

October 19, 2000

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

SUBJECT: NRC INSPECTION REPORT 05000354/2000-007

Dear Mr. Keiser:

On September 30, 2000, the NRC completed an 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. Tim O'Connor in an exit meeting on October 6.

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 selective review of procedures and representative records, observations of activities, and interviews with personnel. Specifically, this inspection involved seven weeks of resident inspection.

The inspectors identified two findings that were evaluated under the risk significance determination process and were determined to be of very low safety significance (Green). These findings have been entered into your corrective action program and are discussed in the summary of findings and in the body of the attached inspection report. Furthermore, one finding was determined to involve a violation of NRC requirements, but because of its very low safety significance, the violation is non-cited.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Sincerely,

R/A

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

Enclosure: Inspection Report 05000354/2000-007

Mr. Harold W. Keiser

2

cc w/encl:

E. Simpson, Senior Vice President and Chief Administrative Officer

M. Bezilla, Vice President - Operations

D. Garchow, Vice President - Technical Support

G. Salamon, Manager - Licensing

C. Kresge, External Operations - Nuclear, Conectiv Energy

R. Kankus, Joint Owner Affairs

J. J. Keenan, Esquire

Consumer Advocate, Office of Consumer Advocate

F. Pompper, Chief of Police and Emergency Management Coordinator

M. Wetterhahn, Esquire

State of New Jersey

State of Delaware

Mr. Harold W. Keiser

3

Distribution w/encl:
Region I Docket Room (with concurrences)
J. Schoppy - NRC Resident Inspector
H. Miller, RA
J. Wiggins, DRA
G. Meyer, DRP
P. Bonnett, DRP
R. Barkley, DRP
C. O'Daniell, DRP
L. Privity, DRS
J. Shea, OEDO
E. Adensam, NRR
J. Harrison, NRR
T. Frye, NRR
C. See, NRR

DOCUMENT NAME: C:\ir 00-07.wpd

After declaring this document "An Official Agency Record" it **will** be released to the Public.

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	RI/DRP		RI/DRP		/					
NAME	JSchoppy		GMeyer							
DATE	10/19/00		10/19/00		10/ /00		10/ /00		10/ /00	

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No: 50-354
License No: NPF-57

Report No: 05000354/2000-007

Licensee: PSEG Nuclear LLC

Facility: Hope Creek Nuclear Generating Station

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

Dates: August 13 - September 30, 2000

Inspectors: J. G. Schoppy, Jr., Senior Resident Inspector
J. D. Orr, Resident Inspector

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

Summary of Findings

Adams Template:

IR 05000354-00-07; on 08/13 - 09/30/2000; Public Service Electric Gas Nuclear LLC; Hope Creek Generating Station; Maintenance Rule Implementation, Maintenance Risk Assessments and Emergent Work Control.

The report covers a seven-week period of resident inspection using the guidance contained in NRC Inspection Manual Chapter 2515*. This inspection identified two green findings, one of which was a non-cited violation. The significance of issues is indicated by their color (Green, White, Yellow, or Red) and was determined by the Significance Determination Process in Inspection Manual Chapter 0609 (see Attachment 1).

Cornerstone: Mitigating Systems

- Green. NRC inspectors identified a non-cited violation for inadequate corrective actions following a functional failure of a residual heat removal (RHR) suppression pool cooling valve. The improper torque switch setting was corrected, but the failure was not evaluated for maintenance rule, extent of condition, or performance indicator purposes.

The inspectors determined that this deficiency was of very low safety significance based on the continued operability of the redundant train.

- Green. NRC inspectors determined that PSEG Nuclear did not effectively manage the risk associated with a planned high pressure coolant injection (HPCI) system outage, in that the PSEG risk categorization was reduced by questionable qualitative evaluations and little was done to address the control of the work.

The inspectors determined that this shortcoming was of very low safety significance based on the availability of the remaining emergency core cooling systems, the availability of the reactor core isolation cooling system, and the relatively short duration of the outage.

TABLE OF CONTENTS

1. **REACTOR SAFETY** 1

R01 Adverse Weather Protection 1

R04 Equipment Alignment 1

R05 Fire Protection 1

R06 Flood Protection Measures 2

R11 Licensed Operator Requalification 2

R12 Maintenance Rule Implementation 2

R13 Maintenance Risk Assessments and Emergent Work Control 4

 .1 High Pressure Coolant Injection System Outage Planning 4

 .2 Risk Management 5

R14 Personnel Performance During Nonroutine Plant Evolutions 5

R16 Operator Workarounds 6

R19 Post Maintenance Testing 6

R22 Surveillance Testing 6

OTHER ACTIVITIES 7

 OA1 Performance Indicator Verification 7

 OA2 Identification and Resolution of Problems 7

 OA5 Other 7

 OA6 Management Meetings 8

ITEMS OPENED AND CLOSED 9

LIST OF ACRONYMS USED 9

ATTACHMENT 1 10

 NRC's REVISED REACTOR OVERSIGHT PROCESS 10

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 planned power reductions on September 10 for turbine valve testing and on September 30 for a rod pattern adjustment.

