECTION REPORT 05000354/1999009

Dear Mr. Keiser:

On January 9, 2000, the NRC completed an integrated inspection of your Hope Creek facility. The enclosed report presents the results of that inspection. The preliminary findings were presented to PSEG Nuclear management led by Mr. Larry Wagner in an exit meeting on January 19, 2000.

NRC inspectors examined numerous activities as they related to reactor safety and compliance with the Commission's rules and regulations, and with the conditions of your license. The inspection consisted of a selected examination of procedures and representative records, observations of activities, and interviews with personnel. Specifically, this inspection involved six weeks of resident inspection and one region-based review of operator licensing open items. There were no findings identified.

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 (PDR).

Sincerely,

Original Signed by:

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

Docket No.: 05000354
License No.: NPF-57

Enclosure: NRC Inspection Report No. 05000354/1999009

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U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Docket No:	05000354
License No:	NPF-57
Report No:	05000354/1999009
Licensee:	PSEG Nuclear LLC
Facility:	Hope Creek Nuclear Generating Station
Location:	P.O. Box 236 Hancocks Bridge, NJ 08038
Dates:	November 29, 1999 - January 9, 2000
Inspectors:	J. G. Schoppy, Senior Resident Inspector J. D. Orr, Resident Inspector T. H. Fish, Operations Engineer
Approved By:	Glenn W. Meyer, Chief Projects Branch 3 Division of Reactor Projects

SUMMARY OF FINDINGS

Hope Creek Generating Station
NRC Integrated Inspection Report 05000354/1999009

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

Performance Indicator Verification

- The inspectors identified several errors in the reported data for the *Containment Leakage* performance indicator (PI). The leak rate coordinator, in an extensive effort to identify the source of these errors, identified several additional errors. Due to these errors, PSEG reported the monthly total containment leakage conservatively high, since March 1999, due to data transfer errors in their database spreadsheets. PSEG documented these errors in their corrective action process and planned to recalculate the highest containment leakage for 1999 and correct the PI values in their next PI package submittal. The errors were minimal and the PI remained green. (Section 4OA2.1)

- The inspectors identified three areas which the inspectors and PSEG had differed on how to calculate PI data. In the first instance, the affect of barring on the unavailability of emergency diesel generators (EDGs), PSEG later agreed with the inspectors and planned to correct the data. In the other two instances, EDG support systems for fuel oil and cooling, PSEG did not agree and planned to submit items for agency review. (Section 4OA2.2)

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Report Details

SUMMARY OF PLANT STATUS

The Hope Creek plant operated continuously at or near full power for the duration of the inspection period except for one planned power reduction to 60 percent on December 10, 1999, for maintenance and surveillance testing.

1. REACTOR SAFETY

(Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity)

1R01 Adverse Weather

a. Inspection Scope

The inspectors reviewed Hope Creek cold weather preparations and walked down numerous plant areas and outside buildings to review potential cold weather vulnerabilities.

b. Observations and Findings

There were no findings identified.

1R03 Emergent Work

a. Inspection Scope

The inspectors reviewed PSEG's corrective actions and risk management controls associated with high vibrations on the A 1E panel room chilled water circulating pump during a planned system outage on the B 1E panel room chiller. The B 1E panel room chiller was available and operated while PSEG investigated and corrected the high vibrations on the A 1E panel room chilled water circulating pump. In addition, the inspectors assessed PSEG's corrective actions and risk management controls associated with high vibrations on the C emergency core cooling system keep-fill pump. Due to a previous test failure of a check valve in the alternate keep-fill supply path (condensate storage and transfer system to the C low pressure coolant injection system), operators declared C low pressure coolant injection inoperable and evaluated the potential to affect primary containment integrity.

b. Observations and Findings

There were no findings identified.

1R04 Equipment Alignments

a. Inspection Scope

The inspectors performed equipment alignment verifications on redundant or backup equipment during system outages on the high pressure coolant injection (HPCI) system and the A filtration, recirculation, and ventilation system (FRVS) vent train.

b. Inspection Scope

There were no findings identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors performed walkdowns of the main control room, the upper control equipment room, and the lower control equipment room. The inspectors also reviewed fire impairments and compensatory measures associated with these rooms.

b. Observations and Findings

There were no findings identified.