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

R01 Adverse Weather Protection

a. Inspection Scope

In July 1997 Hope Creek's Individual Plant Examination for External Events (IPEEE) identified the need for a missile shield installation in front of door 19 in room 5619 to protect against tornado missiles which could otherwise jeopardize operability of the A loop of the control room emergency filtration units. The inspectors performed a walkdown of the area to assess PSEG's actions to mitigate this external event.

b. Issues and Findings

There were no findings identified.

R04 Equipment Alignment

a. Inspection Scope

The inspectors performed equipment alignment verifications on redundant equipment during a high pressure coolant injection (HPCI) system outage. Additionally, the inspectors reviewed various corrective action notifications associated with equipment alignment deficiencies (20037698, 20038075, 20039027, 20040371, 20040438, and 20040841).

b. Issues and Findings

There were no findings identified.

R05 Fire Protection

a. Inspection Scope

The inspectors performed a walkdown of the 125 Vdc safety-related battery rooms, the reactor core isolation cooling (RCIC) battery room, and the HPCI battery room. The inspectors reviewed Hope Creek's IPEEE for risk insights concerning these areas. Additionally, the inspectors reviewed several notifications associated with fire protection deficiencies (20037772, 20038185, 20038232, 20038827, 20039719, and 20040219).

b. Issues and Findings

There were no findings identified.

R06 Flood Protection Measures

a. Inspection Scope

The inspectors evaluated operator action in response to a degraded reactor building flood protection watertight door (notification 20038550). The inspectors also reviewed corrective action notification 20040970 associated with implementation of flood protection measures.

b. Issues and Findings

There were no findings identified.

R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed two simulator training scenarios, involving two different operating crews, to assess operator performance and training effectiveness. One scenario involved the risk significant operator action of reactor pressure vessel manual depressurization for low pressure injection. The second training scenario included operator response to a severe storm with heavy flooding and an anticipated transient without scram. The inspectors assessed simulator fidelity and observed the simulator instructor's critique of operator performance. The inspectors also reviewed several notifications (20039814, 20039874, 20039883, and 20040856) that involved operator training issues.

b. Issues and Findings

There were no findings identified.

R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed corrective action notifications initiated from May 1 to June 15, 2000, for maintenance rule screening. The inspectors evaluated three notifications that involved system engineer functional failure determinations (20028405, 20028749, and 20038076). The inspectors also reviewed Hope Creek Expert Panel Meeting Minutes (HCEP 00-07 and HCEP 00-08).

b. Issues and Findings

The inspectors identified a non-cited violation for inadequate corrective actions following a functional failure of a residual heat removal (RHR) suppression pool cooling valve. In particular, on May 22 operations initiated notification 20030547 for failure of the BCHV F024A valve to stroke open when attempting to place RHR in the suppression pool cooling mode to support HPCI and RCIC surveillances during the plant startup. Subsequent troubleshooting identified that the torque switch setting in the open direction was set too low. Technicians adjusted the torque switch setting, successfully stroked the valve (both static and dynamic), and closed the notification.

Months later in August the inspectors identified that none of the evaluations which should have occurred for such a valve failure had occurred. Specifically, no order was created for the motor operated valve (MOV) engineering group to evaluate the extent of condition, and senior reactor operators (SROs) in the work control center did not create a maintenance rule task for the above notification to determine if the deficiency represented a functional failure. Also, system engineering may have missed an opportunity to identify a maintenance preventable functional failure (MPFF) when it initially failed on May 4, a subsequent repeat MPFF on May 22, and consequently did not implement A(1) goal setting to improve maintenance effectiveness. In addition, the inspectors noted that engineering had not evaluated the initial failure to determine the associated fault exposure unavailability. (This has the potential to affect the accuracy of the Safety System Unavailability, Residual Heat Removal performance indicator (PI).)

In response to the inspectors' concern, engineering initiated actions to perform this review and to update their PI as necessary. Engineering entered this problem into the corrective action program as notification 20040761. The MOV engineering group determined that the similar valve (BCHV F024B) in the redundant train had performed satisfactory in previous stroke tests and when placed in service for suppression pool cooling since its last torque switch adjustment. The MOV engineering experts noted that there had not been an adverse trend in the similar MOVs tripping out on torque when stroking in the open direction.