1R06 Flood Protection

a. Inspection Scope

The inspectors reviewed flood protection measures in areas containing risk significant equipment including the 54', 77', and 102' elevations of the reactor building.

b. Observations and Findings

There were no findings identified.

1R09 Inservice Testing

a. Inspection Scope

The inspectors observed portions of, reviewed the results of, and verified the adequacy of inservice tests of the C safety auxiliaries cooling pump and the D residual heat removal system valves.

b. Observations and Findings

There were no findings identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed maintenance rule implementation for three potentially risk significant equipment failures or problems: Notification 20007734 - C diesel fuel oil storage tank high particulate, Notification 20007246 - B control room chiller freon leak, and Notification 20007915 - B emergency diesel generator jacket water pump seal failure.

b. Observations and Findings

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

The engineering department classified Notification 20072496 (B control room chiller freon leak) as a preventable system functional failure. The inspectors considered this classification appropriate. Operators classified Notification 20007734 (C diesel fuel oil storage tank high particulate) as maintenance rule not applicable and Notification 20007915 (B EDG jacket water pump seal) as not a functional failure, but did not provide sufficient justification. The inspectors determined that these classifications were incorrect or cursory. The PSEG maintenance rule coordinator agreed that the two Notifications were not appropriately dispositioned for maintenance rule application. PSEG initiated corrective actions to address these problems (Notifications 20017611 and 20017614, respectively). NRC inspectors and PSEG have also previously identified similar weaknesses. Some of those problems were described in NRC Hope Creek and Salem Inspection Reports 05000354/1999005, 05000272/311/1999005, 05000272/311/1999007 and 05000272/311/1999008. PSEG initiated a corrective action (Notification 20018356) to determine if an adverse trend in maintenance rule implementation has occurred.

1R13 Maintenance Work Prioritization

a. Inspection Scope

The inspectors evaluated PSEG's on-line risk management for the HPCI system outage.

b. Observations and Findings

There were no findings identified.

1R16 Operator Work-Arounds

a. Inspection Scope

The inspectors reviewed the operator work-around list and other equipment deficiencies to evaluate potential impacts on the operators' ability to implement abnormal or emergency operating procedures.

b. Observations and Findings

There were no findings identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed Safety Evaluation H99-055, *Emergency Sump Pump Discharge Valves*, to verify that the revised flowpath served the functional requirements of the plant equipment and floor drainage systems.

b. Observations and Findings

There were no findings identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed the results and adequacy of post maintenance tests associated with the HPCI system outage and the A FRVS vent train outage.

b. Observations and Findings

There were no findings identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed portions of and reviewed the adequacy of: the B emergency diesel generator monthly operability test, safety relief valve position indication functional testing, and HPCI system steam supply low pressure auto-isolation sensor calibrations.

b. Observations and Findings

There were no findings identified.

4. OTHER ACTIVITIES [OA]

4OA2 Performance Indicator Verification

.1 Containment Leakage

a. Inspection Scope

The inspectors reviewed the methods used to calculate the performance indicator (PI) on *Containment Leakage* and reviewed the PI data submitted for 1999. The inspectors reviewed a sample of local leak rate test results performed in 1999 and thoroughly compared PSEG's leak rate database spreadsheets for Type B and Type C tests against the reported PI values.

b. Observations and Findings

The inspectors identified several errors in the reported data for the *Containment Leakage* PI. The errors consisted of data transfer oversights in the recording and use of test results in the PSEG database files. The leak rate coordinator identified several additional errors during a subsequent, extensive effort to review the errors. The leak rate coordinator noted that most of the errors originated during the March 1999 refueling outage (prior to the beginning of the pilot oversight program in June 1999) and resulted in errors carried forward throughout the remainder of 1999. PSEG had reported the monthly total Type B and Type C maximum path containment leakage conservatively high since March 1999, due to these errors in their database spreadsheets used to calculate the leakage PI.