The inspectors used the significance determination process (SDP) and determined that this deficiency was of very low safety significance based on the continued operability of the redundant train. Failure to take prompt and appropriate actions for a condition adverse to quality is a violation of 10 CFR 50 Appendix B Criterion XVI. This violation is being treated as a non-cited violation, consistent with Section VI.A of the Enforcement Policy, issued on May 1, 2000 (65FR25368). **(NCV 05000354/2000-007-01)**

R13 Maintenance Risk Assessments and Emergent Work Control

.1 High Pressure Coolant Injection System Outage Planning

a. Inspection Scope

At 4:00 p.m. on Friday August 18, operations management identified that a HPCI outage scheduled for Monday August 21 had not received appropriate planning attention befitting an activity assessed as risk significant (PSEG risk color of red). Operations management tasked probabilistic safety assessment (PSA) personnel to re-evaluate the risk associated with the HPCI maintenance. In developing Hope Creek's risk matrix, PSA had originally calculated the associated core damage frequency as $1.05E-4/\text{year}$. On August 18 a PSA analyst used qualitative judgment to assess the HPCI risk as (PSEG) yellow (CDF less than $1.0E-4/\text{year}$) based on increased awareness, protection of redundant systems, and the short duration of the outage. The inspectors became aware of the HPCI planning issue as operations management initiated a healthy discussion on the topic during the morning management meeting on August 21. Following the morning meeting, the inspectors performed a walkdown of the redundant systems and discussed HPCI outage planning with PSA, control room SROs, the HPCI system engineer, and work planners.

b. Issues and Findings

The inspectors concluded that the risk categorization had been reduced from red to yellow based on questionable qualitative evaluations. It appeared that some factors had been rationalized to reduce the quantitative risk to a lower level.

Regardless of the specific risk categorization (red or yellow), the inspectors determined that following operations management's identification of the planning shortcoming, PSEG Nuclear did little to control the HPCI outage commensurate with the on-line maintenance risk. Specifically, on Monday when the HPCI outage began, the following conditions existed:

- The system engineer was not aware that HPCI was tagged out of service.
- Control room SROs were not fully aware of the status of the on-going HPCI maintenance.
- Maintenance technicians working the job apparently were not briefed initially on the importance of reducing HPCI unavailability.
- The HPCI system had already been removed from service for approximately five hours before the August 21 management meeting that discussed risk reduction measures.
- The shift superintendent's morning status recording and work management's plant status report for August 21 identified the risk assessment condition as GREEN and missed an opportunity to increase site awareness of the HPCI system outage risk.

- No engineering evaluation existed to determine if the potential gain in HPCI system reliability to perform the environmental qualification (EQ) preventive maintenance (PM) on two limitorque operators warranted the resultant HPCI unavailability.
- No apparent PSA assessment to evaluate the risk impact of moving the EQ PM from the outage schedule to on-line.
- No planning review had been done of the HPCI health report to evaluate what corrective maintenance, possibly needed to improve the condition of the HPCI system, could be performed during the planned maintenance window.

On September 19 PSEG Nuclear entered the issue regarding HPCI outage planning into their corrective action program as notification 20040444. The inspectors used the SDP and determined that this shortcoming was of very low safety significance based on the availability of the remaining emergency core cooling systems, the availability of the RCIC system, and the relatively short duration of the outage.

.2 Risk Management

a. Inspection Scope

The inspectors evaluated on-line risk management for the planned A emergency diesel generator (EDG) outage and for the C service water pump strainer backwash valve emergent work. In addition, the inspectors reviewed notifications involving risk assessment and emergent work (20037595, 20038572, 20039336, 20039478, 20039901, 20040023, and 20040995).

b. Issues and Findings

There were no findings identified.

R14 Personnel Performance During Nonroutine Plant Evolutions

a. Inspection Scope

The inspectors reviewed operator and electrical technician actions in response to an unexpected trip of seven A channel, steam affected area, backdraft isolation dampers. Technicians performing authorized work in a relay cabinet apparently came in contact with a loose fuse clip causing a spurious actuation of the high temperature damper isolation relays. Technicians immediately notified the control room and initiated corrective action notification 20038422. Operators promptly re-opened the 7 affected dampers within 43 minutes. Closure of these dampers, if not recovered in an expeditious manner, could result in a HPCI isolation or main steam line isolation and subsequent reactor scram.

b. Issues and Findings

There were no findings identified.

R16 Operator Workarounds

a. Inspection Scope

The inspectors reviewed the operator work-around list, corrective action notifications, operator logs, and instrument panel status to evaluate potential impacts on the operators' ability to implement abnormal or emergency operating procedures.

b. Issues and Findings

There were no findings identified.

R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed the results of post maintenance tests associated with HPCI system preventive maintenance on two limiter torque operators, A service water pump corrective maintenance, and A EDG planned maintenance. The inspectors also reviewed notification 20037601 concerning problems identified during a post maintenance test.

b. Issues and Findings

There were no findings identified.