PSEG documented these errors in their corrective action process (Notification 20018074) and planned to recalculate the highest maximum pathway leakage for 1999 and correct the PI values in their next PI package submittal. In addition, PSEG's corrective actions included plans to develop an improved local leak rate tracking program and to enhance their independent verification of the data prior to submitting the data to the NRC. The errors were conservative and relatively small amounts, and the PI remained green. Because the errors were not significant in that no change in the NRC's action would have resulted from this data and the errors were not willful, this is a minor violation and not subject to formal enforcement action.

.2 Emergency AC Power System Unavailability

a. Inspection Scope

The inspectors reviewed the methods used to calculate the PI on *Safety System Unavailability, Emergency AC Power System,* and reviewed the PI data submitted through November 1999. The inspectors reviewed the limiting condition for operation logs and control room operating logs for the months of September through November 1999. In addition, the inspectors reviewed PSEG's maintenance rule electronic databases and Licensee Event Reports for 1999.

b. Observations and Findings

In general, the inspectors noted good alignment between the limiting condition for operation logs, the control room operating logs, and the maintenance rule electronic databases relative to reported emergency diesel generator (EDG) unavailability. However, the inspectors applied the guidance in Nuclear Energy Institute (NEI) 99-02 (Draft Rev. D), *Regulatory Assessment Performance Indicator Guideline,* for crediting operator restoration actions and determined that the EDGs should not be considered available during EDG barring (rolled over with air for approximately two seconds). The frequently performed barring process removes any accumulated moisture from the EDG cylinders to preclude EDG failure due to a hydraulic lock on the pistons. The inspectors believed that crediting operator restoration actions was inappropriate; to be appropriate, the restoration actions should have met the following criteria:

- Written procedures should direct a dedicated operator's actions to restore the EDG in the event the EDG was needed to perform its safety function. Restoration actions should be uncomplicated (generally, a single action) and permit prompt restoration of the auto-initiation function.

- Restoration actions should be virtually certain to be successful (probability nearly equal to 1.0) during accident conditions.

On each of these criteria, the inspectors judged PSEG's status to be questionable. PSEG agreed with the inspectors' assessment concerning EDG barring and planned to amend their EDG unavailability PI values accordingly. The inspector noted that each EDG is generally unavailable for 15 - 30 minutes at least once per month (sometimes more frequently) during the barring process.

In addition, the inspectors noted two apparent inconsistencies between the NEI 99-02 guidance for support system unavailability and PSEG's EDG unavailability accounting practices. In particular, the NEI guidance states:

- If the unavailability of a support system causes a train to be unavailable, then the hours the support system was unavailable are counted against the train as either planned or unplanned unavailable hours.

- For emergency generators, cooling water provided by a pump powered by another class 1E (safety grade) power source can be substituted, provided a pump is available that will maintain electrical redundancy requirements such that a single failure cannot cause a loss of both emergency generators.

In contrast to the first statement above, PSEG performed corrective and preventive maintenance on EDG fuel oil storage tanks (an EDG support system), involving the draining of approximately one-half the technical specification required volume, and did not credit any unavailability to the EDG. However, they did declare the EDG inoperable and credited unavailability to the fuel oil transfer system. The inspectors recognized that this unavailability accounting method, relative to charging unavailability to the support system only, is in accordance with NUMARC 93-01, Revision 2, *Industry Guideline For Monitoring the Effectiveness of Maintenance at Nuclear Power Plants*. In addition, the inspectors noted that NEI 99-02 guidance and the 10CFR50.65 Statements of Consideration published July 19, 1999, strongly imply that all planned and unplanned maintenance be counted as unavailable hours. This attempts to record a true measure of the effectiveness of the maintenance program when tracked within the maintenance rule process. The inspectors also noted another example where PSEG performed troubleshooting on an EDG fuel oil transfer system and did not credit any EDG unavailability. In contrast to the second statement above, PSEG removed a service water pump or a safety auxiliaries cooling (SAC) pump from service for maintenance without charging any time to the respective EDG unavailability. For example, with the A SAC pump out of service, a failure of the C SAC pump would result in the subsequent failure of both the A and C EDGs, if operator action could not be credited to align the B SAC loop to supply the A and C EDGs. The inspectors recognized that PSEG's technical specifications allow a service water pump or a SAC pump to be out of service for an allowed outage time of 30 days and PSEG had appropriately implemented the LCO action statements. PSEG also appropriately charged unavailability against the SAC system or the service water system for maintenance rule accounting.