R22 Surveillance Testing

a. Inspection Scope

The inspectors observed portions of and reviewed the results of a HPCI surveillance test and a reactor recirculation flow channel calibration. The inspectors also reviewed notifications concerning problems encountered during surveillance testing (20037468, 20038621, 20039291, 20039446, 20040467, 20040655, 20040937, and 20041324).

b. Issues and Findings

There were no findings identified.

4. OTHER ACTIVITIES [OA]

OA1 Performance Indicator Verification

a. Inspection Scope

The inspectors verified the accuracy of *Unplanned Scrams per 7,000 Critical Hours*, *Scrams with a Loss of Normal Heat Removal*, and *Unplanned Power Changes per 7000 Critical Hours* performance indicators for the period July 1, 1999, through June 30, 2000. The inspectors reviewed licensee event reports, monthly operating reports, NRC inspection reports, and PSEG Nuclear's Sky Line power history charts.

b. Observations and Findings

There were no findings identified.

OA2 Identification and Resolution of Problems

The inspection findings in previous sections of this report also had implications regarding PSEG Nuclear's identification, evaluation, and resolution of problems, as follows:

- a. Section 1R12 - Failure to take adequate corrective actions following a functional failure of a RHR suppression pool cooling valve.
- b. Section 1R13.1 - Following operations management's identification of a planning shortcoming, PSEG Nuclear did not take timely actions to control a HPCI outage commensurate with the on-line maintenance risk.

Additional items associated with PSEG Nuclear's corrective action program were reviewed without findings and are listed in Sections 1R04, 1R05, 1R06, 1R11, 1R13.2, 1R14, 1R16, 1R19, and 1R22 of this report.

OA5 Other

(Closed) IFI 05000354/1998-80-07: Potential single failure of HVAC systems due to fire damper closure. It was previously identified that the failure of certain fire dampers in the air supply or exhaust ducts could isolate air flow in the control area and diesel area battery exhausts, as well as the diesel area class 1E panel room supply. PSEG Nuclear stated that they considered the failure of these fire dampers to be a passive failure and that the NRC regulations governing the design of such systems do not specify under what conditions single failures of passive components in a fluid (i.e., air) system should be considered in the design. As noted in NRC Inspection Report 05000354/1998-80, a number of ways exist for operators to promptly identify the failure of these fire dampers. More importantly, except in severe summer weather conditions, the temporary loss of air flow to the areas noted would not have a significant impact on the affected plant equipment. In addition, PSEG Nuclear engineering calculations showed that the temporary loss of ventilation exhaust flow from the battery rooms would not result in a build-up of hydrogen concentration to a hazardous level. Thus the overall risk significance of this HVAC design issue is minimal. Based on the minimal risk and the existing administrative measures in place to identify spurious fire damper closures in these ventilation systems and restore ventilation flow, this inspector follow-up item is considered closed.

OA6 Management Meetings

Exit Meeting Summary

On October 6 the inspectors presented their overall findings to members of PSEG Nuclear management led by Mr. Tim O'Connor. PSEG Nuclear management acknowledged the findings presented and did not contest any of the inspectors' conclusions. Additionally, they stated that none of the information reviewed by the inspectors was considered proprietary.

During this inspection, one non-cited violation was identified as discussed in the report. If PSEG Nuclear contests this NCV, a response should be provided 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 copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at the Hope Creek facility.

ITEMS OPENED AND CLOSED**Opened/Closed**

05000354/2000-007-01	NCV	Failure to take adequate corrective actions following a functional failure of a residual heat removal suppression pool cooling valve. (Section 1R12)
----------------------	-----	--

Closed

05000354/1998-80-07	IFI	Potential single failure of HVAC systems due to fire damper closure. (Section 4OA5)
---------------------	-----	---

LIST OF ACRONYMS USED

CDF	Core Damage Frequency
EDG	Emergency Diesel Generator
EQ	Environmental Qualification
HPCI	High Pressure Coolant Injection
HVAC	Heating, Ventilation and Air Conditioning
IPEEE	Individual Plant Examination for External Events
MOV	Motor Operated Valve
MPFF	Maintenance Preventable Functional Failure
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PI	Performance Indicator
PM	Preventive Maintenance
PSA	Probabilistic Safety Assessment
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
SDP	Significance Determination Process
SRO	Senior Reactor Operator

ATTACHMENT 1

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety	Radiation Safety	Safeguards
<ul style="list-style-type: none"> ● Initiating Events ● Mitigating Systems ● Barrier Integrity ● Emergency Preparedness 	<ul style="list-style-type: none"> ● Occupational ● Public 	<ul style="list-style-type: none"> ● 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 that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance

(as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

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