PSEG did not agree that charging PI unavailability to the EDG was appropriate in the two cases discussed above. PSEG intended to submit a frequently asked question (FAQ), addressing the two issues, for NEI and NRC concurrent resolution. The inspectors agreed that the EDG unavailability issues were complex and acknowledged that an FAQ response would yield consistent application. PSEG's EDG unavailability performance indicator calculated value is an unresolved item pending NEI and NRC FAQ response and NRC review of corrected EDG unavailability values (based on EDG barring unavailability). **(URI 050000354/99009-01)**

.3 High Pressure Coolant Injection System Unavailability

a. Inspection Scope

The inspectors verified the methods used to calculate the *High Pressure Coolant Injection (HPCI) System Unavailability* PI and reviewed the data for the previous 36 months. The inspectors reviewed limiting condition for operation logs, control room operating logs and maintenance rule electronic data bases.

b. Observations and Findings

The NRC inspectors noted that PSEG considered the HPCI system available during routine monthly oil sampling; however, operators placed the HPCI in an abnormal lineup during the oil sampling. Operators start the HPCI auxiliary oil pump to draw the oil samples. Starting the auxiliary oil pump affects the HPCI response during an auto-initiation. In a standby lineup (ready for automatic initiation), the steam stop admission valve is closed and is designed to ramp open on an auto-initiation, but with the auxiliary oil pump running, the steam stop valve is full open. In a standby lineup, the governor control valve is closed and is designed to ramp open and to automatically establish HPCI injection flow at 5600 gpm. However, with the HPCI auxiliary oil pump already running, the governor control valve will be full open if the HPCI flow controller is left in its standby alignment (in automatic and set for 5600 gpm). This abnormal lineup can cause the HPCI turbine to overspeed and trip. In some instances, but inconsistently, control room operators placed the HPCI flow controller in manual and at zero demand to preclude overspeeding the HPCI turbine in the event of an auto-initiation.

The inspectors applied the guidance in NEI 99-02 (Draft Rev. D), *Regulatory Assessment Performance Indicator Guideline,* for crediting operator restoration actions and determined that the HPCI system should not be considered available during oil sampling. The inspectors believed that crediting operator restoration actions was inappropriate because:

- Written procedures did not exist that directed a dedicated operator's actions to restore HPCI and allow an automatic initiation. Written procedures also did not exist to ensure consistent operator placement of the HPCI controller in manual at zero demand prior to starting the auxiliary oil pump.

- The HPCI system response with the controller initially in manual and crediting operator action to manually establish HPCI system flow at 5600 gpm relies on operator response and attentiveness and is not virtually certain to be successful, unlike the hands-off automatic initiation.

PSEG did not agree with the inspectors' conclusions. PSEG intended to submit a FAQ for NEI and NRC resolution. The inspectors agreed that the HPCI unavailability issue had enough complication and acknowledged that an FAQ response would yield consistent application. The NRC inspectors determined that crediting operator restoration actions for availability was not unique for performance indicator reporting, but also affected maintenance rule implementation. Guidance on crediting operator restoration actions for maintenance rule implementation is similar to the NEI 99-02 guidance and is contained in the 10CFR50.65 Statements of Consideration published July 19, 1999, and also in the NRC's maintenance rule web page FAQ's submitted July 1, 1998 and December 15, 1998. PSEG's availability determination based on credit for operator restoration actions during HPCI oil sampling is an unresolved item pending NEI and NRC concurrent FAQ response. **(URI 050000354/99009-02)**

The inspectors noted that the potential unavailability time during oil sampling was not significant, about thirty minutes each month, and would not normally cause the performance indicator to exceed a threshold.

.4 Safety System Functional Failures

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 issued for Hope Creek were reviewed to determine whether issues meeting the SSFF definition in NEI 99-02 Draft Revision D, *Regulatory Assessment Performance Indicator Guideline,* were included in the data set.

b. Observations and Findings

There were no findings identified.

4OA4 Other

.1 (Closed) Inspector Followup Item 05000354/1998302-1: NRC examiners identified quality deficiencies involving PSEG's initial examination submittal which Hope Creek training staff prepared for a December 1998 initial licensed operator exam. In addition, the applicants' pass rate on this exam was unusually low and was a repeat problem from another NRC exam administered in February 1998. The details of these issues are described in NRC Inspection Reports 05000354/1998-302 and 05000354/1998302-Supplement. The inspectors verified that PSEG corrective action program Notifications CR981118083 (Inadequate exam submittal) and CR990125161(High failure rate) adequately addressed resolution of these problems. For example, corrective actions that addressed exam submittal deficiencies included better training on exam item development and the examination process, and establishment of a five year training plan to ensure personnel involved with exam responsibilities are not inordinately challenged by additional concurrent duties.

Actions that addressed the high failure rate included administering applicants exams with higher order questions earlier in their training classes, assignment of a class mentor to follow the progress of each applicant, management feedback on applicant status, and development of remediation plans to improve marginal applicant performance as well as to give management a basis for making decisions on an applicant's continued participation in the program. An NRC risk analyst was consulted on this IFI. Because this item did not have a credible effect on any cornerstone objective, the analyst determined there was no safety impact. This IFI is closed.

.2 (Closed) Violation 05000354/1998302-3: NRC examiners identified five examples where PSEG staff failed to maintain records for licensed operators documenting their participation in the licensed operator requalification program. This issue was discussed in NRC Inspection Report 05000354/1998-302. The inspectors verified that PSEG corrective action program Notification CR981208136 adequately addressed this item. Inspectors also noted that all licensed operators made up any missed training prior to the end of the 24 month requalification training cycle. Violation 05000354/1998-302-3 is closed.

.3 Year 2000 Rollover: The inspectors remained in the Hope Creek main control room from 11:00 p.m. to 01:00 a.m. and onsite until 05:00 a.m. and verified that the Hope Creek plant remained unaffected by any potential year 2000 computer problems.

4OA5 Management Meetings

a. Exit Meeting Summary

On January 19, 2000, the inspectors presented their overall findings to members of PSEG Nuclear management led by Mr. Larry Wagner. PSEG Nuclear management acknowledged the findings presented and did not contest any of the inspectors' conclusions, except as noted in Section 4OA4. Additionally, they stated that none of the information reviewed by the inspectors was considered proprietary.

ITEMS OPENED AND CLOSED

Opened

05000354/1999009-01	URI	PSEG's emergency diesel generator unavailability performance indicator calculated value. (Section 4OA2.2)
05000354/1999009-02	URI	PSEG's availability credit for operator restoration actions during HPCI oil sampling. (Section 4OA2.3)

Closed

05000354/1998302-1	IFI	NRC examiners identified quality deficiencies involving the facility licensee's initial examination submittal which Hope Creek training staff prepared for a December 1998 initial licensed operator exam. (Section 4OA4.1)
05000354/1998302-3	VIO	NRC examiners identified five examples where PSEG staff failed to maintain records for licensed operators documenting their participation in the licensed operator requalification program. (Section 4OA4.2)

LIST OF ACRONYMS USED

EDG	Emergency Diesel Generator
FAQ	Frequently Asked Question
HPCI	High Pressure Coolant Injection
IFI	Inspector Followup Item
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
PI	Performance Indicator
PSEG	Public Service Electric Gas
SAC	Safety Auxiliaries Cooling
SSFF	Safety System Functional Failure
URI	Unresolved Item
VIO	Violation

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	Radiation Safety	Safeguards
● Initiating Events	● Occupational	● Physical Protection
● Mitigating Systems	● Public	
● Barrier Integrity		
● Emergency Preparedness		

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